FORSVARET

UD 2-1E The Norwegian Armed Forces Safety Rules and Regulations for Land based military activities

Valid for 2024/2025 Rev 2

UD 2-1 Armed Forces Safety Rules and Regulations.

ABOUT UD 2-1

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FOREWORD

Foreword by the Chief of the Norwegian Army's (CNoA)

I hereby stipulate *UD 2-1 The Norwegian Armed Forces' safety provisions for land-based activities* for use in all land-based operations. UD 2-1 sets out the minimum requirements that allow us to operate, instruct, train and conduct exercises as safely as possible. We will identify hazards, and reduce and manage risk. This will be achieved by means of good safety culture, clear leadership, training and competence, reporting and experience-based learning. The aim of our safety provisions is to reduce risk in all our activities and they therefore apply both during peacetime and in times of war, in Norway and abroad.

We will continuously develop the safety culture and maintain a focus on safety management. Safety is the foundation of all our training, operations and other activities. Our commanders must be strong and prepared, and personally involved in safety work. Good tactical plans include risk management. Safety is ensured by combining the expertise of officers and specialists when managing risks, and planning and implementing training and operations.

There may be deviations in accordance with point 0.1.3 Deviations. Commanding officers must not allow the safety regulations to prevent their units from completing missions authorised by Instructions for military officers and military commanders in the event of an armed attack on Norway, or during operations abroad.

I am confident that commanders and individual soldiers will all exercise good judgement in complying with UD 2-1 in such a way that our activities contribute to a strengthened defence.

Lars S. Lervik, Chief of the Norwegian Army

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0 INTRODUCTION AND DEFINITIONS

0.1 INTRODUCTION

0.1.1 Purpose

0.1.1.1 The purpose of UD 2-1 can be divided into three components:

- Minimising the risk of injury and loss of life.
- Ensuring the competent authority of the chief of the Army for land-based operations.
- Setting requirements in the form of safety regulations for land-based military instruction, training, exercises and operations.

Land-based operations are associated with certain dangers and risks. Successfully fulfilling the most demanding task given to the Norwegian Armed Forces by the government, the defence of the Norwegian Kingdom, requires realistic and tactically challenging training. Realistic training requires the Norwegian Armed Forces to find a satisfactory balance between risk and safety. The requirements and the UD 2-1 safety regulations represent absolute safety barriers that protect against dangers and support commanders in finding a balance between safety and risk.

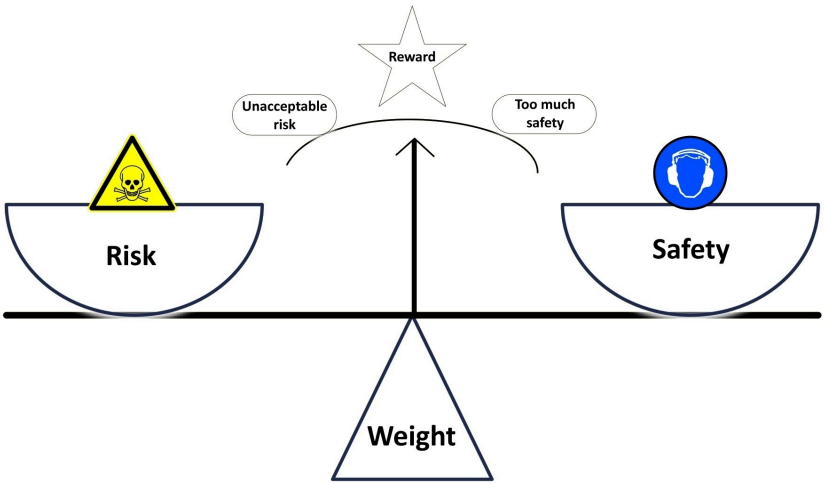


Figure: 0.1

The balance between risk and safety

0.1.2 Scope and extent

0.1.2.1 The regulations apply to land-based operations in Norway.

0.1.2.2 The regulations apply to forces operating abroad under the command of the NJHQ commander or the tactical force commanders.

0.1.2.3 The regulations have precedence before instructions for field firing ranges and training grounds, and provisions issued in regulations, operating instructions, procedural descriptions and drills.

0.1.3 Deviations

0.1.3.1 In general

Deviations from the safety regulations are permissible when required due to self-defence, the principle of necessity or to other special circumstances. Special circumstances may arise where it is safer to deviate from a safety regulation than to adhere to it.

An application for deviation from UD 2-1 is submitted on a separate form, see Appendix 26. Application procedure is described in point 0.1.3.3.

0.1.3.2 Deviation – operations in and outside Norway.

In the absence of other provisions issued by the NJHQ commander or the tactical force commanders (the commanders of the Norwegian Army, the Royal Norwegian Air Force, the Royal Norwegian Navy, the Norwegian Armed Forces Special Operations Command, and the Norwegian Home Guard), the following guidelines are applicable for Norwegian forces conducting operations:

1. UD 2-1 applies, though with deviations for special operational needs. Special operating needs are deemed to be present when:
   a. a department receives an order to carry out a mission requiring a special course of action involving specific breaches of safety regulations, or
   b. when it is safer to deviate from a safety regulation than it is to adhere to it.
2. This is particularly the case for artillery and mortars: If a deviation is approved, “war mode” is used on the fire control system for artillery and mortars, and safety distances calculated based on 0.1 % probability of incapacitation (PI) will then be used.

0.1.3.3 Deviation Instruction, training and exercises in and outside Norway.

Deviation from the safety provisions may be issued in connection with instruction, training and exercises (ITE) in Norway or abroad. For departments with an operational need to deviate from UD 2-1, the following procedure applies:

- An application for deviation from UD 2-1 is sent through official channels to a competent authority in accordance with Appendix 27 allocation of competent authority.
- The competent authority must provide a written technical recommendation for the application based on the need, documented risk management, training standard, proficiency and an approved plan for the activity.
- Having received the competent authority’s recommendation, commanders may, in accordance with 0.1.3.4, allow the application to deviate from UD 2-1. The decision must be documented and archived.

The following people must be copied in to the document allowing deviation from UD 2-1:

- The Army safety inspector.
- Safety inspector or equivalent in each operating unit in the Norwegian Armed Forces.
- The respective competent authority.

0.1.3.4 Authority to allow deviation

The following commanders in the Norwegian Armed Forces are authorised to allow deviation from UD 2-1:

- NJHQ commander for forces OPCOM to NJHQ in Norway.
- Senior Norwegian Representative (SNR) abroad under the command of the NJHQ commander or the tactical force commander. The SNR may allow deviation if the SNR instruction allows for this. If possible, the SNR should confer with NJHQ before a deviation is allowed. This authorisation applies only during operations, and not for exercises, peacetime service such as Peace Establishment (PE), or other postings abroad where no operations are being conducted.
- Commander-in-Chief of the Army
- Commander-in-Chief of the Navy
- Commander-in-Chief of the Air Force
- Commander-in-Chief of the Home Guard
- Chief of the Norwegian Armed Forces Special Operations Command
- Commander of a common division if the commander is a brigade commander/ commodore or higher.

0.1.4 Responsibility for the safety regulations

0.1.4.1 By virtue of his competent authority, the chief of the Army has responsibility for distributing UD 2-1 and for instruction and training in the use of the safety regulations. This competent authority entails responsibility and authority to conduct supervision throughout the Norwegian Armed Forces prior to land-based operations. This inspection authority also applies to foreign forces training in Norway.

0.1.4.2 The competent authority is responsible for drawing up, revising, and publishing the safety regulations in UD 2-1.

0.1.4.3 Commanders and officers in charge undertake to ensure that the personnel under their command are made aware of the safety regulation, including any changes, and that there is compliance with these.

0.1.5 Responsibility for revision of provisions, announcement and publication

0.1.5.1 Responsibility for drawing up new regulations and revising current regulations

The chief of the Army has delegated the authority to prepare and update UD 2-1 to the Army Safety Inspector, Commander of the Army Weapons School (HVS) and other competent authorities within their respective areas of responsibility. (See Appendix 27,

Allocation of competent authority.) The Army Safety Inspector has responsibility as the editor and publisher of UD 2-1. The operational safety section at the Army Weapons School, on behalf of the Army Safety Inspector, has day-to-day responsibility for follow-up for UD 2-1.

The Army Safety Inspector has a particular responsibility for ensuring that the regulations are developed in line with the safety policies of the Army and the Norwegian Armed Forces, and the Norwegian Armed Forces' operational needs. UD 2-1 contains a number of safety regulations that are outside the competent authority of the chief of the Army. The Army Safety Inspector has coordinating authority and responsibility for ensuring that safety regulations — outside the competent authority of the chief of the Army — that make possible safe training and operations in high-risk environments are included in UD 2-1.

0.1.5.2 Announcement and publication

UD 2-1 The Norwegian Armed Forces' safety regulations for land-based operations are announced and published on the Norwegian Armed Forces' intranet. The document can be found in the FOBID base under the regulation portal.

The published electronic version is the official and continuously updated and applicable version of UD2-1.

0.1.5.3 Revision and corrections

UD 2-1 is revised every other year and is issued in January in years with even numbers. The electronic version of UD 2-1 is continuously updated in response to operational need, discovered errors, or introduction of new safety regulations. The operational safety section at the Army Weapons School is responsible for continuous updating on behalf of the Safety Inspector.

If revising, correcting or introducing safety regulations, the competent authority must ensure that this is subject to particularly thorough assessment. Depending on the change, the competent authority must assess the need for: impact assessment, consultation rounds and submission for legal or other technical review. Final proposals are sent to the chief of the Army via the Safety Inspector for approval.

The correction procedure for corrections is described under the chapter allocation of competent authority.

Words in red type are defined under point 0.2 Definitions.

All changes since the previous revision are indicated in UD 2-1 by a grey background.

All changes since the previous main revision are indicated in UD 2-1 by a red background.

0.1.5.4 Annulment of safety regulations

During the revision process, the competent authority is required to assess the safety regulations and annul any that are not necessary. Safety regulations in UD 2-1 must be annulled when the competent authority and the Army Safety Inspector consider it

appropriate to do so or when there is no longer an operational need for the regulation in question.

0.1.6 Safety announcements

Particularly important changes to safety regulations, drills and procedures, or an immediate suspension of activities, use of materiel, ammunition and explosives must be confirmed in a safety announcement. Only the Army Safety Inspector can issue and cancel safety announcements. In practice, the section for operational safety at the Army Weapons School has responsibility for this communication on behalf of the Safety Inspector.

The competent authorities may issue technical bulletins; the term safety announcement is used only in particularly important and time-critical instances where changes are introduced in order to avoid loss of life, serious injury to personnel or serious damage to materiel.

0.1.7 Certification

0.1.7.1 See definition

Certification entails documenting the proficiency and qualifications in the military conduct sheet, specifying the time frame and validity of the certificate.

An overview of applicable certification schemes for land-based operations may be found in Appendix 25. The overview is updated in accordance with the overview of competent authorities.

0.1.8 Qualification

0.1.8.1 See definition

The commanding officer in charge decides who is qualified based on an assessment of experience, and formal and actual competence. The commanding officer is required to document which personnel are qualified to direct activities or provide instruction in different types of materiel and disciplines. The requirement of documentation in this context is limited to high-risk activities and to within what the commanding officer considers reasonable.

0.1.9 Materiel safety

0.1.9.1 Safety-approved materiel.

All durable materiel requires final or provisional approval for use in the Norwegian Armed Forces (GFB/GFB-M), or else be approved for testing and trial operation (GFB-TP) before it is taken into use by divisions, see Provisions for materiel administration in the Norwegian Armed Forces (BMF) and Directive for materiel administration in the defence sector (the Materiel Directive)

0.1.9.2 References to overarching regulations for materiel safety:

- The Ministry of Defence guidelines for materiel management in the defence sector and guidelines for materiel safety in the defence sector.
- Directive for materiel administration in the defence sector

- Provisions for materiel administration in the Norwegian Armed Forces (BMF)
- Direktiv for trygging [Directive on systematic HSE work]

0.1.10 Testing and development and introducing new activities and materiel types

0.1.10.1 The Norwegian Armed Forces are in continual development. This entails developing new techniques and testing and trialling new materiel. It is important that the provisions address this requirement, as well as the safety of personnel and the Norwegian Armed Forces' operational needs. This is addressed by means of the competent authority's technical and administrative approval (TFG) and the user representative's approval prior to use (GFB).

0.1.10.2 When using materiel or personnel for testing and development, GFB must describe as a minimum and ensure that the following is in place:

- Basic descriptions of concept/technique/procedure/use (regulations, procedural descriptions, necessary certification requirements and training programmes).
- Necessary training given and documented.
- Safety provisions must be reviewed and approved by the Safety Inspector.
- Risk-assessment must be completed and failure criteria specified.
- The respective tactical force's commanding officer must be informed directly or via their safety inspector.
- The commanding officer must be informed and have approved the sue of their own personnel or materiel.
- When testing weapon systems and ammunition under development, Appendix 22 also applies.
- If testing and development entails deviation from UD 2-1, point 0.1.3 applies.

0.1.11 Modifying/reconfiguring materiel

In general:

- It is prohibited to modify, re-configure or adapt all types of ammunition, explosive and pyrotechnic firing markers.
- It is prohibited to modify or re-configure materiel without the approval of a competent authority.
- Materiel and equipment may be adapted as long as this is done within an acceptable risk and it is approved by an commanding officer .
- See also point 0.2 Definitions, Modification/Reconfiguring.

0.1.11.1 Materiel in the Norwegian Armed Forces shall not be used beyond the restrictions stipulated in Acts, regulations or military regulations.

Material shall be managed in accordance with the Directive on Material Management in the defence sector (the Materiel Directive published by the FMA).

0.1.11.2 All proposed modifications and/or reconfigurations must be submitted to an authority with competence for materiel (Defence materiel, FMA). This is submitted through official channels and requires approval by a change/technical board before required

modifications/reconfigurations are made by approved workshops and technical personnel.

Army operational needs for modifications/reconfigurations to materiel discussed in UD 2-1 can be submitted via Fis-B to **Army Suggestions Box (postbox)** in accordance with Routine for processing proposed changes in the Army (see DL 2018025755 the Army Suggestions Box). Suggestions will be assessed and discussed by the change board made up of technical personnel from user level, competent authorities and competent authority materiel.

A copy is sent to THE ARMY SAFETY INSPECTOR (postbox)

Before using modified/changed materiel, the competent authority (see Appendix 27, Overview over Professional Responsibility) shall determine whether applicable safety regulations, training programmes and valid documentation are adequate as a consequence of the modifications/changes to the materiel.

0.1.12 Joint operations with foreign forces

0.1.12.1 Prior to joint operations with foreign forces, relevant safety regulations must be reviewed and coordinated between the parties.

0.1.12.2 For operations abroad, it is the strictest regulations that shall apply to Norwegian personnel. If necessary, deviation from UD 2-1 can be applied for in accordance with 0.1.3. If UD 2-1 sets out stricter requirements than local regulations, it must be considered whether other countries' operations may involve a greater risk to Norwegian personnel. If this is the case, measures must be identified and implemented to ensure that an acceptable level of risk is maintained.

0.1.12.3 For operations in Norway, UD 2-1 is at all times applicable to Norwegian personnel. Foreign forces must comply with UD 2-1 as a minimum, though they are free to determine whether their own regulations are to apply to their personnel if they are stricter than Norwegian regulations. If foreign forces are unable to comply with UD 2-1, for example due to requirements for equipment, measures must be implemented that produce an effect that is equivalent to the relevant points in UD 2-1. These measures must be approved by Norwegian OCE.

0.2 DEFINITIONS

Ammunition

A common term covering all kinds of weapons that can be sent in a ballistic or guided path, such as projectiles, rockets, shells, torpedoes, bombs and guided weapons with the necessary propulsive charges, igniters, fuses, detonators and charges, chemical charges or charges made of other substances. In its broadest meaning, the term is not limited to weaponry as mentioned above, but also includes pyrotechnical devices that can be used for illumination, warning, marking, saluting, exercises, training, hunting or sport.

Commanding Officer (CO)

The commanding officer must hold an officer's rank. The commanding officer has day-to-day command of a unit and has limited or full disciplinary authority by virtue of their position. Officers commanding have positions as company commander (or equivalent) and higher. In UD 2-1, officers commanding are never lower than company level. UD 2-1 must specify in which cases activities require approval by commanders with full disciplinary authority. Battalion commanders (or equivalent) and higher have full disciplinary authority.

Work equipment

Technical devices etc. such as machines, lifting equipment, safety components, containers, transport devices, apparatus, installations, tools and any other item used in the manufacture of a product or in the performance of work.

Failure criterion

A failure criterion is a pre-determined criterion in the risk-management process that involves an immediate stop of the activity/operation, after which it is discontinued in its entirety.

Unit weapons

Unit weapons are taken to mean the 84 mm recoilless rifle, the Javelin (antitank missile system), MMG (7.62 mm medium machine gun), HMG (12.7 mm heavy machine gun), GMG (grenade machine gun), and 81 mm mortar.

Decision point

Defined by the *Staff handbook for the Norwegian Army—the planning and decision process*. Used here as part of a risk-management process in order to identify a time, event, space or object that requires an officer conducting the exercise (OCE) to make a risk decision and adjust the activity in order to restrict the residual risk to an acceptable level.

UXOs

UXOs ammunition which, having been fired, thrown or dropped, or where an attempt has been made to ignite them in some other way, have not functioned normally as intended. The following are also to be considered UXOs:

- ammunition that has been damaged in fire or tossed around due to explosions, damaged ammunition that can represent a risk

- ammunition that has been found

UXO zone

'UXO zone' refers to a restricted zone inside firing and training grounds, in which firing, throwing and demolition exercises are being carried out, or have been carried out, using ammunition and explosives which may result in UXOs.

Bridge-planning

This refers to the entire planning and preparatory phase required prior to bridge-laying.

Bridge-laying

Physical establishment of a structure for use by personnel and/or vehicles in crossing a gap.

Should

Should is used in UD 2-1 where a competent authority has formulated a safety regulation that may reduce risk but where it is still possible to carry out the activity without following what comes after "should". Where the word "should" is used, this is the principal rule. An commanding officer must decide whether there is to be deviation from the "should" rule.

The individual

Here, the individual is taken to mean: any military personnel member, including officers, recruits, conscripts or civilians, who directly or indirectly participates in the activity (applies also to onlookers and observers).

Detonation

A detonation begins with a pressure wave, a condensing shock, caused by an initiating device, for instance a blasting cap. This pressure wave moves through the explosive compound at a speed which is greater than the speed of sound and is followed by the chemical transformation. The speed of detonation varies between approx. 1,500 and 9,000 m/sec.

Detonator

A component in an explosive train which can be made to detonate either by electrical or mechanical impulse, by a flame or glowing fragments from a deflagrating substance. Its purpose is to initiate a stable detonation in the following link in the train.

Double check

This applies to artillery and mortars: Double checks must be used in all transmission and entering of data relevant to the firing of artillery and mortars that occurs verbally or between systems. Double checks require a minimum of TWO people to be performed correctly. The recipient must read out transferred data from received data or cleared ammunition to the sender. The sender checks by looking at their data while it is read back to them.

Exercise ammunition

Exercise ammunition is ammunition intended for use in loading exercises, drills etc. Exercise ammunition contains no explosive, pyrotechnical or other dangerous substances of any kind.

Explosives

A substance or mix of substances intended to initiate an explosive or pyrotechnical effect. The term does not apply to an explosive atmosphere of gas, vapour or dust.

Explosive ordnance disposal

EOD (Explosive ordnance disposal). Explosive ordnance disposal (EOD) means all duties connected to the search, tagging, reporting, removal or destruction of UXOs or other ammunition that must be removed from a field firing range or areas outside a field firing range. The removal/destruction of improvised explosive devices (IEDs) is regarded as EOD. Destroying discarded/out-dated ammunition is not considered EOD.

Explosion

The mechanical and heat effect from the chemical reaction within an explosive substance during a detonation or deflagration in a confined space. The term “explosion” may also be used as a common designation for detonation and deflagration in a confined space.

Modular bridge

Bridges consisting of module-based components that can be assembled and disassembled multiple times. In addition, the components have multiple uses in the bridge system. The Bailey bridge system is the Norwegian Armed Forces’ current modular bridge materiel.

Hangfire

A hangfire is a delayed combustion of an igniter or charge during firing. The length of the delay cannot be predicted, but in most cases it will be somewhere between a fraction of a second to several minutes. As it is not possible to distinguish between a hangfire and a regular misfire, a misfire must be considered a hangfire, and the precautions and time intervals for that specific weapon/ammunition type must be complied with.

Misfire

A misfire is an explosive or an explosive charge that does not detonate on attempted ignition. A misfire may also be a total failure to function during firing. A misfire may be caused by a faulty triggering device or a faulty ignition charge or main charge. A misfire is in itself not dangerous, as long as it does not occur in a weapon/automatic weapon that is hot from firing, when special precautions apply which can be found in the relevant weapon regulations. Since a misfire is not immediately distinguishable from a hangfire, it must be treated as a hangfire until it has been determined whether or not it is a fail.

Fragment

All or parts of a projectile which, following an initial hit, do not retain their ballistic properties and stability. Fragments have unpredictable direction and trajectory, though reduced range. See also ricochet and secondary splinters.

Gel

Gel is used here to mean a fire hazardous material with a semi-solid consistency, usually a liquid to which a thickening agent has been added.

General support bridge

Provides mobility support to patrol routes and is used as a replacement for combat support bridges when a higher number of load transfers is required. These bridges primarily have a span of less than 40 metres and are capable of handling significantly more load transfers than combat support bridges. Some bridge systems permit construction of bridges over several spans.

Approved floatation equipment

- **Category 1** Recreational activity: Normal clothing, calm and stable weather conditions, sheltered waters. Minimum life jacket according to individual weight
- **Category 2** Duty near/on water. Regular uniform, floatation device with minimum buoyancy 150 N
- **Category 3** Offshore operations
- **Category 4** Heavy clothing (Body armour). Minimum 275 N

High Explosives

An explosive substance which in normal use gives the characteristic effects of a detonation.

Non-Explosive but dangerous substances

Substances which when used in combination with certain ammunition types can cause special effects. Example: White phosphorous.

Firing sector

The firing sector (right, left limitation) gives the greatest (smallest) sideways horizontal traversing and is either given as a direction in the terrain, as a compass direction or as an aiming point and with a horizontal traversing from this.

Firing position

The position from where a weapon is fired.

Improvised bridge

A bridge that comprises available construction materials, whereby the typical rigidity of such materials is classified by technical military personnel. Relevant in areas where Eurocodes, national standards and regulations in respect of the rigidity of the materials are absent.

Improvised Explosive Devices (terror bombs)

IED (Improvised Explosive Devices). Improvised explosives (terror bombs) refer to charges made and placed or intended to be placed, and that made to kill, disfigure, harass and/or disturb persons or groups of personnel, or to destroy and/or occupy private or public property. They contain explosives or an explosive, gaseous, pyrotechnical and/

or igniting chemicals. They can consist of or contain military materiel but are frequently made from non-military materials.

Infantry weapons

Weapons with a calibre of 12.7 mm or smaller.

Combat support bridge

Offers direct mobility support to combat units through rapid bridge-laying. Such bridges have a relatively short span (less than 30 metres).

Classification of severity in the event of accidents and incidents

The Norwegian Armed Forces' classification of severity for accidents and serious incidents and governs the scope of any investigation. See Appendix G for Provision regarding investigations of accidents and incidents: Guidance in the use of the HFACS model in investigative work and cause classification in FIF [common integrity management] incident management system. The document is available in FOBID.

Short range training ammunition

A shell in which everything but the shell bottom is made from plastic. The shell casing and the projectile is cast as one piece with a breakage point that ensures the projectile breaks loose from the casing and is fired in a ballistic path. At short ranges the projectile has about the same ballistic properties as a live round. Even though the light weight of the projectile results in a much shorter range, and the danger area is considerably smaller, the short range shell is still considered a live round. *Short range training ammunition with tracer*. This is identical to the above ammunition, but with an aluminium tracer cap embedded in the projectile.

Qualification (qualified personnel)

Personnel with formal and practical expertise and experience in directing an activity, operating materiel, providing instruction in individual or collective disciplines, and in using and operating military materiel where there is no requirement of certification. See also certification.

Light All-Terrain Vehicles, Summer, LTV/S

LTV/S (4 and 6 wheel ATVs) are systems comprising both vehicles and trailers, with the system as a whole configured for special use by the Norwegian Armed Forces.

Light All-Terrain Vehicles, Winter, LTV/W

LTV/W (Snowmobile) are systems containing both vehicles and sleds, with the system as a whole configured for special use by the Norwegian Armed Forces.

Logistic support bridge

Provides mobility support to main supply routes (MSR) and lines in which the heaviest materiel is being transported (MLC higher than 80). These bridges have a span of more than 40 metres and have sufficient capacity to support every type of vehicle in the field.

Barrel safe fuse

Barrel safe fuses are fuses constructed in such manner that the projectile cannot explode in the barrel or at the muzzle and thereby causing injury to personnel (crew).

Blank ammunition

Blank ammunition refers to all types of ammunition meant to mark or simulate gunfire. Blank ammunition normally has no projectile that leaves the barrel.

Maritime safety officer (MSO)

The MSO is an officer who defines and directs the safety service for assignments involving boat and ferrying operations. The MSO support the OCE in planning and conducting maritime activity, is required to approve boat and ferrying operations, and defines how safety is to be maintained in the prevailing circumstances. MSO replaces the term *sea safety officer*.

Materiel

Military materiel, including technical materiel and systems, of all categories that are approved for use by a competent authority and supplied to units by the Norwegian Armed Forces supply or procured by the units themselves.

Mines

A mine is an explosive device designed to be placed under, on or above the ground and which is triggered by presence, proximity or contact with a person, vehicle, aircraft, maritime vessel or landing craft.

Modification/reconfiguration:

A change to the functional or physical characteristics of the materiel/system. For technical materiel, the following definition applies: All changes to technical materiel beyond approved configuration as indicated in TH-10, or in accordance with issued materiel technical orders (MTO) issued by a competent authority.

Authority

Power, right and duty to issue requirements, make decisions, put into effect rulings/ decisions, check and enforce applicable laws, instructions and regulations within a given area of responsibility.

Target area

The target area is a part of a field firing range towards which fire can be directed from a specific firing position using predefined types of weapons. The limitations of the target area must be defined in the instructions for each specific range and will be visibly marked in the terrain where practically possible. The target area is to be chosen so that the risk of UXOs is as small as possible. Targets are established in the target area based on the user’s needs and possibilities. Based on the target area, the dangerous area is defined by using the safety template(s) for the weapon(s) allowed at that specific range.

Near-accident

Near-accidents are defined as situations in which slightly different circumstances could have resulted in injury, serious event or accident.

Intermediary charge

The intermediary charge is a high explosive component of the explosive train between the detonator and the main explosive charge. Its purpose is to boost the shock-wave from the detonator so as to ensure a reliable initiation of the main charge.

Operational safety

All systematic work on safety and risk with the aim of optimising performance and effectiveness, thus reducing the risk of loss and undesired events in military operations and activities.

Peace mode

Particularly for artillery and mortars: A mode in the firing system for artillery and mortars, ODIN FSS, meaning that the system uses peacetime safety templates during live fire exercises.

Pyrotechnical ammunition

Ammunition which, in addition to containing combustible substances, also contains chemical ingredients that cause fire, light, smoke or sound. Under certain conditions, pyrotechnical ammunition can represent a risk of explosion.

RAPP

An abbreviation for the Norwegian Armed Forces' Reporting App for smartphones. Used for upgraded reporting of health, environmental and safety issues.

Reassessment

Reassessment here is linked to the risk-management process. Continuous reassessment of hazards, assessment of the risk of the hazard arising and that the risk-reducing measures have been put into operation and appear proportional in reducing risk. See also the STOP regulation.

Ricochets

A projectile that glances off a target or slope and which then adopts a new ballistic trajectory while retaining all or part of its ballistic properties. If the project is aerodynamically unstable following a ricochet, then it is not a ricochet, but a fragment.

Risk

Risk is the possibility of an undesired event occurring. Risk is understood as likelihood x consequence.

Risk-management

Risk-management is a five-stage method for managing risk. The process is also known as Operational Risk Management (ORM). The process is used by military units to identify risks, assess the risks, develop risk-reducing measures, make risk decisions, put them into operation and follow up the measures

Restricted ammunition

Ammunition that is subject to restrictions on use.

Secondary splinter

Part of a slope, target, vegetation or similar that flies off after being struck by a projectile, ricochet or fragment. See also ricochet and fragment

Self ignition

Self ignition of shells and grenades in a loaded weapon means one or more explosive components igniting due to high temperature in the chamber. In such cases it is most likely for the booster charge and the igniter to be set off prior to the explosives in the fuse or the shell. If this is the case, the weapon will fire more or less normally and at a normal speed. However, it should be seen as very important to avoid loading hot weapons, unless firing can be done immediately after loading. Under no circumstances is the round to be left in the chamber longer than the prescribed time for each weapon type.

Certification

Certification is a process that results in a certificate, technical approval and documentation of absolute and unalterable requirements in terms of knowledge and skills in operating materiel, practising, direction or providing instruction in a particular discipline or activity. See also qualification.

Safety

Safety is an absence of conditions that lead to undesirable events, deviations or near-accidents / accidents.

Safety limiter

A safety limiter is used to prevent a weapon being aimed too low, too high or outside the permitted firing sector limits. A safety limiter can be made from logs, sandbags, turf, firing stands etc. and placed so as to prevent the weapon being aimed in the wrong direction. This is checked by using the sight.

Simunition

A training system for hand weapons, such as MP-5 and pistols. The system can be used both for one-sided or two-sided exercises, and when hit will give a colour marking of the hit point. The system can be attached to service weapons or permanently mounted onto weapons to be used in simunition exercises. Ammunition for the MP-5 and pistols is the army 9 mm casing with an undercalibred, easily deformable, hollow light-weight plastic projectile which contains a soap-based water-soluble dye. It should be considered fresh produce, since the dye will dry up after some time. Dried-up ammunition is not suitable for two-sided exercises. At short ranges the projectile has about the same ballistic properties as a live round. It is absolutely necessary to use protective equipment, as without protection a hit from the ammunition may cause serious injury. The ammunition must not be confused with CQT Simunition, which is a live short-range round.

Avalanche risk area

Terrain where avalanches may occur. All snow-covered areas of a mountainside or slope, where the difference in height exceeds 5 metres, the slope is steeper than 30^{o} and where there is no dense forest og som ikke er dekket av tett skog.

Firing-ranges and training grounds

'Firing-ranges and training grounds' refers to all shooting ranges, field firing ranges, detonation zones and training grounds within or outside of military areas that are used, or have been used, by the Norwegian Armed Forces.

Shooting

Shooting refers to all kinds of shooting, including the use of blank ammunition, throwing of hand grenades, demolition and other similar exercises.

Restricted ammunition

Ammunition that is subject to a prohibition on issue and use.

Stand

A limited area in which there can be one or more firing positions.

The STOP rule

STOP stands for stop, think, orientate yourself, plan further action. The rule is intended to aid personnel in making continuous reassessments during activities or operations.

Radiation

Radiation sources have a considerable potential to cause injury and include ionising and non-ionising sources such as lasers, radar, jamming devices, radioactive, industrial and medical X-rays. The Norwegian Armed Forces make widespread use of materiel systems that include sources of radiation.

Swimming (personnel)

Crossing bodies of water with a depth greater than 1 meter or when personnel do not have sufficient footing or balance.

Adaptation of materiel and equipment

Personal adaptation of materiel and equipment with the aim of: enhancing operational effectiveness or personal user comfort, or reducing the risk of personnel injury, damage to equipment and materiel and detection by hostiles.

Safety

Systematic work for protecting personnel (life and health), materiel values and external environments against undesired events that might result in injury/damage and/or loss.

Issuer

The person, unit or similar that is assigned responsibility and authority to issue a directive, regulation or similar.

UTM Marking ammunition

A training system for hand weapons, such as MP-5 and pistols. The system can be used for both one-sided or two sided exercises, and when used will produce colour marking of the hit point. The weapon system can be attached to the service weapon or mounted permanently on weapons dedicated for UTM. Ammunition for the MP-5 and pistols is the army 9 mm casing with an under calibre, easily deformable, hollow lightweight

plastic projectile containing a lipstick-based water-soluble dye. At short ranges the projectile has about the same ballistic properties as a live round. The use of personal protective equipment is absolutely essential, as hits may result in serious injury of such equipment is not used. The ammunition must not be mixed up with UTM's live short-range ammunition.

Equipment

Personal clothing and equipment (PCE) — but not weapons — approved for use by a competent authority and issued by the Norwegian Armed Forces at the quartermaster stores or procured by the units themselves.

ITE

Abbreviation for instruction, training, and exercises. Normally used for peacetime service.

Wading (for personnel across all types of water)

It must be possible to maintain footing and balance when crossing water on foot with a maximum depth of 1 metre. If it is not possible to maintain footing and balance, swimming regulations must be applied.

War mode

A mode in the firing system for artillery and mortars, ODIN FSS, which means that safety distances of 0.1% PI are used.

Officer conducting the exercise (OCE)

Officer conducting the exercise (OCE) The OCE is the person who directs activities, including risk management. The OCE is appointed by an officer commanding. There must be an OCE during all activities. Any qualified officer or recruit, regardless of service position, can be appointed as OCE.

UD 2-1 Armed Forces Safety Rules and Regulations.

1 GENERAL SAFETY RULES AND REGULATION

1.1 INTRODUCTION

If UD 2-1 should prove deficient or if there are no safety regulations for an activity, it is the duty of the OCE, in consultation with the officer commanding, to exercise good judgement before starting the activity. In all such cases, the activity must be based on a risk-management process. Where the word “should” is used in all subsequent chapters, this must be interpreted as the principal rule. An commanding officer must decide whether there is to be deviation from the “should” rule.

1.1.1 Land-based operations Risk-management

Figure: 1.1

The company commander visualises and creates understanding of the operation, including dangers, risk, and risk-reducing measures.

The Norwegian Armed Forces conduct realistic training and operate safely in high-risk environments; The Norwegian Armed Forces identify dangers, and reduce and manage risk.

1.1.1.1 Introduction

Operational Risk Management (ORM) is a five-stage process that consists of identifying and assessing dangers with associated risk, developing risk-reducing measures (safety barriers), making risk decisions and monitoring and evaluating the measures. Risk acceptance and risk decisions are a leadership task.

Commanding officers and/or officers in charge of exercises are required to risk-manage all activities and operations. An ORM process must be carried out before and during activities and the be evaluated afterwards. Risk-management must be conducted both vertically and horizontally in units in order to create a context and a comprehensive understanding of how to instruct, train and operate safely. It is important for risk-management is carried out at the correct level in order to ensure that everyone is aware of relevant dangers and risk-reducing measures for the activity to be carried out.

In order to instruct, train and exercise realistically and also operate safely in high-risk environments, it is necessary to reduce and accept risk. Land-based operations in themselves — even without hostile involvement — involve dangers and high-risk environments. Dangers and risks in the course of training, such as the risk of avalanche and detonation radius, are the same as during live operations. A possible difference is that officers commanding might accept greater risk during operations compared to during training.

In order to improve the standard of training as much as possible, it is essential that such training is based on a good safety culture. A good safety culture achieves a good balance between risk and risk-reducing measures so as to avoid imbalance in either direction. In order to achieve this balance, officers commanding and/or officers in charge of exercises must create understanding of the dangers and risks — a risk awareness — in the context in which the activity is taking place. As with situational awareness during training and operations, risk awareness must be created and continuously maintained. The aim of risk-management, safety culture, and risk awareness is to fulfil the intention in the Norwegian Armed Forces' safety policy, reduce risk to an acceptable level that is in proportion to the intent and purpose of the training or operation. Success with the above helps to improve the standard of training and a unit's relative fighting strength.

1.1.2 Risk-management (Operational Risk Management (ORM))

1.1.2.1 The risk-management process / ORM process

The description of the process can be found in the publication Risk-management Compendium (link FOBID). A concise check-list if provided below. For details and instruction in the process, see the publication. It is a requirement that officers commanding and officers in charge of exercises complete ORM for all activities.

1.1.2.2 Visualisation of the five stages in the risk-management process.

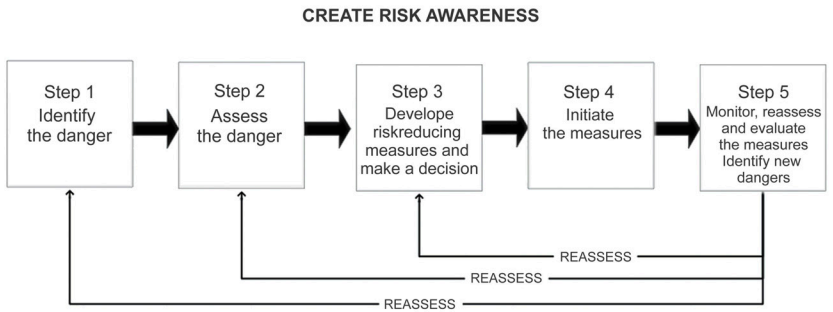


Figure: 1.2
The risk-management process (ORM)

1.1.2.3 Operationalisation of risk-reducing measures.

All risk-reducing measures must be operationalised in connection with the activity or operation. These are steps 4 and 5 in practice. Operationalisation means creating and maintaining a collective risk awareness. This is done by orientating the participating personnel and incorporating the risk assessments and measures into an exercise/ operations order.

One way in which to create understanding of dangers and good risk awareness is to use the same method as would normally be used to issue orders and visualise operations. Dangers and risk-reducing measures can then be included when going through the plan. Visualisation of relevant dangers on order sheets, map overlays, model tables, sketches and slides creates risk awareness. In order to re-assess dangers and measures while also maintaining and increasing risk awareness during an activity or operation, this can be included as part of the tactical crosstalk over radio and during coordinating meetings.

1.1.2.4 Continuous re-assessment of risk-management

Three tools have been developed for supporting continuous re-assessment. The suspension criterion is the highest level of re-assessment and involves immediately discontinuing the activity and then suspending it in its entirety. All suspension criteria must be known to all participating personnel. Similar help questions used by the Norwegian Armed Forces when using force in live operations can be used:

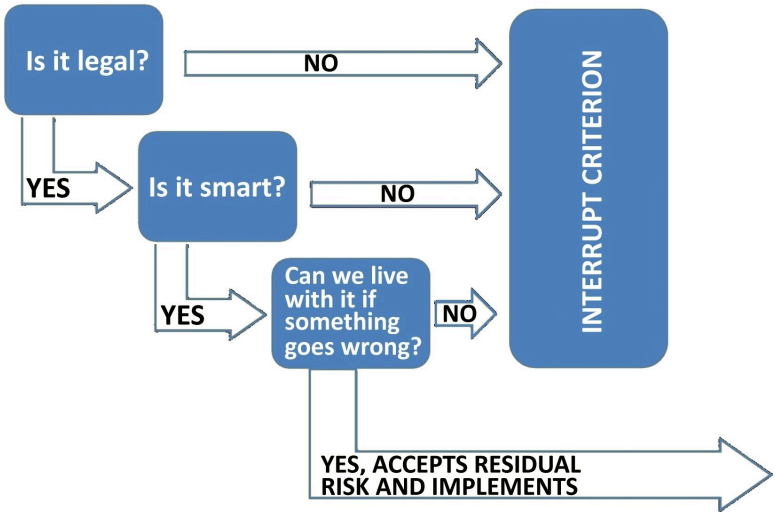


Figure: 1.3

Help questions for defining a suspension criterion

Decision point is the middle level of re-assessment, and it is used in the same way as when planning and conducting operations. In this context, especially for creating an awareness regarding how a situation or status arises in which the risk-reducing measures

no longer produce the desired effect, in which case a risk decision must be made and the activity, or parts thereof, must be adjusted before proceeding. A decision point may mean implementing the STOP rule.

The STOP rule is the lowest level of re-assessment, and it is used when a situation or status arises that has not previously been identified as a suspension criterion or decision point. STOP stands for:

1. STOP – Temporarily stop the activity you are engaged in.

2. THINK – Break off from what you are doing and gain an overall view of the situation.

3. ORIENTATE YOURSELF – Re-assess the situation and the conditions around you.

4. PLAN – adjust the plan or formulate a new plan. Continue the activity.

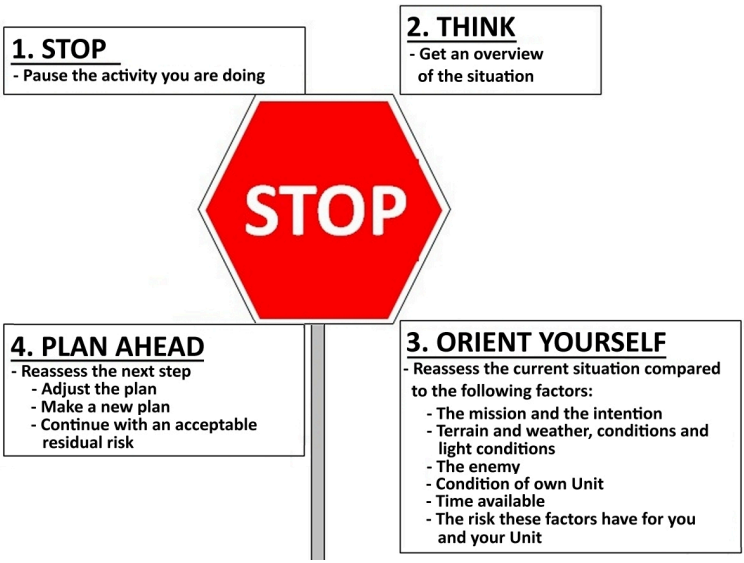


Figure: 1.4
Visualisation of the STOP rule

1.1.2.5 Concise check-list for the risk-management process (ORM).

1. Identify dangers;
   a. Identify all potential and relevant dangers associated with the activity/ operation.
   b. Identify possible causes for the dangers arising.
2. Assess the dangers;
   a. determine the consequences of the various dangers;
      1. insignificant – basically an absence of consequence.

2. low/minor – insignificant consequence.
3. moderate – may result in minor damage, minor illness, minor damage to materiel.
4. severe – may result in severe injury, illness and damage to materiel.
5. critical/very serious – may result in death and loss of important materiel.

b. determine the probability of the various dangers arising;

1. very improbable- the event will occur rarely or never.
2. low probability – the event will seldom occur.
3. moderate – probability the event will probably occur.
4. high probability – the event will eventually occur.
5. very high probability – the event will occur immediately or very soon.

c. make a provisional decision regarding various dangers based on consequence and probability.

3. Develop risk-reducing measures (safety barriers) and make a decision;

a. develop measures for reducing risk for the separate dangers;

1. prioritise measures that reduce dangers associated with high risk.
2. determine remaining risk.
3. make a decision regarding remaining risk.
4. identify and implement suspension criterion, decision points and use of the STOP rule.

4. Implement the measures;

a. operationalise the measures.

b. create understanding of the measures at all levels of the unit.

5. Monitor, re-assess and evaluate the measures. Identify new dangers;

a. ensure that the measures are implemented and complied with at all levels

b. re-assess dangers and measures and adjust the measures as required.

c. create continuous risk awareness.

Appendix 24, An ORM is used to implement and document the risk-management (Fobid: Form 1021 B Risk management).

1.1.3 The responsibilities and duties of personnel

Figure: 1.5
Respect the responsibility for safety.

1.1.3.1 In general

Good tactical plans include risk assessment. The plan identifies dangers, and reduces and manages risk in all activities. Thoroughness means safety. Thorough work on planning, implementation and evaluation of activities and operations creates safety.

1.1.3.2 The responsibilities and duties of the individual

See chapter 0.2 for a definition of the individual. In order to reduce risk when implementing activities, the individual must:

- Respect and comply with safety regulations.
- Be aware and take responsibility for their own safety and that of others.
- Be aware of the dangers, risks and risk-reducing measures for the activity they are conducting and have an understanding of what it is they are doing.
- Have the necessary expertise for using and handling the materiel they are using, know the risk from incorrect use, and be able to perform correct procedures, drills, manipulation and handling in the event of functional failure of materiel, weapons, ammunition and explosives.
- Report near-accidents, undesired events, accidents and breaches of safety regulations as in point 1.1.5
- Be aware of the safety regulations for the activity and check their safety equipment before the activity begins.

No personnel are permitted to handle materiel, weapons, ammunition or explosives on their own:

- until the individual has acquired sufficient knowledge of and proficiency in safe handling and is familair with the safety regulations that apply to use of the relevant materiel and techniques

- if the individual is under the influence of alcohol and/or drugs
- If the individual does not feel sufficiently competent. The exception in this respect is during mastering and selection exercises in which, following a risk assessment, responsibility can be transferred to the OCE.

Anyone who feels unqualified shall notify his/her immediate superior.

The individual shall demonstrate caution in the use of materiel, ammunition and explosives. The individual has a duty to intervene in the case of any improper handling of materiel, ammunition and explosives, and use that contravenes prevailing safety regulations.

It is the responsibility of the individual to use weapons, equipment and techniques in accordance with procedures and drills, and also to practise combat drills and combat techniques correctly, providing satisfactory training has been given beforehand.

1.1.3.3 The officer's special duties

Before activities are started, the commanding officer must ensure that the individual is suited for and is familiar with the safety regulations for the activity. Anyone providing instruction or conducting training and exercises shall be qualified for, and have in-depth knowledge of the handling and use of the materiel and techniques that are the subject of instruction, training or exercises, and also of the relevant safety regulations. If any officer who is ordered to plan, direct or carry out activities considers themselves unqualified, he or she must notify the officer commanding. The individual officer therefore has a responsibility to assess their suitability. OR 4 with the company commander school is defined as an officer in this context.

Officers assigned to to act as OIC of an exercise, firing commander, demolition commander, safety commander, ass. safety commander, safety supervisor or a similar role have a duty to familiarise themselves with the regulations relevant to the respective roles. All officers shall be familiar with risk assessment methodology (ORM).

All officers shall be capable of conducting a risk management process and of implementing this for every type of activity for which they are responsible.

The OCE shall ensure that measures from the risk management process are communicated and implemented through preparations and an adequate mission brief The OCE shall ensure that the activity is de-briefed in order to identify experiences and near-accidents.

All officers have a special responsibility to continuously assess risk. This entails re-assessing whether the measures are effective and making decisions about risk in the event of a change in conditions or in the situation.

1.1.3.4 The responsibilities and duties of the commanding officer

Every commanding officer and OIC of an exercise with responsibility for planning and implementation of activities, or for ordering activities to be carried out, must ensure that:

- assigned personnel have the correct expertise, qualification, and where required, certification for the task

- new personnel are given the training required to be able to function in their positions
- personnel understand and use applicable safety regulations for the activity, materiel or ammunitions and explosives to be used
- suitable training areas/facilities/courses are at their disposal
- applicable instructions for the exercise area in question (shooting range, field firing range, exercise facilities or similar) are available and being used.
- correct ammunition, materiel and other resources are available to them
- exercising troops and safety personnel are given sufficient time to prepare
- the notification plan, action plan in case of accidents and medical plan are known and prepared, that the assigned medical materiel is present, and that the assigned protective equipment is used
- sufficient time is set aside for supplementary work for exercising troops and safety personnel

1.1.4 Activity management during instruction, training and exercises.

Figure: 1.6

The company commander directs combat operations

1.1.4.1 In general

These regulations apply during instruction, training and exercises. Activities shall only take place under the direction of an OCE. Officer in charge of the exercise is defined as any qualified officer or recruit, regardless of rank. The commanding officer shall ensure that the OCE is qualified, and certified where required, to direct the activity.

Depending on the scope of the activity, the OCE may assign (or be assigned) personnel with the following roles:

- Firing commander (demolition commander)
- Safety commander:

In the case of complex activities, a safety commander would usually be assigned. The safety commander has under their command the necessary number of assistant safety commanders, safety supervisors and safety guard posts

- Ass. safety commander
- Safety supervisors
- Safety guard posts
- Target officer with the necessary target personnel

Safety personnel must bear markings as ordered by the OCE. All safety personnel shall have access to materiel that can be used to signal their own position, e.g. a reflective vest, white light, signal pistol or flag. The use of marking must be assessed and implemented as part of the risk-management process.

During less extensive activities, the OCE can take over the duties of the other roles. In such case, this decision shall be made based on a risk assessment.

1.1.4.2 Commanding officer

This role may only be filled by officers. It is the commanding officer who approves activities by means of the unit's internal procedures. Approval is given by means of day/ week slips, exercise orders or verbal communication. The commanding officer is not required to be present during activities.

Figure: 1.7

Commanding officer

1.1.4.3 The Officer Conducting the Exercise (OCE)

This role can be filled by officers or recruits. The OCE has responsibility for planning and directing activities in line with safety regulations and instructions.

The OCE has the following duties:

- Risk-managing the activity and creating understanding of risk-reducing measures for exercising forces and the safety organisation. It is the responsibility of

the OCE to ensure that minimum orders, a driving brief and safety a brief are conducted.

- Become acquainted with all relevant safety regulations for the activity.
- Ordering the use of protective equipment in accordance with the provisions, or which have been guided by a personal risk assessment.
- Coordinating and ensuring that others exercising or present in the vicinity do not affect or are themselves affected by the activity. Coordinating and implementing their own supervision and coordinating measures where necessary.
- Together with the local radiation protection coordinator, assess the danger of using material systems where radiation sources are included.
- Together with the local field firing range administration, assessing the danger of manoeuvring inside the target area and/or the UXO zone, and if this is done, assessing and implementing measures for ensuring the safety of participating personnel and materiel. See section 2.2.3 Transit across firing ranges and training grounds.
- Have access to first aid equipment and transport for the injured, with space to transport patients in a lying position, preferably on stretchers, as well as space for a handler/monitor at the side of the patient, in accordance with the provisions of the relevant activity and local instructions.
- Be familiar with local notification plans and meeting points. Be in possession of a telephone or communications equipment for rapid and effective notification/ evacuation.
- Have fire-fighting equipment in place as specified in the safety instructions for the relevant- range and training ground/training facility. Where feasible, the risk of fire shall be reduced as follows:
    - The appropriate choice of training ground/field of fire
    - The appropriate choice, use and handling of ammunition and materiel
    - If a fire should occur in an area defined as a UXO zone, all personnel must leave the vicinity immediately. Under no circumstances is it permitted to carry out fire fighting with personnel in such an area. In the event of fire, a UXO zone must be cordoned off and the fire permitted to burn itself out within this area.
- Cease all firing, abort any activity, when this is necessary for reasons of safety
- Where relevant, ensure that explosives and priming devices are in place for the blasting of UXOs and misfires and, at any given time, be aware of how to alert personnel who possess demolition certificates
- If special conditions should make the demolition of UXOs and misfires infeasible on the same day that activity is in progress, a report must be submitted as soon as possible to the field firing range administration, the area marked and a sentry duty considered

- Ensure that a report detailing use of ammunition/explosives (DBL 750) is completed after firing/demolition in accordance with the provisions of point 2.1.6.1 and Appendix 6A

Figure: 1.8

Officer in charge of the exercise

The OCE must be present throughout the exercise in such a manner as to be able to carry out the assigned tasks. If the OCE has to carry out other tasks outside the activity, the assistant OCE shall take over, or a new officer shall be designated. A change of OCE must be communicated to all personnel involved.

1.1.4.4 Firing commander/demolition commander

The firing commander/demolition commander is assigned from among qualified officers and recruits. Recruited personnel may be approved as firing commanders by the officer commanding from company level and higher. This assumes the recruit has undergone a minimum of 2 years' relevant service and possesses the professional and personal qualities that the officer commanding regards as being necessary for the task.

Recruits operating in the role of firing commander/demolition commander are subject to the same provisions in point 1.1.3.3 The officer's special duties.

The firing commander's responsibilities, duties and range of activities are stipulated by the OCE. The firing commander's other duties appear in Chapter 3: Firing and specific provisions for the respective weapons. The demolition commander's duties appear in point 2.4.2.3

1.1.4.5 Safety commander and safety officers

Safety officers are assigned from among qualified officers. Officers commanding can authorise recruits as safety commanders and assistant safety officers. Normally one safety commander is assigned to each ongoing activity. If multiple activities are taking place in immediate proximity to each other, such activities may be jointly assigned to one overall safety commander under the command of the OCE.

If the activities are not in immediate proximity to each other, or it is difficult for the safety commander to maintain an overview of multiple activities, further safety officers shall be assigned to provide support for the safety commander.

The safety commander is responsible for safety at all activity locations and during all activities; the safety officer is responsible for the safety of the activity he/she has been assigned to

The safety commander and safety officers shall have the required number of safety supervisors and safety sentries under their command.

The safety commander answers to the OCE for the following:

- hat safety officers, safety controllers and safety sentries are familiar with their duties, the activity, and have the proficiency and qualities necessary in order to function in their roles.
- That all activity is stopped or reduced when necessary for reasons of safety.
- That there is supervised collection of ammunition and explosives
- That all firing is within the set firing sector and set limitations in range
- Where firing takes place outside the sector, this shall be cleared with the OCE and field firing range officer, within the safety templates, and communicated to all other parties involved.
- That no-one enters the danger zone.

The safety commander and safety officers undertake the follow the regulations as set out in Chapter 2 and Chapter 3 and safety regulations for each specific weapon.

The safety commander is the superior officer for exercising personnel in matters concerning safety issues.

The safety commander must, if possible, remain in the vicinity of the OCE or be in direct communication with the OCE. Communication shall normally be established between the safety commander, safety officer, safety supervisor and safety post. The safety commander can, when appropriate, take over the duties of the safety supervisor.

1.1.4.6 Safety supervisor

The required number of safety supervisors shall be assigned from among qualified officers, recruits and conscripts. Personnel participating in the activity may not simultaneously serve as safety supervisors, with the exceptions as set out in the following. Safety supervisors shall not be assigned additional tasks.

The safety supervisor reports to the safety commander and is responsible for ensuring that the there is compliance with the safety regulations and for reporting near-incidents and safety breaches. Designated duties are described for the various activities/materiel types in the following chapters. The safety controller must not leave the weapon or the zone to which he/she has been assigned as long as the activity is in progress.

1.1.4.7 Safety sentries

Safety guard posts are assigned in accordance with the specific provisions of the OCE/ safety commander for a defined task, such as:

- reporting to the safety commander,
- preventing anyone from entering the danger zone,
- reporting when an aircraft or vessel enters the danger zone,
- reporting any fire,
- reporting any animals entering the danger zone.

1.1.4.8 Target officer

Officers, recruits and civilian workers can be appointed as target officers. The target officer reports to the OCE and is responsible for ensuring that the targets are correctly positioned and that the target personnel's safety has been safeguarded. The target officer shall locate him/herself where he/she can best direct and control the service and shall, if possible, maintain communication with the OCE and safety commander. The target officer has the following duties:

- checking target areas and weapons systems (ammunition types) against safety templates and safety distances,
- preparing and maintaining order with targets and fire marking(s),
- instructing target personnel,
- notifying the OCE when the target layout is ready and target personnel are in a safe zone (under cover),
- notifying (giving a signal) when the activity must cease on the grounds of safety,
- taking note of, or being informed about, unexploded shells, as well as reporting this to the safety commander and the field firing range administration,
- when necessary, marking, cordoning off or fencing in zones where unexploded ordnance is present.

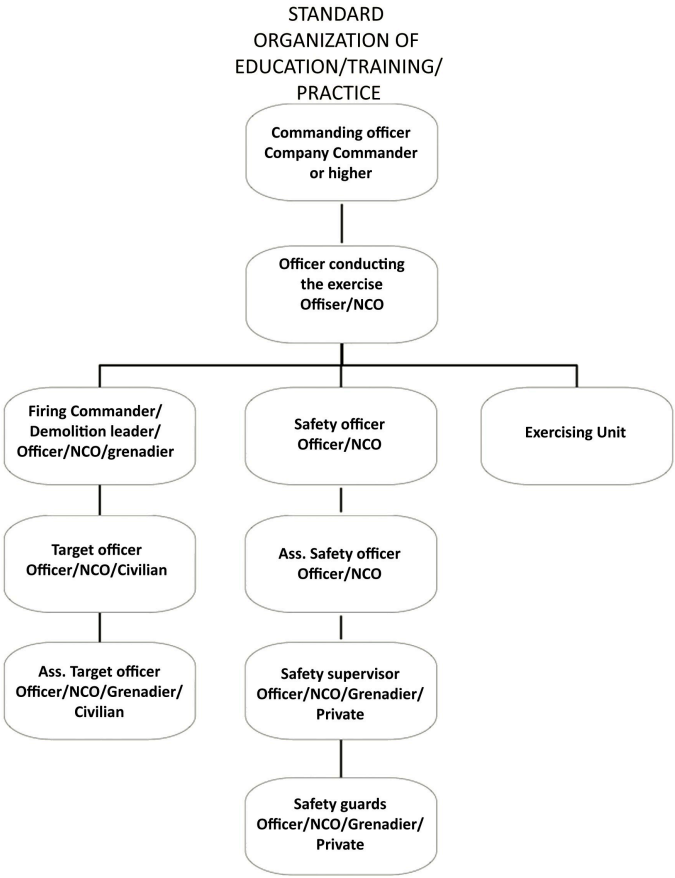


Figure: 1.9
Example of standard organisation

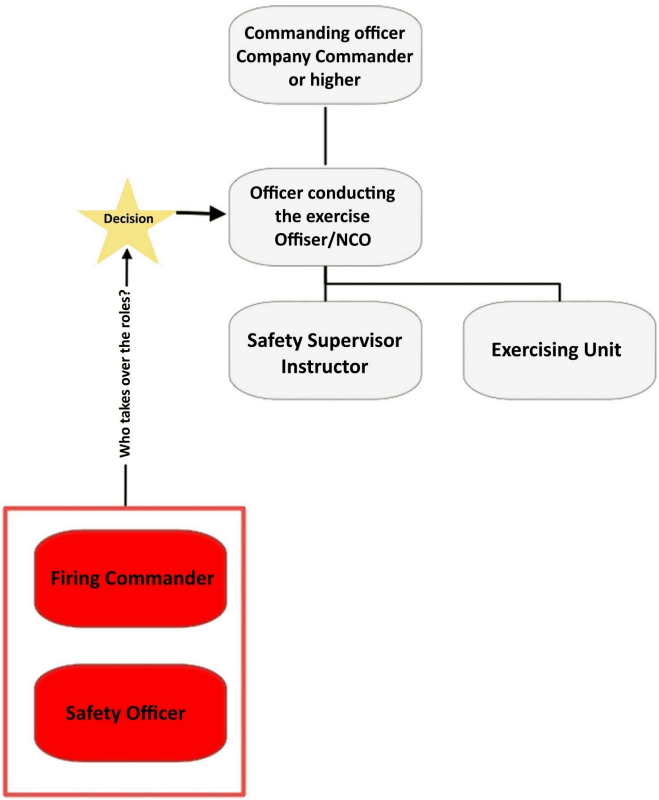


Figure: 1.10
Example of organisation of a shooting range service

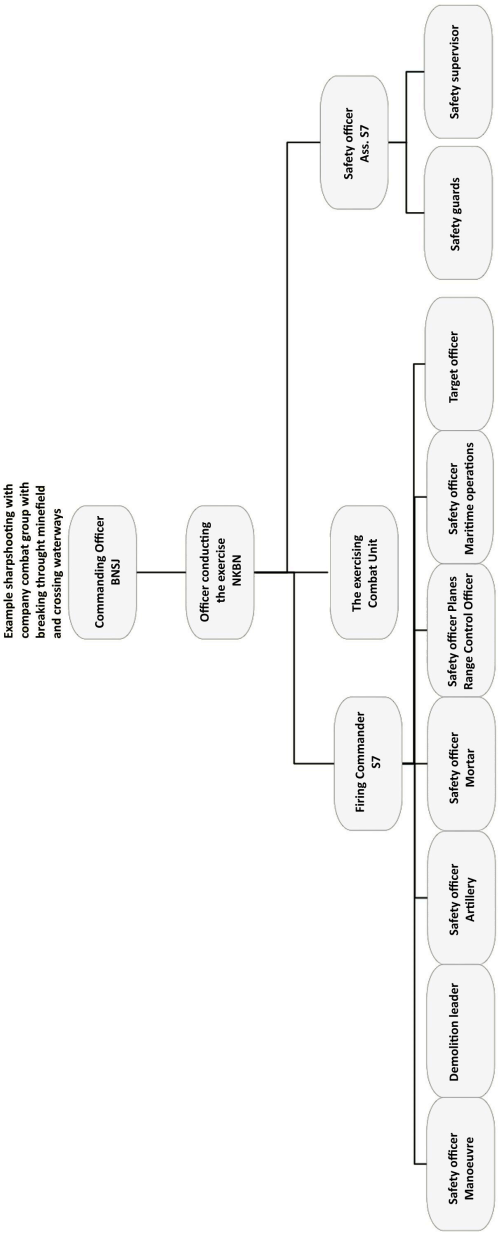


Figure: 1.11

Example of firing with a company combat group with minefield penetration and crossing water.

1.1.5 Reporting

1.1.5.1 All personnel are required to report the following using the Norwegian Armed Forces' reporting systems:

- breaches of the safety regulations
- undesired events, deviations, near-accidents and accidents
- circumstances that can be expected to result in changes and improvements to the prevailing central and local safety regulations
- proposed changes to safety regulations.
- Ammunition-reporting in accordance with Chapter 2.
- Weapons-reporting in accordance with Form 0770 B *"Discrepancy handling for firearms"*.

1.1.6 Handling, notification and reporting in case of accidents and incidents in the Norwegian Armed Forces

Figure: 1.12

Work at the incident site

1.1.6.1 Serious incidents and accidents in the Norwegian Armed Forces

Officers commanding and officers in charge of exercises are required to follow their own unit's **action plan for serious incidents and accidents**. The following points are minimum requirements. The Norwegian Armed Forces Alarm Services and the operations centres of its various branches provide support with procedures and reporting. The Act on Investigating Accidents and Incidents in the Norwegian Armed Forces and the *Administrative Regulation on Investigating Accidents and Incidents in the Norwegian Armed Forces*.

1.1.6.2 Actions in case of serious incidents and accidents in the Norwegian Armed Forces

The officer commanding, OCE, senior officer or most suitable person at the scene of the accident shall:

- Secure the scene of the accident in order to avoid further injury.

- Call 113, the emergency medical dispatch centre (EMD) if necessary.
- Initiate life-saving first aid.
- Call 112 — the police — and MP 23 09 20 00 in case of road traffic accidents, if rescue is urgently required or where the interests of a third party are affected.
- Arrange for:
  - the necessary transport of injured persons to the ambulance meeting place, hospital or aid centre.
  - determining the sequence of events as much as is possible (notes, sketches and photographs)
  - securing and protecting materiel and equipment with a connection to the accident. The scene of the accident/incident must be left undisturbed until the MP, the police or an officer commanding authorises clearing up. See also point 1.1.6.5
  - taking down names, addresses and phone numbers of any witnesses. Witnesses must remain at the scene until the MP, the police or the officer commanding has allowed them to leave.

1.1.6.3 Notifying critical and serious incidents and accidents in the Norwegian Armed Forces

The officer commanding or OCE is required to:

- Notify their immediate officer commanding with information about:
  - When and where the accident occurred
  - Names of personnel affected
  - Extent of the damage/injuries
  - What measures have been initiated
- The officer commanding shall send a written "INCSPOTREP" as soon as possible to the national operations centre in their own branch of the armed forces via a suitable means of communication.

The unit or immediate assigned commander is given responsibility for reporting to a higher authority and to civil authorities when an accident has resulted in:

- Loss of life
- Injury to personnel
- Significant damage to, or loss of, military or non-military property

Unit	Operations centre	Telephone	E-mail
The Norwegian Armed Forces	The Norwegian Armed Forces' alarm services (FALARMTJ)	800 20 113, 0540 4040	FisB: The Norwegian Armed Forces' alarm services (PO Box) Unclassified: alarmtjenester@mil.no

The Norwegian Army	National land operations centre (NLS/NORLOC)	77 89 52 00, 0580 5200	FisB: The Norwegian Army NLS contact (PO Box) Unclassified: norloc@mil.no
The Norwegian Home Guard	Home Guard Territorial operations centre (TOS)	62 40 85 00, 0502 8500	FisB: HVST contact (PO Box)Unclassified: hvst.kontakt@mil.no
The Royal Norwegian Navy	National maritime operations centre (NSS)	55 50 46 00, 0540 4600	FisB: VSJ SEA (PO Box) Unclassified: vs.sjo@u.mil.no
The Royal Norwegian Air Force	National Air Operations Center (NAOC)	75 53 69 00, 0565 6900	FisB: naoc@mil.no Unclassified: naoc@mil.no

Further case-processing in the Norwegian Armed Forces:

- The operations centres must ensure that civil authorities in the district where the accident/incident occurred, and the Norwegian Armed Forces' Military Police have been informed. If this has not been done by personnel at the scene or by the unit involved, the operations centres must issue notification.
- The relevant operations centre will provide information internally in the branch of the armed forces, and also issue notification to the NJHQ.
- The NJHQ will provide information internally in the Norwegian Armed Forces, and also pass on details to the Defence Staff Operations Department/SITSEN
- SITSEN will inform the CHoD and the MOD
- Based on the nature of the incident, the National Accident Investigation Board (SHK) will independently consider whether to open an investigation.
- In the event of death or serious personal injury, the Norwegian Labor Inspection Authority shall be notified.
- Commanders with responsibility for investigation may consider setting up special investigation groups for defence-internal investigative work.
- The Military Police have the right and duty to investigate breaches or potential breaches of safety regulations, and they decide whether or not to investigate the accident/incident.

1.1.6.4 Reporting in connection with incidents and accidents.

Following actions and notifications in accordance with the previous point, the following must also be notified:

Type of incident	Type of report	Who is to be notified		TEL.: e-mail
Personal injury of all kinds	Telephone, Classified or Unclassified e-mail, INCSPOT-REP	The Norwegian Armed Forces' Military Police Unit (FMPA)	Civil	23 09 20 00
			Military	0510 2000
			E-mail	mpo@mil.no
Personal injury and/or damage to materiel involving ammunition, explosives or weapons (Moderately to severely serious incidents).	Telephone, Classified or Unclassified e-mail, INCSPOT-REP, RAPP.	The Norwegian Armed Forces' Alarm Services	Civil	800 20 113
			Military	0540 4040
			E-mail	The Norwegian Armed Forces' Alarm Services (PO Box) (gradert) alarmtjenester@mil.no (Unclassified)
Irregularities involving materiel other than ammunition and weapons.	INCSPOT-REP, FiF-HMS, RAPP , e-mail, or Telephone.	The Norwegian Armed Forces' Alarm Services	Civil	800 20 113
			Military	0540 4040
			E-mail	The Norwegian Armed Forces' Alarm Services (PO Box) (Classified) alarmtjenester@mil.no (ugradert)
Near-accidents (insignificant and less serious incidents)	FiF-HMS, RAPP, e-mail or Telephone	The Norwegian Armed Forces' Alarm Services	Civil	800 20 113
			Military	0540 4040
			E-mail	The Norwegian Armed Forces' Alarm Services (PO Box) (Classified) alarmtjenester@mil.no (ugradert)

The following points must be reported to to an authority with competence for materiel (Defence materiel, FMA) in case of accidents, damage to and irregularities involving materiel, and also who, what, where, when and how:

- Weather, driving, light, firing and temperature conditions
- Number of shots/mileage/hours
- Ammunition lot no.
- Weapon no./serial no./registration no.
- Condition of the weapon/vehicle/system when the incident occurred
- What kind of table/exercise was being fired
- BK/SAP history of the weapon/vehicle/system
- Date of previous quarterly inspection or equivalent
- If possible, total stress on the weapon/system

Form 0770 B *"Discrepancy handling for firearms"* must be used for reporting involving firearms.

1.1.6.5 Measures for supporting causal inquiry

To facilitate the work of the competent authority and or the inspection and/or investigation group on identifying the cause of the accident/irregularity with all types of materiel, it is important for all relevant evidence to be secured, including ensuring that there is no cleaning, separation for transport or disassembly until it has been handed over to or clarified with the officer commanding.

The officer commanding, or else the OCE, shall if necessary clarify with the armed forces' branch's operations centre before clearing up the scene of the accident/incident. For weaponry, it is important that the weapon/weapon system is not disassembled and cleaned, as valuable evidence may be lost. Exemptions to this are when there is still ammunition in the weapon that must be removed in order to allow for safe handling and transport. Empty shells represent potentially valuable evidence, and attempts must be made to collect them from the weapon/weapon system in question.

Where possible the weapon must be handed over immediately to weapons-technical personnel. In each individual case, the competent authority will provide guidelines regarding further action to be taken with the weapon/weapon system.

UD 2-1 Armed Forces Safety Rules and Regulations.

2 AMMUNITION AND UXOS, MINES AND DEMOLITION

2.1 USE, HANDLING AND CHECKING OF AMMUNITION

Figure: 2.1
Explosion

2.1.1 In general

2.1.1.1 The Norwegian Defence Materiel Agency General Material Division is the competent authority for ammunition and is responsible for conducting routine inspections of ammunition. The competent authority has responsibility for issuing regulations concerning the maintenance, storage, transport, handling and checking of ammunition, and which regulations shall be observed for reporting after use. The competent authority shall ensure that notifications regarding ammunition that has been subject to restrictions are made known. For safety or other reasons, ammunition can be subject to restrictions or blocked for use. Such usage restrictions are usually communicated in the form of Ammunition restrictions for the Norwegian Armed Forces. Before any type of ammunition is used, it must be verified whether it has been subject to restrictions or blocks.

2.1.1.2 Upon delivery of ammunition that has been subject to restrictions, the depot (ammunition store) shall make the unit using the ammunition aware of the restriction and deliver the ammunition with a copy of same.

2.1.1.3 Before firing commences, the ammunition shall be inspected and prepared as determined for the ammunition and type of weapon in question. See other items in UD 2-1, ammunition datasheets, weapon regulations and technical manuals.

2.1.1.4 Smoking and open flames are forbidden within a 30 m radius of ammunition. This does not apply to the use of blank ammunition during exercises or minor stores of small arms ammunition during live field exercises. Common sense should be exercised.

2.1.1.5 Detailed regulations for the ammunition service are specified in the regulation series “Regulations for the ammunition service”.

- Regulations for the ammunition service – Common regulations
- Regulations for the ammunition service – Ammunition procurement
- Regulations for the ammunition service – Ammunition storage
- Regulations for the ammunition service – Ammunition transport
- Regulations for the ammunition service – Ammunition maintenance and destruction

2.1.2 Responsibility of the unit using the ammunition

2.1.2.1 Upon receipt of ammunition, the unit using the ammunition is responsible for verifying that the ammunition is of the correct type. When ammunition subject to restrictions is received, it shall be verified that a copy of the ammunition restriction has accompanied the delivery. The unit using the ammunition must ensure that subsequently issued regulations are properly registered. The unit using the ammunition is responsible for ensuring that the ammunition is stored in accordance with regulations. Upon delivery, the unit in training must be made aware of any restrictions and must be given a copy of same.

2.1.2.2 Ammunition that is removed from original packaging must be put back in the original packaging when no longer in use. During exercises, ammunition must be stored in locations where it cannot be exposed to influences that might potentially cause accidents.

Ammunition must be handled carefully and protected from moisture and high temperatures.

2.1.3 Returning ammunition

Figure: 2.2
Disarming

2.1.3.1 Upon delivery or storage of ammunition that remains after exercises have ceased, an inspection of the ammunition shall be conducted in which the following factors shall be verified if the packaging has been opened:

- that the ammunition is undamaged and without missing components,
- that all transport safety devices and other protection measures are in place,
- that the ammunition that is being returned is in its original packaging, and that the LOT numbers on the ammunition and on the packaging match,
- that packages containing left-over ammunition have been reinforced so to prevent damage to the ammunition.

2.1.4 Returning empties

2.1.4.1 Empties subject to mandatory return (pallets, boxes, casings, etc.) shall be returned undamaged, dry and clean. It is permitted to use empty ammunition boxes as packaging for empty shells and other empties to be returned. Such boxes, etc. must be labelled with form 0755-1B “Free of explosives” that indicates which unit has emptied the package and verified that it has been emptied of ammunition/explosives. The person who has checked the empties, by signing the label, is responsible for ensuring that all explosive material has been removed. A superior officer must also sign the label to confirm that an inspection has been carried out. A duplicate of the label with signature shall be placed in the empties. The receiving unit shall inspect the empties prior to further shipment. Empties must not be stored together with ammunition or explosives.

2.1.5 Irregularities in ammunition

2.1.5.1 Firing practice with live and/or practice ammunition must cease if the following irregularities occur:

- 2 consecutive UXOs from one weapon during the same firing exercise, or
- the average of UXOs exceeds 10% of the total number of rounds/discharges/ demolitions, or
- 2 consecutive misfires, or
- 2 misfires (does not apply to ammunition up to and including 12.7 mm)

2.1.5.2 If the OCE (firing commander) believes the reason for the UXOs could be:

- unfavourable impact angle
- unfavourable impact zone
- target object too small or poor target material,

An attempt shall be made to eliminate the possible cause by choosing from the following:

- new stand and/or new direction of fire (impact zone)
- larger and/or more solid target material

If irregularities continue to occur during firing, firing must cease and the situation must be reported (see point 2.1.7).

2.1.5.3 If the OCE/firing commander is of the opinion that the ammunition from a specific batch is the cause of the UXOs, firing shall not continue unless ammunition from another batch is available. This also applies to demolition exercises, etc. in which misfires or other irregularities occur. The situation is reported as stipulated in point 2.1.7

2.1.5.4 During firing with artillery and/or mortars, based on the number of observed UXOs, the responsible OCE/firing commander shall assess whether or not firing must be stopped.

2.1.5.5 If the reason for a misfire is attributable to a weapon malfunction, the officer conducting the exercise (OCE)/firing commander shall replace it and firing may continue. If the weapon continues to misfire, firing must be stopped in accordance with the regulations stipulated in point 2.1.5.1 and the conditions must be reported immediately, see point 2.1.7.

2.1.6 Reporting following firing/demolition/hand grenade throwing

2.1.6.1 Use of digital form 750 (DBL-750)

All use of ammunition and explosives, with the exception of blank ammunition <20 mm and devices used for simulating fire[1] must be reported in the specified reporting system in the web portal on FISBasis using Digital Form 750 (DBL-750) “- and environmental report when using ammunition/explosives”. In addition, separate procedures apply to reporting each individual missile in which the missile registration form in accordance with appendix 6C must be used. The main purpose of reporting is to report irregularities

1) Explosives and detonation devices used for simulating fire must be reported

with ammunition and otherwise to register the environmental impact in the field firing range and training ground (SØF).

When the field firing range/shooting range is booked via SMART/Remedy and the time of the booked exercise has passed, an email will automatically be generated to the firing commander/OCE with a link to DBL-750 for registration of ammunition use. This link must be used in order for the booking ID to be registered and reminders to cease. If the field firing range/shooting range is not booked via SMART/Remedy, the following link must be used:

http://intranett2.mil.no/fag/Logistikk/Fellesmateriell/Ammunisjon/Sider/Blankett-750.aspx

In the event of irregularities, including malfunctions with blank ammunition and devices used for simulating fire, the non-conformance report in DBL-750 must be completed and the irregularity described in detail, including prevailing weather conditions, temperature, impact zone's properties and whether the UXOs have detonated or not.

Appendix 6B shows an English version of form 750, which is completed by foreign units when firing in Norwegian field firing ranges. The completed form must be delivered to the field firing range administration for registration.

2.1.7 Reporting irregularities when using ammunition/explosives involving injury to personnel and/or damage to materiel.

2.1.7.1 In the event of accidents/irregularities with personnel and/or materiel damage involving ammunition, explosives or weapons, a preliminary report must be submitted as soon as possible in accordance with UD 2-1 point 1.1.6.

2.1.8 Ammunition - Test and trials

2.1.8.1 It is not permitted to carry out testing and trial firing with ammunition without approval for testing and trial firing (TFG-TP (technical administrative approval for test and trial operation)) as approved by the competent authority for materiel (NDMA). Appendix 22 stipulates the minimum information to be included in a TFG-TP.

2.2 MOVEMENT AND EXPLOSIVE ORDINANCE DISPOSAL ON FIRING RANGES

Figure: 2.3
Unexploded ordnance (UXO)

2.2.1 Requirements in respect of cordons, markings and warnings for UXO zones

UXO zones must generally be marked out using signs. UXO zones for particularly hazardous UXOs must be marked out and cordoned off. Markings and cordons must be suitably adapted and appropriate in accordance with a joint risk assessment by the competent authorities for explosives clearance, materiel and safety on firing ranges and training grounds.

The Norwegian Defence Estates Agency is responsible for markings and signage of UXO zones in accordance with the "Manual for field firing ranges and training grounds".

2.2.2 The general rule for UXOs is:

DO NOT TOUCH IT

MARK THE LOCATION WHERE IT WAS FOUND

REPORT THE FINDING

UXOs can be extremely sensitive, and the slightest movement can cause it to function. A watch must be established or the area be cordoned off if considered necessary. UXOs should only be dealt with by personnel with the appropriate formal expertise.

2.2.3 Movement within field firing ranges and training grounds

All movement within field firing ranges and training grounds involves an element of risk, even outside established UXO zones. Therefore, general vigilance must be exercised when moving across field firing ranges and training grounds.

The commanding officer of any unit moving across firing ranges and training grounds, including UXO zones, is responsible for the safety of personnel.

The following provisions apply to movement across field firing ranges and training grounds:

a. All movement must be coordinated with the firing range administration take place in accordance with guidelines issued by the firing range administration via field firing range instructions, warning procedures, specified warnings, etc.

b. The route/zone to be used, as well as the activities to be undertaken, must be submitted to the field firing range administration prior to the commencement of the activity. c. Personnel must be informed of the risk of UXOs and of any special measures that need to be adopted.

c. Personnel must be informed of the risk of UXOs and of any special measures that need to be adopted.

d. Any finds of UXOs must be reported to the field firing range administration.

e. Civilians must be notified via markings/signage/posters indicating that all movement through marked zones is at their own risk.

f. Starting a fire, use of disposable barbecues, digging holes and pitching tents in UXO zones is forbidden. Exceptions may be specified in individual field firing range instructions.

2.2.4 Traffic within a UXO zone

Movement within cordoned-off UXO zones is forbidden, except for personnel from the firing range administration, the Norwegian Defence Estates Agency and explosives clearance groups. Movement in other UXO zones should be avoided, though is permissible with special alertness and under specific conditions. Different provisions apply for military and civilian employees, and for firing range administration personnel and civilians.

2.2.4.1 Military and civilian employees

The UXO zone in question must be assessed based on, among other things, the age and purpose of the field firing range, the status of primary annual ordnance clearance and type of ammunition used on the range. An order containing risk assessment must be drawn up in consultation with the firing range administration in order to assess which activities can be carried out. As a minimum, the order must include:

- The type of activity to be carried out.
- Routes/zones to be used in the UXO zone.
- Assessment of why the UXO zone should/must be used.
- Medical preparedness with particular reference to the local risk of UXOs.
- Fire protection measures with particular reference to the local risk of UXOs.
- Procedure in case of incidentally found ammunition/UXOs.
- Assessment of the benefits of training versus general risk/risk of UXOs.
- Risk assessment should be carried out in accordance with UD 2-1, point 1.1.2.

The users must not themselves initiate fire-fighting measures in UXO zones.

Local regulations in respect of risk reduction when moving through UXO zones should appear in local field firing range instructions.

2.2.4.2 Firing range administration personnel

All work in UXO zones requires the approval of the Firing range administrator. Standard operating procedures (SOP) or general operating procedures (GOP) must be drawn up for the dealing with and destroying incidentally found UXOs, but also for other work purposes. As a minimum, SOPs/GOPs must include:

- Routines for how the work is to be carried out
- Hazards in respect of ammunition/UXOs
- Handling of incidentally found UXOs
- Use of protective equipment
- Use of vehicles/machinery
- Use of communications equipment
- Medical preparedness
- Fire protection measures

For work performed by Norwegian Defence Estates Agency personnel or personnel employed by the Norwegian Defence Estates Agency, the Norwegian Defence Estates Agency firing range and training ground director is responsible for drawing up and approving of an SOP/GOP and also an implementation plan for the work in question.

The field firing range administration should be able to provide personnel possessing expertise within explosive ordnance disposal (Class 3) to undertake an assessment of every aspect of the field firing range and training ground.

2.2.4.3 Civilians

Civilian movement through UXO zones must be restricted as much as possible. Regulations for movement through UXO zones must be regulated/announced in appropriate media/channels, as well as by general and specific markings/signage. It must be clear from such announcements that all movement through a marked zone entails personal risk is done at the individual’s own responsibility. The Norwegian Defence Estates Agency is responsible for signage and marking in accordance with the "Manual for field firing ranges and training grounds".

2.2.5 Clearing firing ranges

The firing range administration must perform primary annual clearance of active OXU zones and drawing up a clearance report. A copy of the report is sent to the Norwegian Defence Estates Agency.

The following provisions are common to firing range clearance in both active and disused firing ranges. The provisions are also applicable to the clearance of a unit’s own UXOs and dealing with blank ammunition.

Firing range clearance must be organised as part of an explosives clearance group (ECG). If more than one ECG is working in the same firing range, an explosives clearance command (ECC) must be established. No one person in an ECG can have

more than one function. The person in charge of firing range clearance must issue an order for the work which must contain as a minimum:

- An assessment of the quantity and type of objects that might be found and their associated hazards.
- Medical plan
- Communications plan
- Extent and content of training for search teams

2.2.5.1 Requirements for ECCs.

- The ECC commander must be an officer.
- EOD advisers must have class III blasting certificate. The ECC commander may have this function if he/she has the necessary blasting certification.
- The medical commander must be an experienced medical personnel member.

2.2.5.2 Requirements for ECGs.

- An ECG commander must be at least OR-5 and hold a class III blasting certificate.
- An ECG must be made up of no more than 45 search teams.
- The commander of search teams must be at least OR-5.
- At least 1 explosives clearer per 15 search teams.
- At least 1 team leader per 15 search teams.
- At least 1 medical orderly with special medical expertise.

2.2.5.3 Requirements for the clearance of a unit's own UXOs and misfired ammunition.

- The ECG commander must hold a class 1B blasting certificate as a minimum.
- Clearance must proceed as a natural extension of the exercise activity.
- The safety regime from a previous exercise activity must be maintained until UXOs/misfired ammunition have been dealt with/destroyed.

2.2.5.4 Requirements for protective equipment

All personnel taking part in firing range clearance must wear as a minimum:

- Helmet
- Shrapnel-proof vest approved for use in the armed forces.
- Protective glasses
- Personal medical equipment

Personnel who are to deal with objects that might contain white phosphorous (WP) must additionally wear:

- Fully-covering field uniform or similar
- Work gloves
- Field canteen containing water

If protective equipment represents an obstacle to the service, the ECG commander, following comprehensive evaluation, may issue dispensation from the use of protective equipment.

2.3 MINE SERVICE

Figure: 2.4
Collecting mines

2.3.1 In general

2.3.1.1 “Live mines” refers to:

- Mines that contain explosives and have igniters. Live mines without igniters shall be regarded as an explosive charge and must be handled accordingly.
- Improvised mines built by using pre-made charges or other explosive materials and an igniter.

2.3.1.2 During peacetime, live mines shall only be used for instruction and for demonstration purposes. During instruction, it is not permitted to make the mine ready (insert an igniter). During demonstrations, it is only permitted to detonate one mine at a time. If "low order" techniques are used on mines, these must be detonated in situ immediately after the demonstration The mine may only be equipped with an igniter during demonstrations that have been approved by a competent authority and by a qualified instructor. During other mine service training, exercise or practice mines shall be used. Igniters without detonators may also be used during exercises.

2.3.1.3 Mines and igniters must be transported in accordance with 2.1.1.5

2.3.1.4 From a safety perspective, a mine with explosives but with no igniter must be regarded as an explosive charge without a detonation devices.

2.3.1.5 For demolition demonstrations, the following applies:

- The mine must not be equipped with a mine igniter (see exceptions in point 2.3.1.2), but detonated using an igniter intended for the demolition operation. If the igniter is not considered sufficient as an initiating charge, an intermediary charge must be used, for example C-4.
- Laid mines and charges must be marked and guarded.
- Personnel not participating in preparations for demonstrations must remain under cover or at a safe distance.
- This type of demonstration is a regular demolition operation intended to show the effect of the mine. The safety provisions for demolition operations must be observed.

2.3.1.6 Only personnel authorised by the Commander of engineering and CBRN are permitted to shoot at mines. Any such activity requires submission of an application. An application must contain as a minimum the goal of the exercise, a risk-assessment and the level of expertise of the personnel leading and conducting the activity.

2.3.2 Laying mines

2.3.2.1 During instruction, training and exercises, the following mines can be laid:

- Dummy mines
- Exercise mines
- Live mines in accordance with point 2.3.1.1

2.3.2.2 Exercise mines and live mines must be guarded.

2.3.3 Clearing mines

Figure: 2.5
Marking a mine

2.3.3.1 During EOD of live mines in peacetime, mines must be blasted on site if possible. The blasting element must be prepared in advance, and only one person is to place the charge

on the mine. Safety regulations for demolition operations must be followed. See chapter 2.2.1 and following points.

2.3.3.2 Mines must be blown up in situ. Where this is not possible for safety reasons, they must be moved to a suitable place. If the mine has to be disarmed before it is moved, this must be done by qualified personnel.

2.3.3.3 Clearing mines with exercise charges and/or live igniters must be carried out with extra care to avoid injuries.

2.3.3.4 Light portable mine clearing system

Dangerous area:

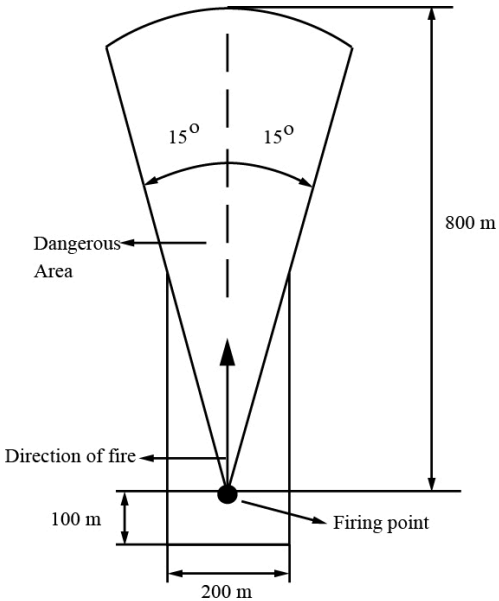


Figure: 2.6

Action in case of misfire:

- The rocket engine does not start: Wait a minimum of 30 min.
- Detonating fuse with charges does not go off after launching: Wait a minimum of 30 min.
- If the system does not function as intended, this is regarded as a UXO and is dealt with by personnel with class 1b demolition certification.

COMMENT

Contact the OCE.

2.3.3.5 Heavy portable mine clearing system

Dangerous area:

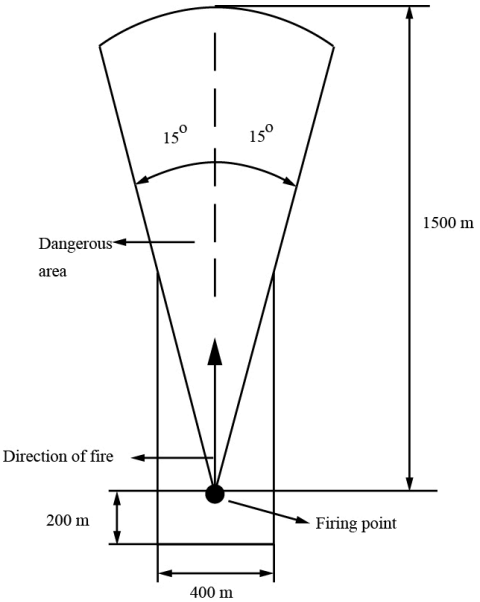


Figure: 2.7

Action in case of misfire:

- The rocket engine does not start: Wait a minimum of 30 min.
- Detonating fuse with charges does not go off after launching: Wait a minimum of 30 min.
- If the system does not function as intended, this is regarded as a UXO and is dealt with by personnel with class 1b demolition certification.

COMMENT

Contact the OCE.

2.3.3.6 Mine-clearing Line Charge (MICLIC)

Follow procedures as in TH 9-2350-25/247-10 TRACKED VEHICLE, ARTICULATED, BV206 TRACKED ASSAULT VEHICLE DN6 MICLIC

Personnel

For explosive line charge M58

Personnel within ”AREA F” must stay inside an armoured vehicle or similar, and use the necessary protective equipment.

Bystanders must not remain within the ”DANGER AREA” or the “NOISE ZONE”. Bystanders must remain behind the detonation zone.

For explosive line charge M68

Personnel within ”AREA F” must stay inside an armoured vehicle or similar cover, and use the necessary protective equipment.

Bystanders must not remain within the ”DANGER AREA” or the “NOISE ZONE” when the charge is fired. Bystanders must remain behind the detonation zone.

Danger area for firing an explosive line charge, detailed sketch of splinter zone for M58 and danger area for M68 explosive line charge

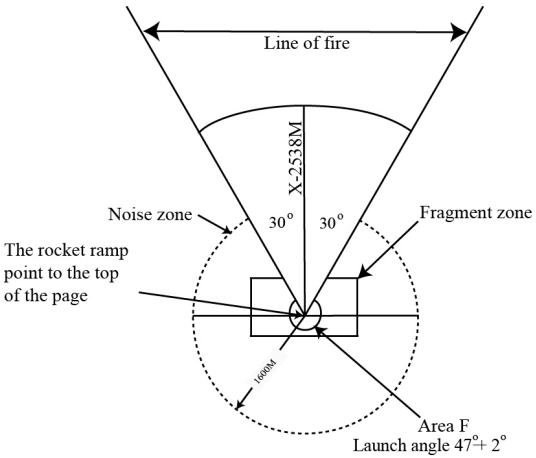


Figure: 2.8
Danger area M58

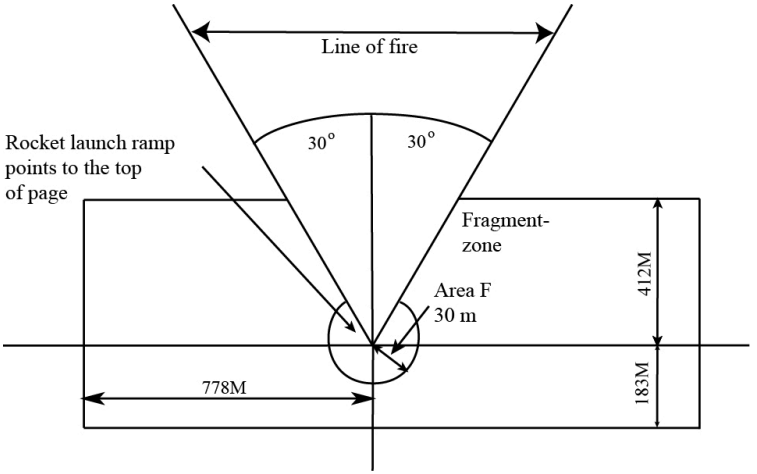


Figure: 2.9

Detailed sketch of splinter zone when firing explosive line charge M58

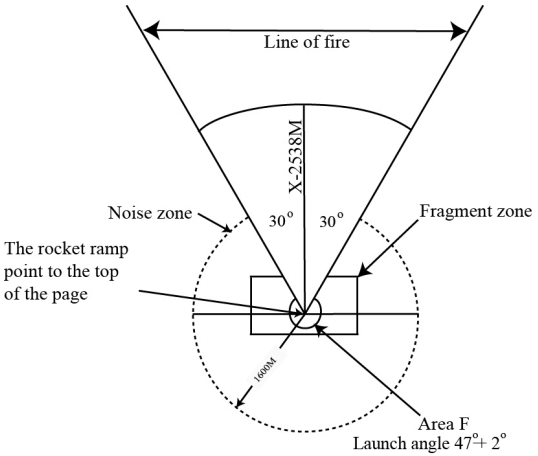


Figure: 2.10

Danger area M68

Procedure in case of rocket engine misfire

Wait for at least 30 minutes after the last attempt at firing the explosive line before leaving safe cover.

Procedure in case of rocket engine and explosive line misfire

Wait for at least 30 minutes after the last attempt at firing the explosive line before leaving safe cover.

Disconnect the firing apparatus.

2.3.4 Mine traps

2.3.4.1 A mine trap is a charge that is triggered by a seemingly non-dangerous influence from the outside.

2.3.4.2 When laying mine traps for mine clearing practice, no live charges, mines or igniters with detonators are to be used. Igniters with detonators and NONEL tubes without igniters can be used.

2.3.4.3 When laying mine traps, the igniter's safety pin(s) is/are removed last using a string. The igniter must then be firmly in place in the dummy charge. For correct and proper handling of the specific igniters that can be used in connection with mine traps, see the weapon description and regulations.

2.4 DEMOLITION SERVICE

2.4.1 In general

Live detonation devices must only be placed in the charge just prior to blast.

Exceptions are in case of borehole charges and when using NPED igniters where the charge is in a location that is difficult to access.

2.4.1.1 Detonation devices that have not gone off, or detonation devices and charges that have not detonated completely, are to be regarded as misfires and destroyed in accordance with the regulations.

2.4.1.2 When conducting demolition operations in an enclosed space, wait at least 15 minutes for the space to be ventilated.

2.4.2 Personnel for command and control

2.4.2.1 With demolition exercises, the following functions are to be covered:

- OCE
- Demolition leader
- Safety officer
- Safety supervisor
- Safety guards

For general areas of responsibility and duties, see 1.1.4. During exercises at stands, the OCE can assume the duties of the demolition commander, safety officer and safety supervisor. If demolitions take place at multiple stands, a demolition commander must be assigned to each stand. During training and courses, a demolition leader must be assigned for each group/team/variable section. During extensive exercises, the OCE is responsible for ensuring there is a sufficient number of safety supervisors, and in such cases a safety officer shall must also be assigned. Safety sentries must always be assigned during demolition exercises. The number shall be determined by the OCE according to the scope of the exercise and size of the training ground. In established detonation zones, the instructions for the zone shall be complied with.

2.4.2.2 In addition to the general duties in 1.1.4.2, the OCE must also ensure that:

- civilian authorities and the local police authorities are contacted to clarify the special safety precautions that are demanded, if demolition work is to be carried out close to populated areas, public communication lines, etc.
- only the strictly necessary number of personnel preparing the demolition and placing charges are present
- that all other personnel are under cover or outside the risk area
- explosives, detonation devices and other demolition equipment are kept separately and under guard
- regulations concerning the handling, storage and transport of explosives and detonation devices are followed (Regulations for the ammunition service in the Norwegian Armed Forces)

If demolitions are carried out on several firing stands that partly overlap each other's danger area, it is the OCE who gives the detonation order. See also: regulations for the safety of air traffic, appendix 7 pt 6.

2.4.2.3 The demolition leader must ensure that:

- all safety regulations are followed
- the demolition leader or a subordinate officer and a recruit checks that the explosives, detonation devices and mud-capping are in regulation condition
- the maximum permissible charge weight is not exceeded
- the key to the electric blasting machine or other blasting devices is not accessible by unauthorised persons
- the explosives and detonation devices are protected from detonations during the ongoing exercises
- personnel are allowed to take of their helmets, should these make demolition preparations difficult
- the OCE is notified when everything is ready for blasting
- all personnel in the risk area are under cover for splinters and protected against detonation waves, before blasting orders are given
- all personnel are under cover and demolition personnel shout "Fire in the hole" and "Firing"
- there is a time delay between each blast so that these can be easily counted so as to be certain how many charges have gone off
- investigate, or allow someone else to investigate, whether all of the igniters and charges have detonated
- when the order "All clear" is given, he or she gives permission to leave cover. The demolition area(s) must be checked before the order is given
- UXOs are detonated as soon as the waiting time has passed
- make sure that demolition equipment, explosives and detonation devices are not abandoned after the exercises

2.4.2.4 A safety officer is appointed only for extensive demolition exercises. The duties of this officer are listed in 1.1.4.5.

2.4.2.5 The safety supervisor must, in addition to the general duties in 1.1.4.6:

- check personnel equipment (splinter-protecting helmet, double hearing protection, medical equipment)
- ensure that explosives, detonation devices and mud-capping are checked
- ensure that the key to the blasting machine, blasting machine and transmitter cannot be accessed by unauthorised persons and that accidental firing cannot occur
- check that posted safety guards repeat the signal/shout "Fire in the hole" before detonation

- count the number of detonations
- together with the demolition leader, or someone appointed by this person, examine all demolition objects that have been detonated
- check that no one leaves cover before the safety guards have repeated “All clear”
- make sure that no mobile phones are brought onto the demolition site

2.4.2.6 In addition to the normal duties described in 1.1.4.7, the safety guard must repeat “Fire in the hole”, “Firing” and “All clear”.

2.4.2.7 The only personnel allowed on the firing stand where demolition is being prepared, are those who are strictly necessary. Exceptions from this are permitted during training and courses. The placing of blasting caps in charges or in contact with detonation circuits is not to take place until all unnecessary personnel are under cover.

2.4.2.8 Qualification requirements for personnel for leadership and supervision

OCE, no requirement of a demolition certificate,

Demolition leader, must have a demolition certificate for the relevant activity.

Safety officer, must have a demolition certificate for the relevant activity.

Safety supervisor, must have a demolition certificate for the relevant activity.

Safety guard, no requirement of a demolition certificate.

The OCE must satisfy the requirements in UD 2-1 points 1.1.4.1 and 1.1.4.3. If the activity includes elements of instruction, the OCE must also satisfy requirements in Provision on authorisation and certification in the Norwegian Army, point 2.4. If the activity takes place at a firing stand and the OCE is to occupy the roles of demolition leader, a safety commander and a safety supervisor, then the OCE must have a demolition certificate relevant for the activity.

2.4.3 Checking explosives and detonation devices

2.4.3.1 Explosives and detonation devices are checked in accordance with applicable regulations and provisions. See Guidelines for the ammunition service for the Norwegian Armed Forces.

2.4.4 Special provisions for the use and handling of the materiel

2.4.4.1 Explosives must be handled in accordance with applicable weapon regulations.

2.4.4.2 Gauge, detonation and initiation devices must be used and handled in accordance with the existing weapon regulations. The following points must also be observed:

a. Powder Cap. Minimum permitted length when using a fuse in connection with a blasting cap is 25 cm. When using a fuse to initiate explosives, the minimum permissible length is 100 cm with an addition of 1 cm for every second it takes to seek cover. The fuse is lit with matches or a fuse igniter. When lighting several charges simultaneously, the fuses must be cut to different lengths to make it possible to count each detonation. A 15 cm difference in length is considered suitable.

b. Detonating fuses. Detonating fuses are explosives, and must be handled as such.

c. Connecting fuses and blasting caps. Blasting caps are attached to detonation fuses using crimping pliers or other suitable pliers.

d. Shock tube. The shock tube it self is not considered as an explosive, unless a blasting cap is attached. Most Nonel igniters are of the NPED type and contain a small steel sleeve. For this reason the safety distance is set to 50 metres when detonating igniters alone, when not covered. If personnel are assembled behind an approved safety shield (V50 550 m/s), with splinter goggles, and are assembled at an angle of approximately 90-270 degrees to the charge's detonation direction, the safety distance may be reduced to 1 m.

e. Electrical detonation. When using electrical detonating, the following points apply:

- Electrical detonation must not be used during thunder storms or during weather where electrical discharge is likely.
- The electrical detonation device is not connected to the circuit until after “FIRE IN THE HOLE” has been shouted.
- Demolition operations in the vicinity of a radar installation must not be undertaken until the radar has been turned off.
- It is prohibited to have mobile phones turned on where electrical blasting caps are in use.
- GR U (1A) is an NPED igniter that contains a small steel sleeve. A safety distance of 50 metres is therefore when detonating just an igniter.
- Electric igniters must not be used closer high voltage lines or high voltage cables than the distances shown in the tables below:

Group A igniters (std electric mil no. 8) should not be used closer than 200 metres from high-voltage power lines

Group 1 igniters

The distribution network’s operating voltage (kV)	**Overhead cable, distance in m**	**Earth cable distance in m**
0.4- 6	20	2
6-12	50	3
12 - 24	70	6
24 - 52	100	10
>52	200	16

Group 2 and group 3 igniters

The distribution network's operating voltage (kV)	Overhead cable, distance in m	Earth cable distance in m
< 24	5	2
24-72	6	3
72-123	10	10
123-245	12	10
> 245	16	16

The distances are calculated horizontally except for underground charging work, where the distance is taken as the total distance from cable to igniter.

Electric detonation close to transmitters that radiate electromagnetic energy must not take place closer than the distances show in the table below:

Group A igniters

Radiated power in watts	Distance in metres
0-30	30
30-50	50
50-100	110
100-200	150
200-300	200
300-500	230

Group 1 igniters[2]

Radiated power in watts	Distance in metres	Radiated power in kilowatts	Distance in metres
5	4	1	40
10	10	5	75
50	15	10	95
100	20	50	150
200	25	100	200
300	30	200	250
500	35	300	300

2) When using slow igniters in groups 2 and 3, the distances may be reduced by up to a half of the given values. Information about the radio transmitter's power and frequency can be obtained by contacting the transmitter station.

		500	350
		750	400
		1000	500
		2000	650

The safety distances do not apply for radar equipment

2.4.4.3 Firing System, Radio Controlled (TASS – Tactical Activation and Fuse System). Before use, the original codes must be coded into the receiver(s). This to prevent codes from other devices from being left in the receiver(s).

2.4.5 Performing demolition operations

Figure: 2.11
Demolition

2.4.5.1 Demolition operations must always be performed in accordance with applicable provisions. In addition the following provisions must always be followed:

When misfires occur, a set waiting time must be observed (see next point). If using electrical detonation, the detonating device must be disconnected before checking that the circuit has been closed. If no fault in the circuit is identified, firing can be tried again using another detonating device. If the charge does not detonate after this, it must be assumed that the blasting cap(s) is/are defective. Defective blasting caps must not be removed from charges, but instead an extra charge must be placed, after which the whole charge is set off.

2.4.5.2 When a primed charge has not gone off (misfire), or where there is doubt as to whether it has gone off, no-one must leave cover until the following time has passed:

- with powder fuse detonation: 30 minutes.
- with electrical ignition and shock tube (such as NONEL): 10 minutes.

2.4.5.3 Demolition operations in rock

- When placing a charge in a borehole, only a wooden loading stick may be used. If the explosives get stuck, they must not be knocked into position, but blasted in their stuck position.
- When conducting demolition operations in rock, it can happen that unconverted explosive residue remains in the blasted material. Before emptying or loading up exploded material it must be visually checked to ensure there are no unconverted explosives in the rubble. If there is, it must be removed manually and destroyed, preferably by burning. If, during the work, unconverted explosive is found, work must be stopped immediately and the explosives removed as described above.
- Borehole charges that misfire must not be drilled or picked out. Any mud-capping must be removed carefully to 15 cm from the old charges – never closer. (The loading height is shown in the drill plan). A new borehole charge with a blasting cap must be placed over the old charge, and the hole blasted once more. A new borehole can also be drilled at least 1 m from the old hole and no further down than to the loading height. The distance must be increased in mountainous terrain where there are gouges and orifices. The new borehole must be parallel to the old one. When this new charge detonates, there will usually be debris from the explosive from the borehole with the misfire. This explosive must be destroyed as soon as possible. Liquid explosives and explosives based on ammonium nitrate and fuel oil (such as Anolite) can be neutralised with water. A borehole's mud-capping must not contain larger stones (bigger than 16 mm).
- On completion of springing, it is prohibited to drill in the hole as there may be undetonated explosive residue present.
- Leave the hole to cool for 30 minutes before placing a new charge in it.

2.4.6 Danger area

2.4.6.1 The danger area is defined as a circle with the charge in the centre. In demolition operations, the following effects occur:

- fragmentation
- shock wave
- ground vibrations

The extent of the danger area is determined by the size of the explosive charge, the material used in the demolition object, mud-capping, ground conditions and terrain. Guidelines for the decision on the extent of the danger area are based on the following tables:

2.4.6.2 Danger area due to fragmentation.

Demolition object	**Size of Charge**	**Radius of the danger area in open terrain and detonation site without cover**
Wood, stone-free dirt and sand or ice	Up to 0,1 kg	50 m
	0,1- 0,5 kg	50 -150 m
	Over 0,5 kg	At least 200 m
Stones and stony dirt	Up to 0,5 kg	400 m
	Over 0,5 kg	At least 500 m
Iron, wood and iron together	Up to 0,5 kg	500 m
	0,5 - 5,0 kg	800 m
	Over 5,0 kg	1000 m

The surface danger zone can be reduced if the object is covered in a satisfactory manner with blasting mats, connected logs, fascines or similar, or if the the personnel are in an area providing sufficient cover. In cases where the OCE is uncertain as to the applicable safety distance, the greatest specified safety distance for the volume of explosive and type of demolition object must be used. A competent authority can be consulted if necessary.

If operating with charges significantly larger than those shown in the table, consideration should be given to increasing the radius of the danger area.

2.4.6.3 Danger areas due to the shock wave effect on windowpanes.

Size of Charge	**Radius of the danger area in open terrain and detonation site without cover**
uP TO 0,1 kg	75 m
0,1 - 0,5 kg	75 - 150 m
0,5 - 2,0 kg	150 - 225 m
3,0 kg	230 m
4,0 kg	275 m
5,0 - 10,0 kg	300 - 400 m
10,0 - 15,0 kg	400 - 450 m
15,0 - 20,0 kg	450 - 500 m
20,0 - 25,0 kg	500 - 550 m
Over - 25,0 kg	At leaset 700 m

In narrow gorges and similar, detonation waves have a stronger impact than in open terrain. The danger area will then be larger than those shown above.

2.4.6.4 Farlig område på grunn av markvibrasjoner. Dette må vurderes i hvert enkelt tilfelle, slik at bygninger, bruer, rørledninger m v ikke skades. Ved sprengning i borehull nær bygninger eller andre verdier som kan skades av vibrasjoner, må borehullene ikke være for dype eller overlades. Følgende data skal følges:

Allowed distance to object	Borehole depth	Charge
1 m (min distance)	0,6 m	0,2 kg
1,0 - 1,5 m	0,8 m	0,3 kg
1,5 - 2,5 m	1,2 m	0,4 kg
2,5 - 5,0 m	2,0 m	0,7 kg

2.4.6.5 Danger area for blasting cap. Blasting caps contain explosives and must be handled accordingly. When detonating a single blasting cap in an open detonation site, the radius of the danger area is 20 m.

2.4.6.6 Danger area for NPED igniters. NPED igniters contain a steel sleeve which results in fragmentation. When detonating a single NPED igniter in an open detonation site, the radius of the danger area is 50 m

2.4.6.7 Hearing protection

All personnel within a radius of 100 m from the charge must double hearing protection, see also point 5.20.

2.5 TOLERANCE EXERCISES WITH EXPLOSIVE CHARGES

2.5.1 In general

2.5.1.1 Tolerance exercises with explosive charges:

- Tolerance exercises entail a considerable strain on the body and must therefore only be conducted by units that in combat situations would be exposed to detonations such as artillery, mines, IEDs etc. These units may conduct tolerance exercises as part of assault courses.
- The OCE must be an experienced officer with demolition certificate class 1A. The person in question must be appointed by a commanding officer, with an emphasis on personal suitability.
- The purpose of the exercise must be to make the soldier aware of the forces contained in explosives, as well as the effect of the detonation pressure on the body.
- The exercise shall only be conducted on an explosives course constructed as in 2.5.2.1.
- No further stress elements may be added to the explosive exercise, such as having a stick in your mouth, digging your own positions or having to set off charges larger than those described in 2.5.1.2.

2.5.1.2 Requirements for conducting the exercise:

- Personnel must be assigned as with other blasting service (see 2.4.2.1).
- The blasting commander must be present at the exercise, and must not themselves take part in the explosion tolerance exercise.
- Prior to detonation, a safety supervisor must ensure that all personnel are wearing helmets, double hearing protection and carrying personal medical equipment, and also that no part of the body is exposed above the cover.
- The exercises are conducted with increasing charge sizes, and with a total of 2 explosions. The first charge must be no larger than 1kg TNT, and the second charge no larger than 3 kg TNT.
- The charges must not be enclosed or contain metal, wood, cardboard or other materials that may result in items and fragments being ejected.
- The charge is placed at least 5 metres away from the personnel, and no-one may be closer than this when the charge is detonated.
- The personnel member leading the exercise must have safe cover from fragments or flying small stones, or be outside the hazardous zone at the time of detonation (see 2.4.6.2).
- The quantity of explosive is calculated based on the explosive coefficient for TNT. If an explosive with a lower blast coefficient is used, the maximum charge should be reduced accordingly. For explosives with higher blast coefficients, the given maximum values apply.

- When detonating a 3 kg charge at 5 metres, personnel are exposed to a pressure of approx. 0.65 bar = 65 kPa = 190.2 dB, which without hearing protection would destroy the eardrum.

2.5.1.3 Exercises involving blowing up obstacles:

- In exercises involving blowing up single, double or triple coils of concertina wire, the following apply:
  - Elongated charges of up to 10kg are permitted to be detonated.
  - The charge must be placed at about 90 degrees to the obstacles.
  - Personnel must be under cover in the longitudinal direction of the charge, at least 15 metres from the nearest part of the charge.
  - The cover must have a thickness of 12.7 mm or more in accordance with UD 2-1 appendix 9.
- When blowing up concertina wire obstacles, particular attention is required to ejected objects such as fence posts.
- When training on explosive breaches of surface minefields (EGOM) and other types of obstacles, the safety distance must be calculated in accordance with 2.4.6.2.
- Following detonation, personnel must remain under cover for 1 minute so that ejected objects, splinters, soot, smoke and gasses can settle before breaking through the obstacle.

2.5.1.4 Personnel who must not attend tolerance exercises:

- Personnel who, during previous tolerance exercises or blasts from large calibre weapons, have shown signs or symptoms of hearing damage, including:
  - reduced hearing,
  - pain in the ears, or
  - buzzing in the ears.
- Personnel who, during the tolerance exercise, display signs or symptoms of hearing damage as stated above, must be immediately withdrawn from any form of noisy service and sent to a medical officer straight away.
- Personnel who, having previously been affected by detonation pressure, display symptoms of inner ear injury, must immediately be sent for examination by a medical officer. Such symptoms include:
  - Reduced attention.
  - Laboured breathing.
  - Palpitations.
  - Headache.
  - Abdominal pain.
  - Memory loss.
  - Disorientation.

- Seeing stars.
- Nosebleed.

2.5.2 Requirements in terms of the explosives course

2.5.2.1 Design of the course:

- The course must be suitable for tolerance explosions. It may be designed for the purpose, or constructed before the blasting is to take place. Common for all positions is that:
  - The charge must rest on sand, snow or non-stony soil with a radius of 3 metres from the centre of the charge.
  - At a radius of 3 metres from the centre of the charge there must be a mass that cannot produce splinters or fragments. This mass must consist of sand, non-stony soil or snow without ice with a thickness of at least 30 cm.
  - The charge must be placed at a height the same as the edge of the cover, and the edge must be approximately 90 degrees.
  - There must be at least 5 metres from the centre of the charge, to the edge of the course's plateau.
  - There must be at least 3 metres from the edge of the plateau, measured from the bottom of the cover, to the nearest obstacle. This area must be relatively flat.
  - Slit trenches, trench systems and such like must not be used without special approval from a competent authority.

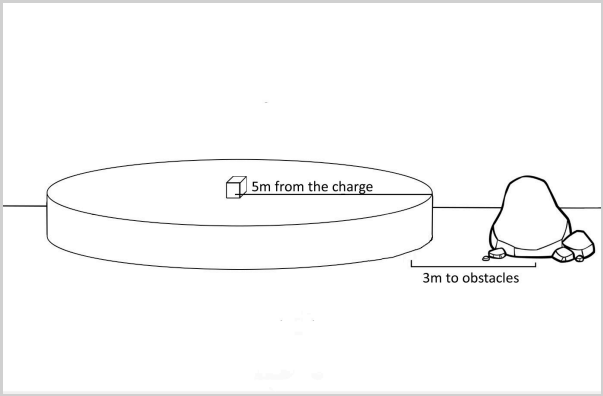


Figure: 2.12
Design of the course

2.6 FIRE SIMULATION AND FIRE SIMULATION DEVICES

2.6.1 In general

2.6.1.1 Fire simulation must only take place with approved devices:

- Blank ammunition
- Percussion charge (simulate hand grenade charge)
- Smoke
- Explosive/detonation device devices.

Safety regulations for the different types of fire simulation devices appear under the individual weapons/calibres, and in the following points.

2.6.1.2 Use of blank ammunition

See "Firing all weapons", point 3.1

2.6.2 Percussion charge (simulate hand grenade charge)

2.6.2.1 Percussion charges (hand grenade simulators) must not be thrown closer than 10 m to personnel.

Using percussion charges (hand grenade simulators) in closed rooms where personnel are located is prohibited.

The protection cap must only be taken off the scratch surface immediately before use. When not in use, the cover for the match head must always be left on the percussion charge (the hand grenade simulator). In case of a suspected misfire, do not replace the cover until after the waiting period. See point 2.6.4.

Figure: 2.13
Percussion charge

2.6.3 Smoke

2.6.3.1 Regulations for the use of smoke are found in point 3.7.4.1 and following points.

2.6.4 Misfires/UXOs

2.6.4.1 Fire simulation devices that do not work when fired must be handled in accordance with the following provisions:

- Blank ammunition for pistols, rifles, machine guns. See the individual weapon/ calibre.
- Blank rounds for FLASH-BANGS (HAND GRENADE SIMULATORS) and SMOKE CANISTERS must remain in their firing contraption/on the ground for at least 30 min. before they can be touched. After the specified waiting time, the fire simulation devices must be handled by the user and destroyed by personnel with a minimum class I demolition certificate. If necessary they are to be marked where they lie, so that they can be found for later destruction.

2.6.5 Explosives

2.6.5.1 For fire simulation using explosives, the following provisions apply:

- Each charge is to be at maximum 0.1 kg.
- The charge is detonated electronically or with a shock tube.
- Charges must be detonated in a detonating pit, or else suspended.
- The charge must only be detonated when there is supervision with the danger area.
- If detonation cannot be fired from a place with clear view of all charges, the OCE or the safety supervisor with such a clear view must be in telephone or radio contact with the person detonating the charge (in case of electronic detonation, see point 2.4.4.2.
- All personnel must wear a helmet and double hearing protection, see point 5.20 .

2.6.5.2 Detonation pits are made by:

- Digging out a crater at least 1 m in diameter and at least 0.6 m deep.
- The sides of the crater must slant towards the middle.
- The dirt mound in which the crater is dug must not contain stones more than 1 cm in diameter. If this is the case, the crater must be dug larger and “lined” with fine-grained sand to a thickness of at least 10 cm all-around so that the shape is as described above.
- The pit can be filled with water. If so the charge is to hang on a line (string) so that it does not touch the bottom or the sides of the pit (see point 2.6.7.3). The water must be free from any floating objects such as sticks, tins, ice etc.
- In the winter the pit can be dug in snow. The snow MUST not contain ice or frozen lumps of snow.
- Charges MUST not be covered with anything other than water or snow.

- Standing personnel must not be able to approach any closer to the charge (the edge of the pit) than 7 m. For personnel in high or low crawl or under cover, the minimum distance is 2 m from the charge.
- To keep personnel from getting too close to the charges, the pits must be surrounded by a barbed wire fence or other types for obstacles. The fence is set up at a distance of 2 m from the edge of the pit.
- Pits must be at least 10 m apart.
- Detonation cables or shock tubes must be buried or laid so that personnel cannot come in contact with them.
- There must be only one charge in each detonation pit.

2.6.5.3 Suspended charges are set up as follows:

- The charge is hung from a string at least 25 cm from the ground and from objects that can produce fragments (stones, wood, metal, ice etc.).
- Charges must not be packed in metal, wood, cardboard and such, and must not contain such materials (the exception is blasting caps with a wire and sufficiently non-fragmenting fastening material).
- Blasting caps must be fully covered by explosive.
- Personnel must be prevented from getting closer to the charge than 20 m.
- Charges must be placed in a manner to avoid their being struck by fragments.
- There must be a distance of at least 5 m between each charge.
- Detonation cables or shock tubes must be buried or laid so that personnel cannot come in contact with them.

2.6.5.4 Provisions for fire simulation using explosives during live firing exercises:

- Fire simulation must be carried out in accordance with the regulations in points 2.6.5.1 - 2.6.5.3.
- For live firing exercises in particularly, simulation charges must be no larger than 0.1 kg.
- There must be a distance of at least 10 m between detonation pits.
- Detonations must not occur while shooting or immediately after shooting over the charges or in their proximity.
- Only one charge may be detonated at a time.
- Detonation may occur only when personnel can be clearly seen from the firing stand.

3 FIRING ALL WEAPONS

3.1 FIRING

Figure: 3.1
Attacking Leopard tank

3.1.1 Personal protective equipment

3.1.1.1 Eye protection

Eye protection must be used during all firing and grenade-throwing, including firing blank ammunition. This applies both for the person firing, and other personnel adjacent to the activity.

Eye protection may only be removed temporarily for safety reasons, or at the order of the OCE.

Eye protection must not be removed if firing at steel targets closer than 100 metres.

Crews in hatch-down infantry fighting vehicles and on vehicles with an RWS/equivalent are exempted from this requirements.

Approved eye protection is:

Supplied protective goggles

Ventilator masks

Private protective goggles offering the same level of protection as those supplied by the Norwegian Armed Forces:

- EN166 FT, BT or AT
- ANSI Z87.1
- US Army Mil PRF 31013

3.1.1.2 Hearing protection

The requirement for use of hearing protection is defined in point 5.20. Hearing and noise injuries, and personal protective equipment.

Exceptions to this are:

- During small-scale, unintended combat, the initiating combat may be conducted without hearing protection. The gunner is responsible for donning hearing protection as quickly as possible. “Unintended” means that neither the contacting force nor the OCE has planned for or could anticipate the event.
- Using smoke, gas and incendiary grenades.

3.1.1.3 Use of helmets

All personnel must use helmets with the chin-strap fastened when:

- taking part in activities requiring a helmet to be used
- within a danger zone during demolition service, mine service and when using combat grenades. Exceptions may be made by the OCE if personnel are under safe cover.
- located in the immediate vicinity during bilateral exercises using practice grenades and flash-bangs. The OCE assesses the use of helmets by safety supervisors based on location and tasks.

3.2 HANDLING WEAPONS AND AMMUNITION

Figure: 3.2
In position with a machine gun

3.2.1 Handling weapons and ammunition

3.2.1.1 Weapon regulations

1. Weapons must always be handled as if they are loaded.
2. Never point or aim at anyone you are not prepared to enter into combat with. Exceptions permitted on the orders of the OCE.
3. Only unlock the weapon once it has been pointed towards the target.
4. Keep your finger away from the trigger until the sights are on the target and you intend to fire.

5. Familiarise yourself with the target – what is around, in front of and behind it.

3.2.1.2 Exceptions to the weapons regulations

During instruction, training and exercises, the OCE can issue exceptions from order no. 2, subject to the following conditions:

- All weapons, magazines and equipment must be inspected before the exception is implemented.
- Dry fire exercise, blank or simulated ammunition only.
- Never point or aim at personnel who are not involved in the exercise.
- Dry fire training must be organised in such a way that the gunners are not compelled to aim or point at each other when sighting each other is not the purpose of the training.

3.2.1.3 Responsibilities of the individual

The individual must:

- comply with the weapons regulations,

  intervene in the event of any handling or use of weapons or ammunition in contravention of applicable safety provisions,

  Before and during firing, ensure that:

  - the ammunition received is of the correct type
  - the ammunition is clean and undamaged
  - wrong type of ammunition or damaged ammunition is returned
  - ready for combat procedure has been performed for the weapon
  - the weapon has the correct barrel
  - the correct recoil amplifier/flash suppressor and bolt have been mounted
  - the barrel is undamaged and free of foreign objects

The following is prohibited:

- Using ammunition that is not approved for the weapon
- Using ammunition for purposes other than what is intended
- Separating ammunition or ammunition components without permission from the competent authority for ammunition
- Mixing different types of ammunition.
  - The OCE can order exceptions from this regulation by mixing live and blank ammunition in order to force the weapon to malfunction during instruction, training and exercises.

3.2.1.4 Instruction, training and exercises

During instruction, training and exercises the individual is responsible for ensuring that:

- the individual is not in possession of ammunition on completion of instruction, training and exercise. If any ammunition is found, it must be delivered to an immediate superior
- During the use of live ammunition: stop firing if people or animals enter a surface danger zone.

The firing commander, instructor or person in charge of the activity must ensure that:

- all handling of weapons and ammunition is in accordance with the safety regulations
- the issue and return of ammunition is organised so as to prevent different types of ammunition becoming mixed
- all participating personnel are checked after firing
- the inspection itself should normally be conducted by an officer

3.2.1.5 Inspection and pat-down

Shall be conducted prior to instruction, dry run, after firing (including using blank ammunition) and when changing between ammunition types when this is necessary.

- All weapons, barrels and replacement barrels must be inspected
- All locations where there might be ammunition must be inspected; for example magazines, combat equipment, bags, helmets, barrel cases, vehicles etc.
- Lamps must be used when required. Inspectors must feel in addition to looking, and do so without gloves

3.2.1.6 Inspecting lasers

All battery-operated lasers from class 2 must be inspected

3.3 INDIVIDUAL FIRING AND UNIT FIRING

Figure: 3.3
HK416

3.3.1 General provisions

3.3.1.1 Shooting range instructions

All firing is to be conducted within the provisions provided in the manual for the relevant range/field. Where UD2-1 provides options not provided by the range instructions, this may be coordinated directly with the local field firing range administration, see point 0.1.2.3. Account must be made for, among other things:

- Other activity
- Environmental provisions
- UXOs

See also 1.1.5 – Activity management. Any need for permanent amendments to the instructions are fed back to the Norwegian Defence Estates Agency (NDEA).

3.3.1.2 Leadership

All live firing must take place under the direction of a qualified firing commander, in accordance with the provisions specified in “Activity management” point 1.1.4.

As a general rule, qualified officers may take charge of firing with their own unit or a unit at the same level, i.e. a platoon commander/platoon sergeant may take charge of firing at troop level, and a company commander/company sergeant may take charge of firing at company level. Deviations from this regulation may be made following an assessment by the officer commanding.

3.3.1.3 Progress in accordance with proficiency level

It is the firing commander's responsibility to ensure that the proficiency level is sufficient to increase the level of complexity, or to progress further.

3.3.1.4 Dry practice

The OCE and the firing commander determine whether a firing exercise shall be dry practised before it is carried out live, and to what extent. This is based on the exercising unit's actual instruction level/training standard, as well as the prevailing weather, surface and light conditions.

3.3.1.5 Combination of close quarters combat and shooting

It is not permitted to combined close quarters techniques against live opponents with sharp (read: deadly) ammunition. See also chapter 8.

3.3.1.6 Safety templates and ricochet angle

All combinations of weapons and ammunition have their own safety templates that describe the danger zone. The safety templates are in FOBID.

Common to all safety templates is that the ricochet angle *(ß)* is 45°, i.e. from the first possible point of impact (Dmin) there must be no friendly forces within a 45° angle of the direction of fire, and beyond to the maximum ricochet spread (WR).

3.3.1.7 The 45° rule

The 45° rule states that the first possible point of impact is set at 0 metres, and this applies unless the requirements are met for using one of the other angle rules. The reason for this is that it is often difficult to evaluate bearing and shield clearance. This is particularly the case when firing in darkness.

In general, there should be no personnel within a 45° angle of the direction of fire.

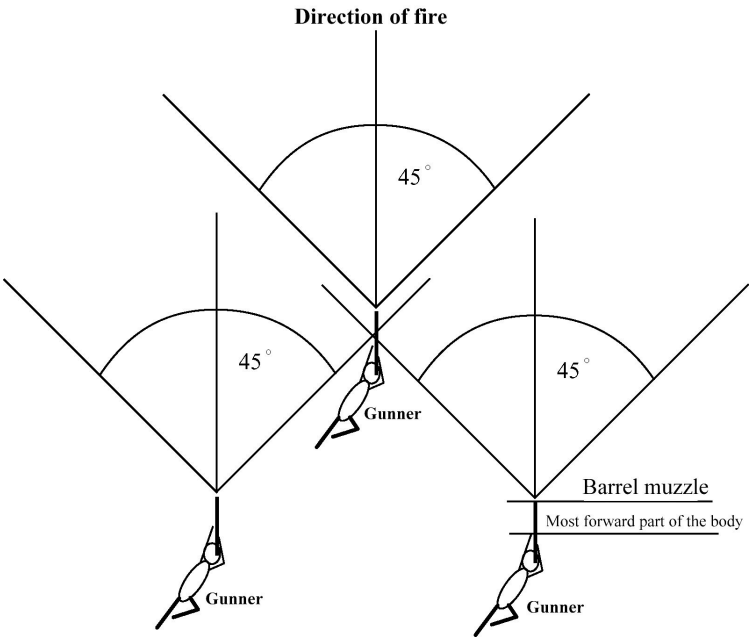


Figure: 3.4
The 45° rule

3.3.1.8 Other angle rules – Exceptions from the 45° rule

- When there is safe cover (for the ammunition type in question) between the gunner and other personnel. See Appendix 9
- If there is sufficient distance for other areas to fall outside the safety template.
- When firing above and to the side of personnel (point 3.3.3.2).
- During live firing exercises (point 3.3.3.3).

3.3.2 Safety in case of individual and unit firing

3.3.2.1 In general

The requirement for any firing is knowing the locations of others who may be affected by your own fire. If this is not known, the 45° rule and the exceptions described in 3.3.3 become irrelevant. This principle corresponds to weapon regulation number 5: Familiarise yourself with the target – what is around, in front of and behind it.

The various rules for firing angles represent knowledge that can only be applied if it is known where other personnel are located, as well as any obstacles on the trajectory.

There must be sufficient fire-coordination measures between the gunner or firing unit and any personnel to the side of the trajectory.

3.3.2.2 Safety organisation

- The safety organisation must be in accordance with point 1.1.4.
- There must be a sufficient number of instructors or safety supervisors to maintain an overall view of all participating units and weapon systems. The norm is one safety supervisor per mobile unit and unit weapon, though the officer commanding makes decisions based on the unit's level of training, the complexity of the exercise and the prevailing conditions.
- The safety supervisors must be positioned and equipped so as to allow then to stop firing immediately should a dangerous situation arise.
- When live fire exercises involve multiple mobile units, safety supervisors must have tactical communications equipment that is tuned to the training unit's network, so that they have the same situational understanding as the unit that is training, and well as the opportunity to intervene when necessary.

3.3.2.3 Firing in darkness and in poor light conditions

Figure: 3.5
Firing in darkness

In addition to the other provisions for individual firing and unit firing, the following also apply:

- All participating personnel/units and safety supervisors must be marked with a light source such as a lamp, strobe, light stick or similar on their body.
- If it is the case that not all safety supervisors or training personnel have night vision devices, the marking must use visible light.

- Target materials must not be marked so as to leave any room for confusion between materials and personnel
- Particular caution must be observed with respect to marking when aiming devices and target marking in the thermal spectrum are combined with aiming devices and target marking in the visible or infra-red spectrum
- The safety supervisors must be able to see as well as training personnel in darkness and light.
- All safety supervisors must be in possession of a lamp with a white light.

3.3.3 Other angle rules in case of personal and unit weapons

3.3.3.1 In general

The angle of fire may be less than 45° when based on specific conditions. This is in order to:

1. make best use of fire support, terrain or a position. In these cases, use is made of the safety regulations for firing above and to the side of personnel, any safety templates or assessment of safe cover.
2. demonstrate specific elements, such as the difference between gunfire and bullet strikes, or to experience the effect of suppressive fire. In this case use is made of the regulations for combat familiarisation firing or assessment of safe cover.

The regulations may be used where units have adequate proficiency in the handling of weapons and operating as a unit.

The regulations are not intended for use at individual level, though they may be used as intended where the level of training is considered adequate. Be aware of D_{min}.

The officer commanding, or someone appointed by this person, can allow use of these regulations.

Regardless of the angle rule, allowance must be made for the risk of fragments or secondary splinters.

Except for during live firing exercises, firing must not usually be conducted closer than 6 metres to the side of friendly personnel. This is due to little time available to cease fire if anyone enters a danger zone. Where both the gunner and the person alongside whom fire is directed are both static, then this distance can be reduced to 2 meters if firing single shots from an assault rifle, sub-machine gun or pistol.

When choosing between mils or metres as units, the option that gives the greatest distance must be used.

Firing over and to the side of personnel is prohibited if using:

- a GLM or anti-tank weapon

3.3.3.2 Firing above and to the side of personnel

Firing above and to the side of personnel with a minimum firing angle of 200^{-} is permitted subject to the following provisions:

- The gunner must be static
- The first possible hitpoint must be so far forward that the ricochet angle (45°) is beyond own personnel.
- The weapon and the barrels used must be sighted.
- The minimum distance as in 3.3.3.1 must be complied with.

Firing above and to the side of personnel using a minimum angle of 100- is permitted subject to the following additional provisions:

- The weapon is on a fixed line (with vertical and horizontal stops).
- A gunner checks fast lines throughout.
- Firing to the side of personnel must be coordinated between the firing unit and the unit it is firing past.
- The extent of the firing zone and the danger zone must be defined.
- In case of instruction, training and exercises, a safety supervisor must be present during operation of weapons.
- In case of instruction, training and exercises, the weapons must be test-fired from the firing position.

3.3.3.3 Life firing exercises

In the absence of safe cover, life firing exercises are permitted subject to the following provisions:

- Weapons may only be fired on fixed lines or in cradle mounts. The MINIMI 5.56 must not be used.
- Bursts must be no more than 8-10 shots and the firing position must be checked between bursts.
- If more than one weapon is used, each gunner must be assigned their own firing sector. The firing sectors must not overlap in the area where there is firing above personnel.
- If more than one weapon is used, each gunner must be assigned their own firing sector. The firing sectors must not overlap in the area where there is firing above personnel.
- There must be no more than two weapons per safety supervisor at a firing stand.
- There must be a distance of no more than 100 metres to the over-firing location.
- Weapons and barrels must be sighted.
- The weapons must be test-fired from the position.
- The height for firing above personnel must be at least 3 metres from crawling personnel, as long as the personnel are physically prevented from getting up.
- If there is no such physical obstacles, the over-firing height is increased to 5 metres.
- The height for firing above personnel is measured from the highest feature over which the personnel are required to traverse to the lowest hit in the dispersion

patter. If there are objects protruding higher up, the height must be measured from these.

- There must be no possibility of fragments or secondary splinters from objects behind the cover.

Where there is safe cover, live firing exercises are permitted using fire directed at or directly above the cover, subject to the following provisions:

- Cover in accordance with Appendix 9.
- The cover must satisfy the minimum height requirement at all points.
- No more than 400 metres to the cover.
- As a minimum, space for sitting upright behind the cover. There must be a minimum of 50cm between the personnel and the edge of the cover.
- There must be no possibility of fragments or secondary splinters from objects behind the cover.
- There must be a safety supervisor in communication with the firing commander located with the personnel who are beneath the firing.

3.4 FIRING WITH PERSONAL AND UNIT WEAPONS

Figure: 3.6
Firing a 12.7 mm machine gun on a tripod

3.4.1 General provisions

3.4.1.1 Safety templates

Details concerning the drawing up of safety templates are described in Appendix 1 “Designing templates for direct-firing weapons” and values for templates for the different weapon types can be found in Appendices 15, 16, 17, 18 and 19. “Input values for the preparation of safety templates”. Examples of calculated templates for use in planning are available in various scales in FOBID, attached to this directive’s document chart.

3.4.1.2 Distance between gunners

When firing weapons of calibres less than or equal to 12.7 mm, firing is prohibited when the next person’s ear is closer to the muzzle than 1 metre. **Exceptions to this may be made when using suppressors, in which case the distance can be reduced to 50 cm.**

For weapons with calibres larger than 12.7 mm, see relevant points under each weapon.

3.4.1.3 Checking the impact zone

Impact areas for projectiles that are closer than 20 metres from the shooter are to be checked in advance in order to ensure there will not be any ricochets or fragments that could potentially harm the personnel.

3.4.1.4 Risk of self-ignition

If automatic weapons become so hot that there is a danger of self-ignition, the weapon must be unloaded within 10 seconds. If this cannot be done, at least 5 minutes must be left to elapse with the weapon pointing in a safe direction before emptying.

3.4.1.5 Short range training ammunition

Short range training ammunition must be treated as live ammunition and must under no circumstance be used as or mixed with blank ammunition.

The following additionally apply for 5.56 mm short range training ammunition:

- Weapons/barrels must be left to cool down (to approx. 20 degrees Celsius) when firing more than 200 shots due to the danger of cook-off
- Barrels and breaches must be cleaned (using a brush) after no more than 500 shots (presuming that firing was commenced using a cleaned weapon), due to the risk of a projectile becoming stuck in the barrel

3.4.1.6 Blank ammunition

If a recoil amplifier has not been fitted to weapons of calibres up to and including 12.7 mm, the minimum target distance with blank ammunition directed at personnel is 20 metres.

If a recoil amplifier has been fitted to the weapon, and all participants are using eye protection, the following safety distances apply:

Weapon type	Safety distance
MP7	2 metres
MP5	2 metres
HK416	2 metres
HK417	2 metres
MINIMI 5,56mm	2 metres
MINIMI 7,62mm	2 metres
AG3	2 metres
MG-3	2 metres
FN MAG	2 metres
12,7mm MITR	10 metres

3.4.1.7 Using small firearms from vehicles

All weapons should normally be emptied before entering a vehicle or tank.

See also point 3.11.3.2.

3.4.2 Simunition training system

Bilateral exercises may be conducted using Simunition FX under the following provisions.

3.4.2.1 Firing commander

A firing commander for training with Simunition must have approved training as stipulated by the competent authority. In addition to the normal tasks, the firing commander is required to:

- ensure that Simunition ammunition is not mixed with other ammunition.
- ensure that unprotected personnel are not able to enter the danger zone unhindered

3.4.2.2 Ammunition

- Simunition FX (soft, coloured material): Used for bilateral exercises
- Simunition CQT (hard plastic): Used only for unilateral exercises
- Simunition Securiblank (propellant only): Used to simulate weapon effect during bilateral exercises
- Simunition FX ammunition has short storability and a defined date of expiry. The ammunition must be stored at 20°.
- The colourant will gradually dry up. Dried up ammunition must not be used during bilateral exercises. This ammunition can be used during unilateral exercises.
- When being used at temperatures below 5°, the OCE must frequently check that the ammunition has not become too hard.

3.4.2.3 Surface danger zone

A surface danger zone is defined at a radius of 75 metres. Safe cover, such as walls, can reduce this.

3.4.2.4 Personal protective equipment

All personnel located in the vicinity of the surface danger zone must use eye protection as a minimum. Personnel who are required to actively participate in bilateral exercises must also use:

- helmet
- face covering
- collar
- jockstrap
- gloves
- uniform covering the entire body (minimum two layers)

personal protective equipment must not be removed until the exercise has ceased.

3.4.2.5 Cleaning the barrel

Barrels and breaches must be cleaned (using a brush) after no more than the following numbers of shots:

P80: 80

C8: 80

HK416: 100

MINIMI 5,56: 100

3.4.3 12,7 mm MITR

3.4.3.1 Special provisions for multi-purpose (MP) ammunition

Firing using 12.7 mm Multipurpose (MP, MP-T) and APS ammunition is subject to special provisions for firing at ground and air targets. If a projectile fails to detonate on impact, it must be considered a UXO. The impact area for firing towards ground targets must be a UXO zone, preferably with a hard surface in order to increase the chance of a projectile detonating.

The shortest permitted firing distance (A min) for live ammunition (MP, MP-T and APS) towards authorised ground targets is 100 metres.

Firing towards air targets must be conducted on authorised firing ranges where the impact area is over water.

3.4.4 40 mm grenade launcher (GLM)

3.4.4.1 The safety supervisor

The safety supervisor must ensure that:

- the muzzle of the grenade barrel is free of snow and dirt
- the grenade has an unobstructed path to the target, particularly with regard to the weapon having a bearing angle. ,

3.4.4.2 The gunner

The gunner is responsible for:

- the muzzle of the grenade barrel is free of snow and dirt
- the grenade has an unobstructed path to the target, particularly with regard to the weapon having a bearing angle. ,

3.4.4.3 Moving with a loaded weapon

Movement is permitted with the weapon loaded and secured.

The exception to this regulation is when the weapon is not mounted on an HK416 or used as a primary weapon, In which case the GLM must be loaded when it is in position and there is an intention to fire. If firing is not undertaken, the weapon must be unloaded before further movement.

3.4.4.4 Special provisions for HE ordnance

Firing with HE ordnance requires approved UXO zones

HE ordnance has an inbuilt self-destructor that detonates the ordnance after about eight seconds. If this works and the ordnance detonates, it will not be regarded as a UXO. In the event of a misfire, the trigger must be pulled again immediately. If there is another misfire, at least 1 minute must be left to elapse with the weapon pointing in a safe

direction before emptying the weapon. The ordnance must be dealt with by qualified personnel.

3.4.5 Fumes

3.4.5.1 Carbon monoxide poisoning

Figure: 3.7
Gun smoke in connection with firing

When firing from covered and enclosed positions, vehicles, tanks, etc., the fumes may cause carbon monoxide poisoning. During training it is important to observe the following if there is a danger of carbon monoxide poisoning:

- If there is a ventilation system / overpressure system, this must be switched on
- where vehicles do no have ventilation systems, the hatches must be open
- a total airing-out must be conducted as soon as possible
- the position and/or the vehicle must under no circumstance be locked or closed

Normal filter cartridges for ventilator masks do not protect against carbon monoxide poisoning. Indoor shooting ranges are subject to specific provisions. These must be included in the instructions for the range.

3.4.5.2 Preventive health measures

Preventive health measures related to firing with 5.56 mm NM255/256 lead-free ammunition, and also lead ammunition:

- Firing is only permitted at outdoor ranges or at enclosed/covered stands using approved ventilation.
- In the event of any signs of health complaints, firing must cease immediately. The firing commander will assess the situation and determine whether firing may continue. Personnel displaying signs of health complaints must be examined by health personnel.
- A break must be taken once every hour when firing indoors or in enclosed/ covered stands in order to get fresh air.

- During firing at enclosed/covered stands, the total firing time per normal working day (8 hours) shall normally not exceed 4 hours.

3.4.6 Firing at steel targets

3.4.6.1 In general

Since firing at steel targets may involve an increased risk of injury, it is important for the firing commander to:

- check that the ammunition is of the correct type for the type of target and safety distance,
- ensure that the target arrangement complies with the rules as set out below, and that splinters from the ammunition do not destroy firing range structures or other target materials,
- allow for gunner error if planning exercises using mixed target materials and different ammunition types.

3.4.6.2 Calibres and ammunition type

All small arms calibres in rifles, pistols and shotguns can be used on steel targets, with the following exceptions:

- 12 gauge shotgun ammunition with steel shot as this can produce an extremely high ricochet risk.
- 12 gauge ammunition destroys standard steel targets and is only used on “shot-out” targets at a distance of more than 75 metres.
- 12.7 mm, all ammunition types, as these destroy standard steel targets.
- Armour-piercing ammunition, all calibres destroy standard steel targets and increase the risk of ricochets. Can only be used on “shot-out” steel targets at a distance of more than 200 metres

There are three types of ammunition for use on steel targets. These have different characteristics and safety distances:

- Frangible ammunition is the primary ammunition for use on steel targets because of its limited ricochet risk.
- Lead-containing full metal jacket ammunition. Secondary ammunition for use on steel targets. Limited ricochet risk. Creates lead and shell fragments in the area beneath/surrounding targets.
- Steel-core ammunition is a tertiary choice for firing at steel targets. Increased risk of ricochets and fragmentation. Creates steel and shell fragments in a large area beneath/surrounding targets.

3.4.6.3 Minimum target distances

	Frangible	Lead core	Steel- and copper-core
4,6 mm	0,5 m	5 m	50 m
9 mm	0,5 m	10 m	15 m
5,56 mm	0,5 m	10 m*	100 m
7,62 mm	2 m	25 m	150 m
.338	5 m**	50 m**	200 m
Kal. 12	2 m***	5 m***	Not permitted

* 5.56 lead ammunition with a SS109 projectile has a hardened steel penetrator that gives an increased risk of ricochet, has a minimum distance of **50** metres.

** .338 should not be used at a distance of less than 200 metres to prevent damaging the targets.

*** Only applies to shotgun ammunition (trap/skeet/buckshot). Compact projectiles (slugs/Hatton) should not be used on steel targets as they destroy the targets. By increasing the distances, the risk of ricochets will be further reduced as well as reducing wear and tear to the targets.

3.4.6.4 Condition of targets – short/long range

All targets must be inspected by the firing commander before use to detect uneven surfaces that could increase risk.

Targets that have dents or uneven surfaces must not be used at short range, regardless of the calibre and ammunition.

3.4.6.5 Ricochets

Ricochets and fragments from targets primarily occur almost parallel to the target surface. Targets must be placed so that they are facing directly towards the gunner. If the targets have been placed at a large angle to the gunner, this may lead to reduced shattering of the projectiles, which will increase the risk of ricochets.

Frangible ammunition produces a low ricochet risk. The projectiles disintegrate when striking steel targets and are reduced to “metal powder”. However, these small fragments have a degree of energy that can cause injury through improper use. Overall, frangible ammunition significantly reduces risk and is therefore the primary type of ammunition for use on steel targets.

3.4.6.6 Set up and angles

The steel targets are of the type that are angled downwards. This is to direct fragmentation down to the ground. If firing is done at ranges of less than **50** metres, the targets MUST be angled downwards (not applicable to frangible ammunition).

Steel targets must be deployed and firing exercises planned in such a way that the direction of fire is perpendicular to the targets as far as possible.

The angle of departure of the fragments must be taken into account when deploying the target layout. This means that the shooting range must sufficiently satisfy the interception of these fragments. Where applicable, there must be a lateral distance equivalent to at least three times the minimum target distance. If multiple steel targets are used on the same stand, these must be deployed either in line or at a minimum distance of 1 metre in depth. This is to prevent ricochets from striking another target thereby significantly altering the angle.

Gunners are also responsible for being aware of their position in relation to the targets and not fire at targets that are positioned at the wrong angle, see safety regulation no. 5: "Familiarise yourself with the target – what is around, in front of and behind it".

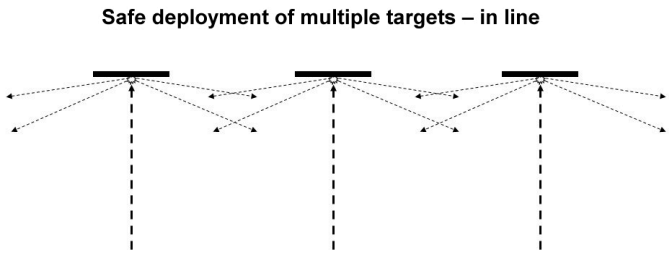


Figure: 3.8
Safe deployment of multiple targets – in line

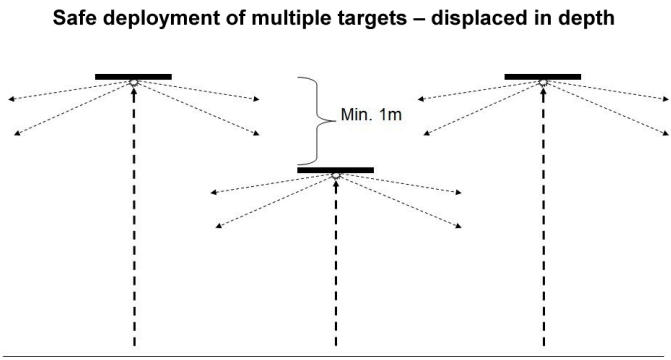


Figure: 3.9
Safe deployment of multiple targets – displaced in depth

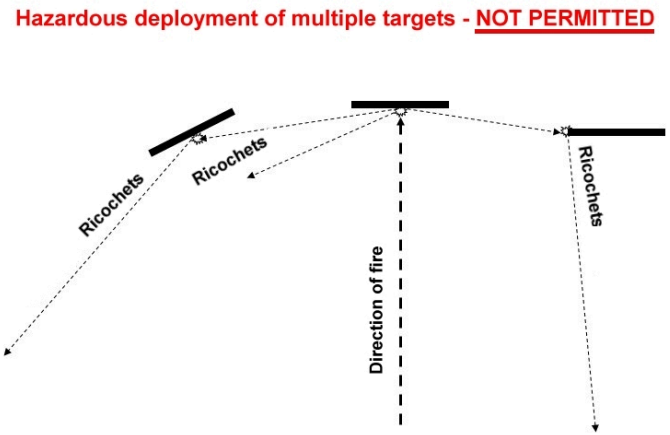


Figure: 3.10
Hazardous deployment of multiple targets – NOT PERMITTED

3.4.6.7 Ground

The ground must be of such a type that it does not increase the risk of ricochets, fragments or secondary splinters. For example, ground featuring hard surfaces that tilt towards the gunners (for example, large stones) must be avoided.

3.4.7 Suppressors

Suppressors may be used in accordance with the following provisions:

- An approved signature suppressor can be fitted to the HK416, HK417, MP7 and MRAD.
- After initial installation, it must be verified that the suppressor is in line with the barrel.
- After installation is complete, it must be verified that the suppressor is fitted firmly and that there is no slack between the weapon and the suppressor.
- Frangible ammunition must not be used, as fragments will destroy the suppressor.
- After a limited number of rounds, the suppressor will become very hot. The gunner must therefore exercise caution and not inflict burns on him/herself, others or materiel.

During instruction, training and exercises the following provisions apply.

- Weapons must always be unloaded and inspected prior to fitting a suppressor.
- Maximum continuous firing rate is 15 rounds per minute.
- In the case of rapid firing rate (> 15 per minute), the weapon and suppressor must be cooled after 90 rounds. Firing can resume once the suppressor is cold enough to be touched with bare hands.

- Cooling shall be via air cooling. During combat, the suppressor can be cooled with water.
- If the suppressor becomes so hot that it changes colour (glows), firing must cease and the bolt locked in the rear position. This is because of a risk of damaging the suppressor, as well as a risk of the weapon overheating with a subsequent “cook-off”.
- The weapon must be unloaded before any internal wetting of the suppressor.

3.4.8 Pistol

The use of a pistol is permitted according to the following provisions:

- Holsters must always be used when carrying a pistol. Pistols may not be carried in ammunition pouches or stuck into trousers/belts.
- Holsters with index finger systems or with safety locks undone may not be used due to an increased risk of accidental discharge.
- If the holster is worn at chest level, the gunner must be alert to weapon discharge when drawing the pistol.

3.5 MARKSMEN AND MARKSMEN WEAPONS

3.5.1 Approved marksmen

The Army Weapon School defines marksmen with various skills and at different levels. These are:

- LEVEL 1: User course Rifle, long range (RLR), HK417 and 12.7 AMR.
- LEVEL 2: Basic marksman training/marksman
- LEVEL 3: Advanced marksman training
- LEVEL 4: Marksman specialist
- LEVEL 5: Marksman instructor
- LEVEL 6: Marksman head instructor
- LEVEL 7: Marksman master instructor

Personnel who have completed training prior to 2017 will be converted as follows:

Previous course levels	**New level grading**
Marksman course level 1 or Technical Course 1 (HV)	Equivalent to User course HK417 and/or 12.7 AMR and Basic marksman training/marksman
Marksman course level 2 or Technical Course 2 (HV)	Advanced marksman training
Marksman course level 3	Marksman specialist (subject to completion of further training on MRAD .338)

3.5.2 Approved marksmen's weapons

The following weapons are defined as marksmen's weapons:

- HK416 with Elcan 1-4, M995 night telescopic sight or S&B PM II sight
- HK417 with S&B PM II sight
- MRAD .338 with PM II sight
- 12.7 AMR with PM II or Hensoldt sight

Other combinations of marksmen’s weapons and sights must not be used without the approval of the NDMA and a competent authority.

Individual weapons regulations indicate permitted firing rates. If the firing rate is exceeded, precision testing must be performed. In case of deviations, weapons must be sent for technical verification.

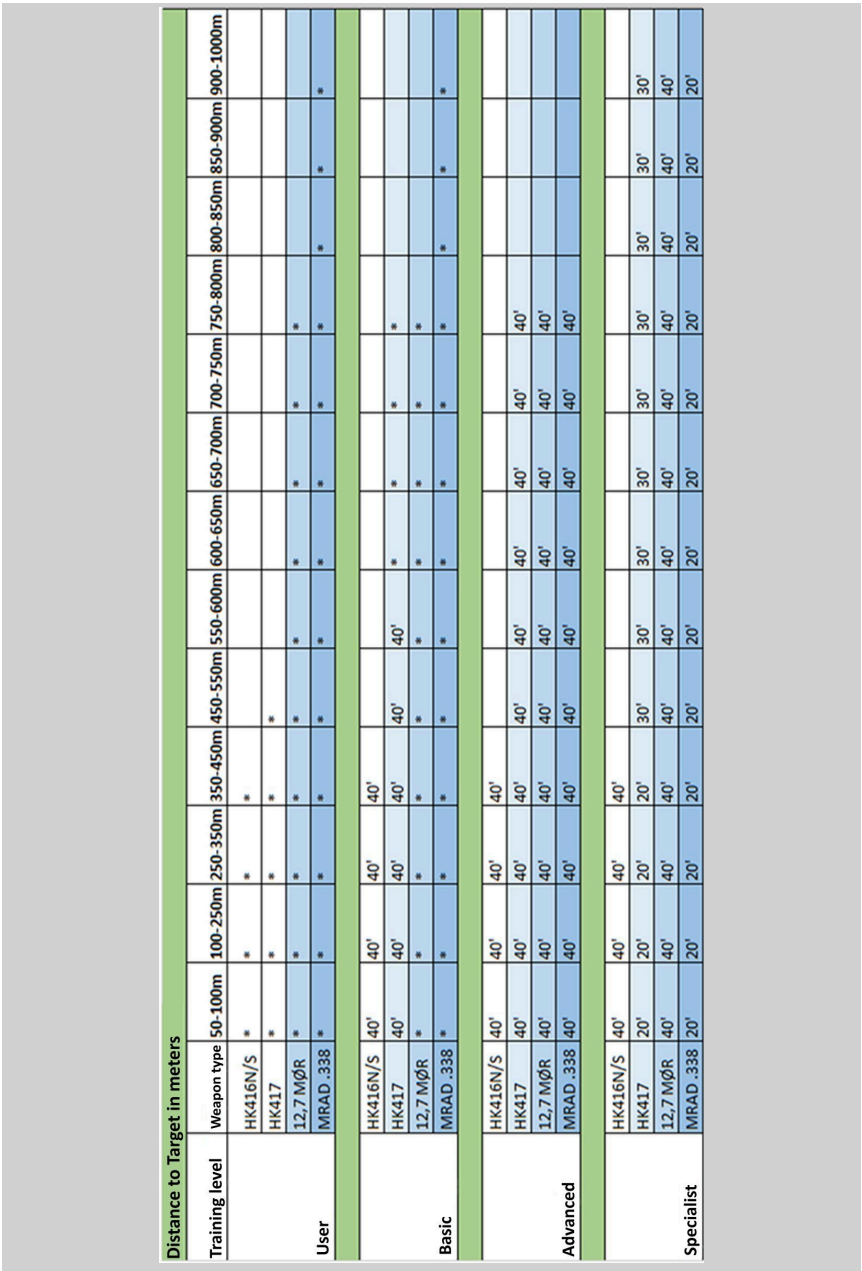
3.5.3 Firing to the side of personnel

Marksmen may fire to the side of personnel in accordance with the following provisions:

- The personnel member who will be firing shots, as well as the spotter, are approved according to a standard for the Norwegian Army's marksmen, levels 1-7.
- The maximum wind velocity at the gunner's location is 10m/s (90° to the direction of fire).

- The targets being fired at must be located beyond the position past which fire is directed. However, the target may be partly concealed, though no further than 1 metre from the obstacle (e.g. vegetation, window, sandbag position).
- There must be full shield clearance between the barrel and the target, i.e. uninterrupted flight for the projectile throughout its entire trajectory.
- Only full metal jacket, steel-free ammunition may be used, in view of the risk of fragments and ricochets.
- It is a requirement that the weapon has two firm supporting points (e.g. sack, bipod, tripod, sling, shooting stick/beanbag) in addition to the gunner themselves.
- It is the duty of the gunner and the spotter to assess their own marksmanship relative to their current proficiency levels and also to the prevailing weather, ground, wind and light conditions before firing to the side of personnel.
- For 5.56 mm ammunition, the maximum distance to the target is 400 m.
- The table stipulates the permitted safety angle when firing to the side of personnel. The angle is determined based on the passed and approved level of training. This forms the basis of all safety angles at a distance of less than 1,000 metres. Safety is further ensured by the maximum permissible distance to the target being determined by the marksman’s level of training.
- Firing to the side of personnel with marksmen's weapons applies to distances of less than 1,000 m.

The table shows the minimum permitted safety angle between target and firing position and assumes that the weapon and the ammunition used satisfy the accuracy requirement of less than 1 MOA. Safety angles in mils



Distance to Target in meters																		
Training level	Weapon type	50-100m	100-250m	250-350m	350-450m	450-550m	550-600m	600-650m	650-700m	700-750m	750-800m	800-850m	850-900m	900-1000m
User	HK416N/S	*	*	*	*									
	HK417	*	*	*	*									
	12,7 MØR	*	*	*	*	*	*	*	*	*	*			
	MRAD .338	*	*	*	*	*	*	*	*	*	*	*	*	*
Basic	HK416N/S	40'	40'	40'	40'									
	HK417	40'	40'	40'	40'	40'	40'	*	*	*	*			
	12,7 MØR	*	*	*	*	*	*	*	*	*	*			
	MRAD .338	*	*	*	*	*	*	*	*	*	*	*	*	*
Advanced	HK416N/S	40'	40'	40'	40'									
	HK417	40'	40'	40'	40'	40'	40'	40'	40'	40'	40'			
	12,7 MØR	40'	40'	40'	40'	40'	40'	40'	40'	40'	40'			
	MRAD .338	40'	40'	40'	40'	40'	40'	40'	40'	40'				
Specialist	HK416N/S	40'	40'	40'	40'									
	HK417	20'	20'	20'	30'	30'	30'	30'	30'	30'	30'	30'	30'	30'
	12,7 MØR	40'	40'	40'	40'	40'	40'	40'	40'	40'	40'	40'	40'	40'
	MRAD .338	20'	20'	20'	20'	20'	20'	20'	20'	20'	20'	20'	20'	20'

Figure: 3.11

** See chapter 3.3.1.8 Other angle rules – Exceptions from the 45° rule*

3.5.4 Training and exercises with marksmen’s weapons

- When firing from a helicopter, a case catcher must be used.
- When firing from a moving platform such as a boat/vessel, vehicle or helicopter, the weapon must be secured to the gunner or the moving platform.
- If using a partner as a firing support, the partner must wear eye protection and a signature suppressor must be used.
- After firing using a signature suppressor, gloves should be sued for dismantling in order to avoid the risk of burn injuries.
- If firing through a loophole/gun slit, the gunner themselves is responsible for having a bearing angle. This must also be verified by a safety supervisor.
- When firing from buildings, doors, windows and hatches are secured using wedges or ropes so that they do not shut at the time of discharge. A firing commander and a safety supervisor are also responsible for establishing the necessary cordons and safety posts to prevent personnel moving into the gunner’s field of fire.
- When firing through a shield or a false wall, the screen must be no thicker than 2 mm. If it is any thicker, a firing slit must be made, with the weapon fired through a loophole.
- If using homogeneous bullets, tactical bonded ammunition or similar, permission must be obtained from the owner of the materiel (NDMA).
- When firing through glass that is front of the gunner and weapon, all nearby personnel must wear full combat gear and eye protection. Exposed areas are the face, neck and hands.
- If wearing a ghillie suit, proximity to naked flames must be avoided, including smoking cigarettes etc.
- When using blank ammunition, the safety provisions in point 3.4.1.6 Blank ammunition, apply.
- Before performing stalking and stealth exercises on a field firing range, the OCE must ensure that all participants have been informed and have control of other activity on the field firing range.

3.6 ILLUMINATION ROCKETS, AMMUNITION, VERY PISTOLS AND WARNING FLARES

3.6.1 Target area for illumination ammunition

During instruction, training and exercises, the target area for all illumination ammunition (illumination rockets, Very pistols, illumination shells) must be selected in such a way that buildings and easily ignitable materials are not located within a distance of 250 m.

3.6.2 Hand-fired illumination rockets

3.6.2.1 Provisions for use

The rocket must have an unobstructed path at point of discharge (clear of trees and bushes) The launching tube must be held against the side of the body during discharge to avoid burn injuries from the back-blast.

3.6.2.2 Firing illumination rockets from vehicles

Preparing and loading/unloading hand-held illumination rockets shall be conducted with the rocket on the outside of the vehicle/edge of the hatch.

3.6.2.3 Misfire

In the event of a misfire, the launching device must be held in the direction of fire for a minimum of 30 seconds. Misfires must be handled in such a way that they point at all times in a non-hazardous direction, in case delayed discharge occurs. Misfires must be delivered to competent personnel for destruction.

3.6.2.4 Personal protective equipment

Basic hearing protection must be worn by gunners as well as by personnel in the immediate vicinity.

3.6.3 Very pistols

3.6.3.1 Provisions for use

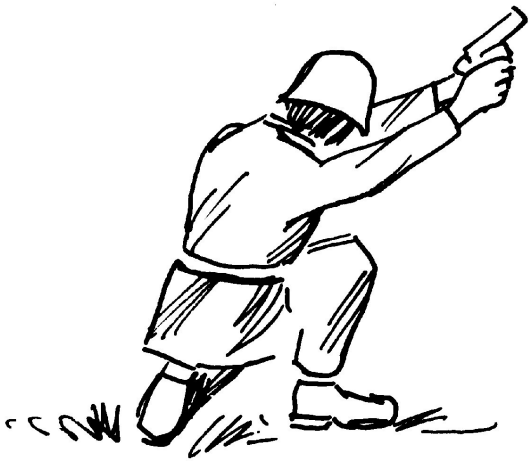


Figure: 3.12
Recommended firing position for Very pistols

3.6.3.2 Firing Very pistols from vehicles

The Very pistol must not be cocked or kept inside the vehicle when cocked.

3.6.3.3 Misfire

In case of a misfire, try firing again. In case of another misfire, wait 30 seconds with the firearm in the direction of firing. If possible, put the misfired round in an empty ammunition box or leave it on the ground and mark it for further handling by qualified personnel.

3.6.3.4 Personal protective equipment

Basic hearing protection must be worn by gunners as well as by personnel in the immediate vicinity.

3.6.4 Warning flares

3.6.4.1 Provisions for use

During instruction, training and exercises the person with responsibility for assembling the warning flare is responsible for ensuring that:

- the warning flare is located in such a way that it cannot injure personnel triggering it (minimum 2 metres above ground, preferably pointing directly upwards)
- the warning flare is taken down after the end of the exercise
- the warning flare is only used outdoors

- the assembled flare is properly attached
- combustible material within 0.5 m is removed
- any misfire is handled correctly

3.6.4.2 Misfire

In the event of a misfire, the flare must not be touched for 30 minutes. Unexploded ordnance must be handled in such a way that it points at all times in a non-hazardous direction, in case delayed discharge occurs. Unexploded ordnance must be delivered to qualified personnel for destruction.

3.6.4.3 Personal protective equipment

Protective goggles and basic hearing protection must be used for assembly and disassembly.

3.7 HAND GRENADES

Figure: 3.13

Practising grenade-throwing

3.7.1 In general

Points 3.7.3 to 3.7.5 apply regardless, though safety distances must be assessed as part of continuous risk assessment during operations.

Figure: 3.14

MOUT training with hand grenades

3.7.2 Definitions

3.7.2.1 Combat hand grenades

Loud shock and grenade fragments regardless of the model. A flash-bang does not count as a stun grenade in this context.

3.7.2.2 Instruction-throwing

Instruction-throwing is the throwing of combat grenades according to instruction on constructed courses (instruction courses) or artificial or natural cover with equivalent characteristics to those of the constructed courses. See point 3.7.10.1

3.7.2.3 Field-throwing

Field-throwing is the throwing of combat grenades on obstacle courses, with or without a combination of combat techniques, see point 3.7.10.2.

3.7.3 Personal protective equipment

As in chapter 3 generally. The OIC safety must assess the use of hand wear based on location.

3.7.4 Safety distances

GRENADE type	Dangerous radius	Safety distance for thrower*	Comment re. type indoors / equivalent
GRENADE, hand, fragmentation, DM 61	150 m	2 m	Forbidden in a (partly) enclosed space
GRENADE, hand, stun, HGR 85	30 m	2 m	Forbidden in a (partly) enclosed space
GRENADE, hand, stun HGO115M	30 m	2 m	
GRENADE, hand, stun HGO115M + 1 module	50 m	2 m	
GRENADE, hand, stun HGO115M + 2 modules	75 m	2 m	
		* if safe cover available	

GRENADE type	Dangerous radius	Comment
GRENADE, hand, stun, flashbang	5 m	May be set to 1 m if point 3.7.10.3 is complied with.
GRENADE, hand, training, HGT115M	10 m	May be set to 1 m if point 3.7.10.3 is complied with.
GRENADE, hand, training, DM 78	10 m	KMay be set to 1 m if point 3.7.10.3 is complied with.
GRENADE, hand, drill, (all types)	10 m	May be set to 1 m if point 3.7.10.3 is complied with.
GRENADE, hand, incendiary, (all types)	10 m	
GRENADE, hand, CS, (all types)	10 m	Forbidden in an enclosed space. Protective masks must be used closer than 5 metres.
See also separate provisions for use of CS / equivalent		
GRENADE, hand, smoke (accumulating)	5 m	Forbidden in an enclosed space. Protective masks must be used closer than 5 metres.

GRENADE, hand, smoke (spontaneous)	10 m	Forbidden in an enclosed space.

3.7.5 Safety regulations in general

3.7.5.1 Safety pin and pulling

Should normally be kept on the finger until the grenade has been thrown, in order to be able to verify arming in the event of a suspected UXO, and so that grenades can be made safe, if required, as in the following point.

3.7.5.2 Making an armed grenade safe

Should usually only be done with live grenades of models that have been designed to allow this. In other words, they must have a “twist-and-pull” pin, e.g. the HGO115M. The grenades should be used as soon as possible after they have been made safe.

3.7.5.3 When throwing hand grenades from moving vehicles, the grenade must be held outside the vehicle when the pin is pulled out.

3.7.5.4 Marking

It is prohibited to change the colour or appearance, or to obscure the model marking on grenades.

The exception is used practice fuses, which are set up for re-use in dry fire training. These may be marked using spray paint or similar if appropriate.

It is prohibited to mark any kind of grenade using tape, due to the risk that they may become caught on equipment or similar.

It is prohibited to tape the striking lever or the safety pin.

3.7.5.5 Storage

Hand grenades must normally be stored in such a way that the pull ring and the safety pin are protected, and the striking lever is held in place.

3.7.6 Safety provisions for specific grenades

3.7.6.1 HGO115M and add-on modules

HGO115M:

- freely used as in 3.7.4
- Fuses must not be stored separately to the grenade bodies. This can result in inadvertent ignition in case of impact or if dropped and thus injuries to personel.
- During instruction, training and exercises, the OCE/firing commander must be able to store loose fuses safely in an ammunition box or other suitable storage.
- During instruction, training and exercises, the room into which the grenade is thrown must have at least one window of normal size
- During operations, great caution is required when using grenades in rooms without windows or similar

+ 1 module:

- not permitted indoors or in slit trenches / equivalent during instruction, training and exercise. Grenades can be thrown in from the outside
- Use indoors / equivalent during operations is permitted, but this must be done with great caution

+ 2 module:

- Use during instruction, training and exercise requires the approval of a unit commander.
- Use indoors / equivalent during operations requires the approval of a unit commander.

Be aware of the possibility of getting a glove or similar trapped between modules during assembly.

3.7.6.2 HGT115M and DM78

Can be armed and re-used in accordance with procedures in relevant documentation for hand grenades.

Should be inspected before and whenever required during the activity. Must be inspected at the end of the activity.

3.7.6.3 Smoke grenades

- If personnel intentionally or unintentionally are present in or in transit through an area containing smoke, protective masks must usually be worn.
- When using spontaneous smoke, there is a risk of ejected fragments and TTC fluid. If TTC liquid makes contact with the eyes, nose, mouth or skin, immediately rinse with copious amounts of water for at least 15 minutes.

Instruction, training and exercises:

- Use of smoke is not permitted in confined or partially confined spaces, except for special exercises in the use of smoke diving equipment.
- Smoke shall be used outdoors to the extent that the objective is achieved without personnel being harmed. The objective will usually be for concealment or to create cover, and the concentration must not be higher than is required to achieve the objective.
- Smoke must not be allowed to enter areas where civilian personnel or domestic animals are located.

3.7.7 Unexploded fragmentation, stun and incendiary grenades

If there is unexploded ordnance, all personnel must remain under cover or outside the danger area for 30 minutes.

Clearance of UXOs can be performed by personnel with a class Ib demolition certificate.

Only personnel who have a class III demolition certificate are allowed to move UXOs.

3.7.7.1 Instruction, training and exercises:

No more grenades may be thrown in a danger zone until the UXO has been found and demolished or removed.

3.7.8 Unexploded flashbangs, smoke and gas grenades

Grenades that do not detonate/discharge must be left for at least 30 minutes, in case delayed detonation occurs. After this time the grenade must be visually inspected, and if the striking lever has completed its striking action, the grenade can be moved. It must be stored safely and appropriately until it is taken care of by qualified personnel.

3.7.9 Unexploded training grenades – all types

3.7.9.1 Unexploded grenades must be left for at least 5 minutes, in case delayed detonation occurs.

After this time the grenade must be visually inspected, and if the striking lever has completed its striking action, the grenade can be moved. It must be stored safely and appropriately until it is taken care of by qualified personnel.

3.7.10 Instruction, training and exercises

3.7.10.1 Instruction-throwing

Before instruction-throwing of live grenades can take place, basic instruction up to and including a valid safety test must be completed and passed.

OCE / firing commander:

- Checking that there is compliance with the requirement for prior knowledge.
- In addition to the customary duties, ensuring that all personnel located inside the indicated safety distance are under safe cover before throwing begins.
- Ensuring that UXOs are dealt with in accordance with applicable provisions.
- Giving a safety briefing and, if necessary, a dry-run in handling by

Other personnel:

- One safety supervisor in each throwing pit
- One officer commanding in the rest area

The safety supervisor:

- Remaining with the thrower in a position so as to be able to intervene immediately if required
- Checking that the thrower is not wearing any equipment that might impede throwing
- Checking that the hand grenades are primed
- Checking that the safety pin is not pulled until the order has been given
- Ensuring that the thrower and the safety officer both follow the grenade’s trajectory in order to see where it comes to rest. Then ensuring that both take cover immediately.

- Being aware that the time in flight in case of particularly high throws can be close to the ignition mechanism's burning period, to the extent that the safety supervisor in such cases must ensure cover is achieved earlier than normal in relation to the trajectory of the grenade.
- The safety supervisor must ensure the thrower is under safe cover in case of unanticipated events

Requirements for conducting the exercise:

Throwing from multiple pits within the same danger zone is permitted on permanent assault ranges, but only from one pit at a time. This is not permitted if using artificial or natural cover.

Only the thrower and the safety supervisor can be in the same position.

Requirements for positions for instruction-throwing:

- Primarily, pre-prepared hand grenade ranges with throwing pits are used.
- Secondarily, artificial or natural cover can be used where the following requirements are met:
    - Availability of safe cover for all anticipated or unanticipated events
    - Unobstructed throwing path
    - Compliance with provisions concerning terrain and vegetation in the intervening space
    - Coordination with the firing range administration

3.7.10.2 Throwing in the field

Requirements for the thrower:

Basic instruction must be completed and passed before carrying out the qualification exercise for field-throwing.

The qualification exercise must be adequately completed before any field-throwing.

OCE / firing commander:

- Assessing the location, and if necessary conducting a qualification test or equivalent location verification

In general:

- If necessary, the exercise must be gone through or dry-exercised beforehand
- When setting out targets, it must be checked that it is possible to throw at them from safe cover
- Only one hand grenade at a time may be thrown at the same target
- Targets and positions must be marked if required

Throwing in dark conditions:

Combat hand grenades should not normally be used. Any such use requires the approval of a unit commander.

Terrain and vegetation:

It must be possible to see where the grenade lands and comes to rest. If this is difficult, measures must be taken when throwing combat hand grenades to enable this. Potential examples are clearing or trampling the area around the targets and removing tall grass and such like. The throwing range must be free of vegetation or other objects that cause an unnecessarily high risk.

3.7.10.3 Bilateral use of flash-bangs and training hand grenades:

- When using flashbangs, role-players must stand upright to reduce the risk of the grenade detonating close to the body. This supersedes any provisions that role-players must lie down once they are “knocked out”.
- The OCE must consider and order use of mouth guards if necessary.
- Personnel within the exercise area must not remove personal protective gear before the order to do so has been given by a safety supervisor/OCE
- Grenades must not be thrown at role-players with the intention of hitting them.
- If a grenade lands within 1 metre of personnel, such personnel must relocate to a minimum distance of 1 metre
- Unsecured grenades must not be picked up / thrown back before they have detonated

3.7.10.4 Indoor use of combat hand grenades

Avoid prolonged exposure to dust or gas. If remaining in place for prolonged periods, personnel should use dust masks or similar. Efforts should be made to provide good ventilation.

Presence in a space adjacent to detonation should be limited to 15 detonations per day.

3.8 CLAYMORE MINES

Figure: 3.15
M-100 claymore mine

3.8.1 Claymore mines, light M-19, and heavy M-100

3.8.1.1 The use of M19 and M100 Claymore mines is defined as demolition.

3.8.1.2 For details for designing safety templates and data for constructing a safety template, see appendix 21When detonating Claymore mines, personnel must be ordered as described in UD 2-1 point 2.4.2.1.

3.8.1.3 When detonating M19 and M100 devices, the demolition leader is not required to have a class 1A demolition certificate provided that the demolition leader has trained in the use of M19 and M100 devices according to the Currriculum for M19 and M100 Claymore mines.

3.8.1.4 In the event of a UXO, there must be compliance with the provisions and waiting times applicable for the firing mechanism used for firing.

3.8.1.5 Personnel with class 1A certification are required for the demolition of M19 and M100 UXOs.

3.8.2 Firing stand for demonstration firing of M-19 and M-100 Claymore mines

3.8.2.1 Personnel can stay behind the blindage when detonating M-19 and M-100 Claymores in blindage built in accordance with figures 3.16 and 3.17. The minimum distance from the personnel to the blindage is 50m.

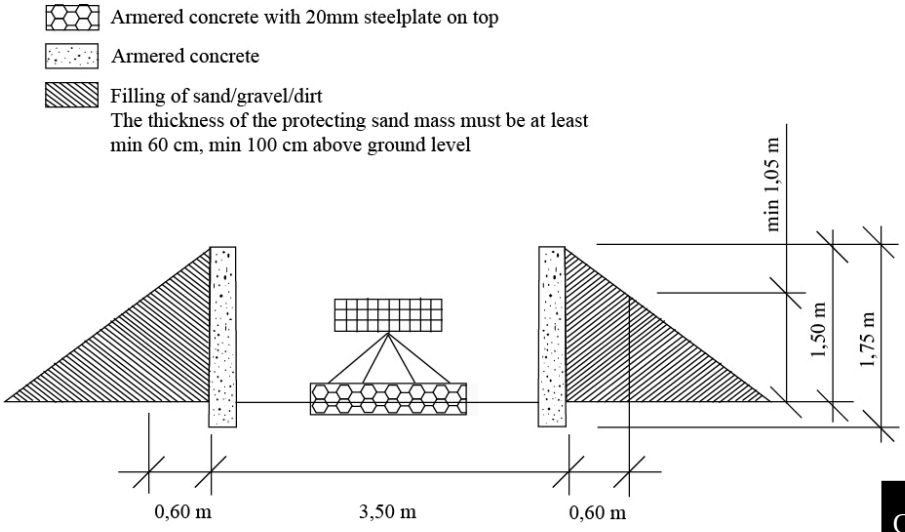


Figure: 3.16
Firing stand, seen from the side

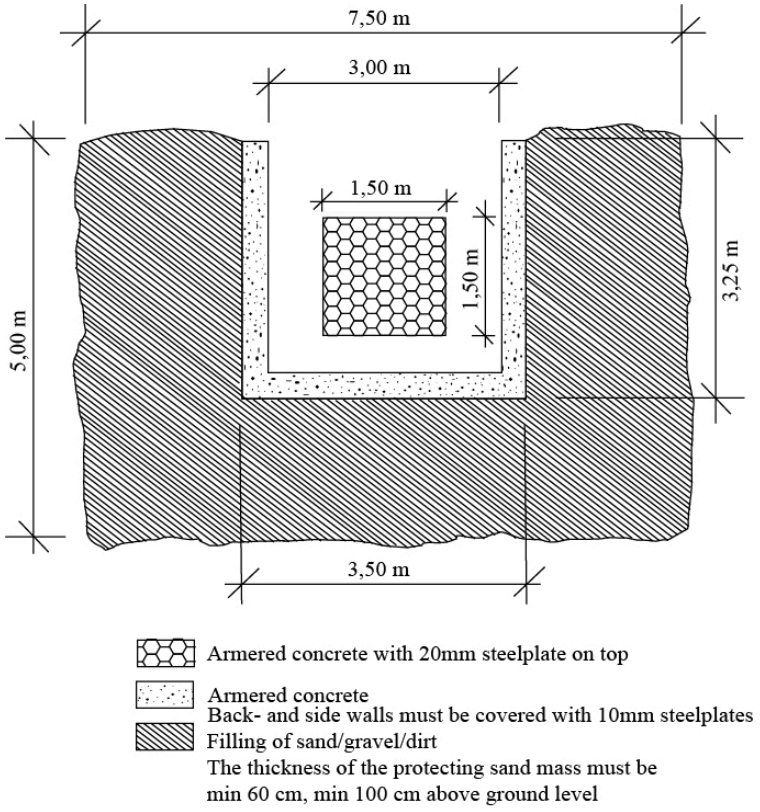


Figure: 3.17
Firing stand, seen from above

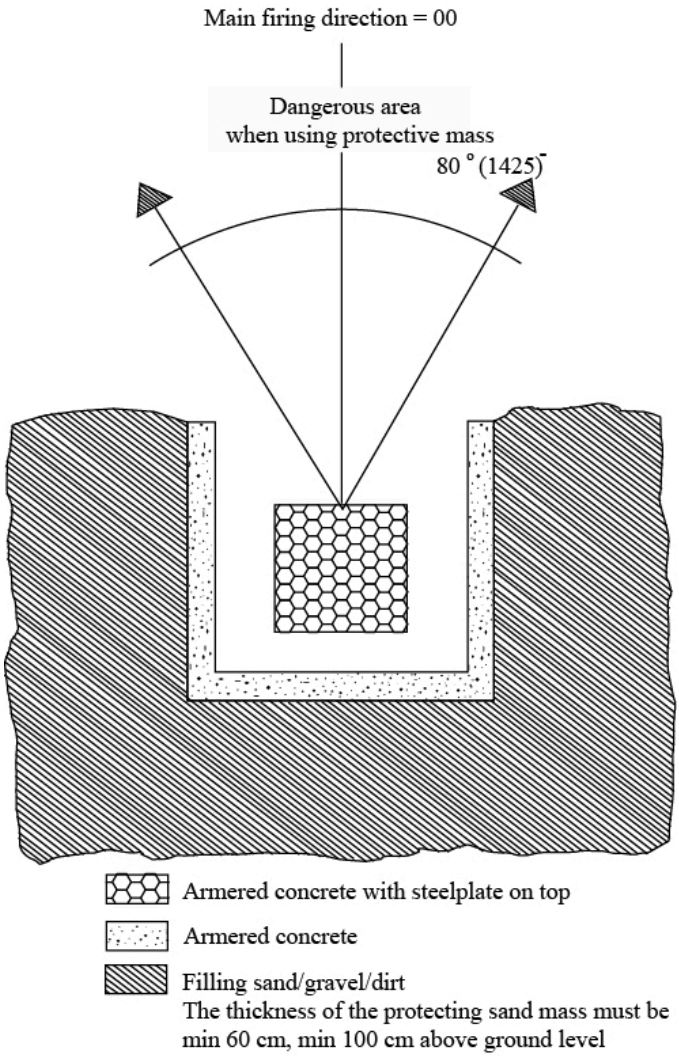


Figure: 3.18
Horizontal danger area

3.8.3 Use of cover when detonating M19 and M100 Claymores

3.8.3.1 If using constructed cover (e.g. a firing position), this must be constructed with a cover thickness in accordance with UD 2-1 appendix 9. (Use cover thicknesses as in the table for 12.7 mm ball ammunition)

3.8.3.2 If using natural cover (e.g. a cliff, elevated position or similar), the cover thickness must, as a minimum, correspond to the cover thickness as in UD 2-1 appendix 9. (Use cover thicknesses as in the table for 12.7 mm ball ammunition)

3.8.3.3 The charge must be placed at least 50 metres away from the cover.

3.9 MORTARS

Figure: 3.19

Firing a mortar from a CV90RWSBK

3.9.1 In general

These provisions are applicable to firing an 81 mm mortar. The provisions take precedence over any provisions in the weapon regulations and manuals. When firing any other country's indirect fire systems either in Norway or abroad, these provisions shall apply wherever possible. Any adaptations must be submitted to the competent authority.

3.9.1.1 Leadership and supervision personnel

During instruction, training and exercises using live ammunition, the following personnel shall normally be assigned:

- Firing commander
- Safety officer in the command post
- Safety supervisor in each observation post
- Safety supervisor at each weapon
- Safety post(s) where required

These are roles that the platoon itself will fill using qualified personnel, with no external safety apparatus required to fire a mortar.

3.9.1.2 Firing Commander

The firing commander is normally a platoon commander. The firing commander must have completed certifying training in commanding firing with mortars as provided by

the Norwegian Army Land Warfare Centre. In addition to his/her normal duties, (point. 1.1.4.4), the firing commander:

- Must be responsible for all firing with mortars can, if necessary, delegate fire command authority to a safety officer
- Is responsible for ordering and checking that airspace has been allocated and is available for the firing in question
- Has coordination responsibility with respect to other units on the firing range
- Must familiarise himself/herself with and comply with the firing instruction(s)

3.9.1.3 The Safety Officer in the command post

The safety officer is normally the command post officer or the platoon sergeant. In addition to his/her normal duties (point. 1.1.4.6), the safety officer must also:

Before firing:

- Define the target area for the firing and check that all targets are within the target area.
- Measure out left and right limits and loading blocks for all weapons and report this to the weapons section.
- Define a vertical surface danger zone and make a note of any height restrictions on the projectile's trajectory.

While putting up signs:

- Check that all fire data sent from the command post to the weapon section fall within the above restrictions.
- Ensure that all internal dialogue, as well as dialogue to and from the command post, is double-checked.
- Log firing data for any misfires or malfunctions of ammunition and fire control systems to allow later follow-up.

The tasks of the safety officer can be fulfilled by the firing commander if necessary.

3.9.1.4 Safety supervisor at each weapon

Safety supervisors at mortar stands are normally group commanders. In addition to his/her normal duties (item 1.1.4.6) the safety supervisor shall:

- Order marking/restriction of the fire sector in accordance with information from the safety officer.
- Ensure that double hearing protection (point. 3.1.1.2), helmets (point. 3.1.1.3) and eye protection (point. 3.1.1.1) is use by gun crews and any other personnel in the immediate proximity. Personnel within 100 m of the weapon system must use double hearing protection.
- Ensure that all internal dialogue, as well as dialogue to and from the weapon team, is double-checked.
- Before firing, ensure the mortar's fixation and orientation.

- Check that the mortar is aligned within the marked-out left and right limits prior to each fire command.
- Check that the weapon has shield clearance.
- Ensure that there is compliance with imposed restrictions on charge and elevation.

3.9.1.5 Safety supervisor in each observation post

The safety supervisor in an observation post is normally the patrol leader. In addition to his/her normal duties (item 1.1.4.6) the safety supervisor shall:

- Scan the target area visually before and after firing to ensure that the area is clear.
- Ensure that all internal dialogue, as well as dialogue to and from the observation post, is double-checked.
- Check the impact pattern and continuously report safety challenges to the command post.
- Advise the firing commander about any transition from unconfirmed fire control data to confirmed fire control data, and from confirmed fire control data to unconfirmed fire control data.
- Insofar as is possible, count impacts and report any UXOs to the command post.

3.9.1.6 Surface danger zone

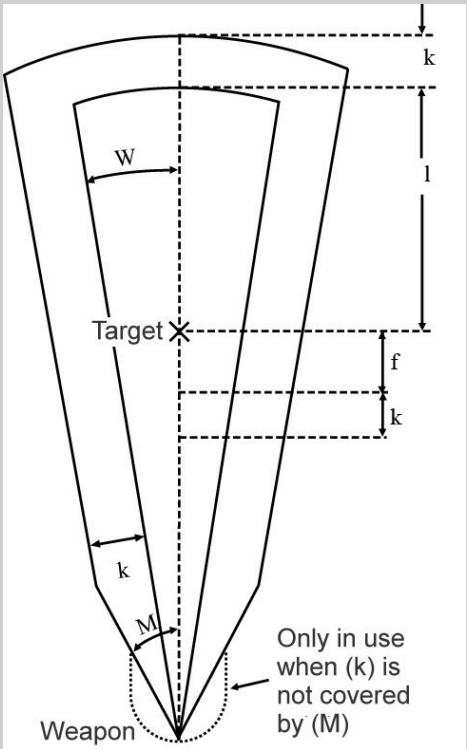


Figure: 3.20
Surface danger zone when firing with barrel-safe fuses

Surface danger zone is shown in the figure above.

- Personnel are not permitted within this zone (except when firing above personnel, see 3.9.4).
- The vertical surface danger zone is the airspace above the figure. It is defined by starting with the apex of the projectile trajectory plus fragment distance (k) and the height of the observer's position relative to each mortar. The apex is calculated based on ammunition, charge and elevation. Safe height is calculated based on this and rounded up to the closest 1,000 feet [approx. 305 m]. Note that vertical surface danger zone is usually expressed in feet above sea level (MSL), see Appendix 7 for further information.
- The following data provides the basis of all ammunition types:

		Unconfirmed fire control data (ITG)	**Confirmed fire control data (ITG)**
A_{max}	Longest target distance for the charge		
A	Actual target distance		
A_{min}	Shortest target distance for the charge		
l	Hazardous distance for hits beyond the target	20% of A, but minimum 340 metres	10% of A, but minimum 170 metres
f+k	Hazardous distance for hits this side of the target	0.4 x A_{min}, but at least 500 metres	0.4 x A_{min}, but at least 500 metres
W	Angle of lateral dispersion	100 mils	50 mils
M	Safety angle	500 mils	500 mils
k	Distance for fragments	300 m	300 m

NB: When using manual safety templates, A_{max} is used to calculate the value l.

Use of safety templates for confirmed fire control data must be determined by the firing commander. The values for confirmed fire control data may be used when one of the following factors has been complied with:

- Area of impact supports confirmed fire control data
- Weather, powder temperature, (target, OP, weapon) in accordance with FR 8-16
- Control point has been registered

3.9.1.7 Target distance

Table for A_{min} and A_{max} for for the individual charges:

Grenade type	NM 123 (SPR)		WP G40 (SMOKE)		NM 150 (LIGHT)	
Charge	A_{min}	A_{max}	A_{min}	A_{max}	A_{min}	A_{max}
0	500	520	300	450		
1	500	1480	300	1200	600	1300
2	840	2440	450	2100	1000	2300
3	1160	3380	650	3000	1300	3200
4	1480	4240	800	3800	1700	4000
5	1740	5030	950	4500	2000	4700
6	2010	5800	1100	5200	4500	5500

During instruction, training and exercises it is not permitted to fire with charge 0

3.9.1.8 Protective equipment

Double hearing protection (point. 3.1.1.2), helmet (point. 3.1.1.3) and eye protection (point. 3.1.1.1) must be used by the gun crew and any other personnel in the immediate vicinity. Personnel within 100 m of the weapon system must use double hearing protection.

3.9.2 Use of the fire control system for safety control during firing

3.9.2.1 In order for the fire control system to be able to ensure safety, it must be in “peace mode”, and the following data must be entered and checked by the safety officer:

- The weapon's bearing data
- OP positions
- Points with restrictions
- The target area’s boundaries with minimum and maximum permitted heights
- Left and right restriction

The following data is entered, where required:

- Crest data
- Weather data
- Powder temperature

Use of the fire control system's "War Mode" as a safety check is regulated by the director of the operation by orders, ROE or similar. "War Mode" may not be used to perform safety checks during instruction, training and exercises.

If use of "War Mode" is not permitted for safety checks, safety checks are performed manually using safety templates. The fire control system may not be used for safety checks when firing over personnel.

3.9.3 Direct firing

When the mortar is used for direct firing, the following provisions apply:

- Whenever the command post of the observation post are not present during firing, the weapon line can nevertheless fire directly. This is on condition that the firing commander in charge fulfils the requirements in 3.9.1.2.
- The roles of "safety supervisor at observation post" and "safety officer in command post" are not required, with these tasks instead being carried out by a firing commander.
- A firing commander may also fill the role of safety supervisor at a weapon.

3.9.4 Firing above personnel

3.9.4.1 Firing above personnel with mortars is permitted subject to the following provisions:

- The area between the mortar and the surface danger zone around the target must be designated as area under the trajectory path.

- In the area under the trajectory path, it is only permitted to be present in a cover position that is safe in case of a full impact hit. Safe in case of a full impact hit is taken to mean M113, CV90 combat vehicle or similar with sealed hatches (closed and locked).
- Firing above personnel is prohibited when the proximity function of the fuse is selected.

The hazardous zone around the target is defined by:

- hazardous distance to impact on this side of the target (f)
- hazardous distance to impact beyond the target (I)
- angle of lateral dispersion (W)
- fragment distance (k). This is set at 50 m for all types of ammunition

Note that some of these factors are dependent on distance from the weapon to the sighting point, and a surface danger zone around the target will vary with firing distance.

3.9.5 Burning sub-charges

The mortar crew can themselves burn up to 2 kg of sub-charges in accordance with guidance issued in UD 6-20-1. Burning of more than 2 kg of sub-charges must be done by personnel with a class 1B blasting certificate.

3.10 ANTI-TANK WEAPONS

3.10.1 General provisions

3.10.1.1 General

- When firing anti-tank weapons, a helmet must always be worn, in addition to other personal protective equipment.
- No-one may be present in, or moving into, the surface danger zone in front of or behind the weapon while it is loaded (recoilless rifle and Javelin) or armed (M72).
- No parts of the body may be positioned in such a way that they can be injured by the back-blast.
- Moving with a loaded or armed weapon is not permitted, though changing position is permitted.
- Firing an anti-tank weapon over or to the side of personnel is not permitted.

3.10.2 M72

Figure: 3.21
Live firing an M72

M72 is used as a collective term for all M72 models.

3.10.2.1 Special provisions

The following provisions apply to all use of the M72:

- firing is not permitted from a covered position, or an enclosed or partially enclosed space.
- there must be no vertical obstacles closer than 2 metres to the rear of the weapon during discharge.
- the breech must be kept at least 20 cm above the ground during discharge.
- the minimum target distance for all M72s is 75 metres.
- during instruction, training and exercises the following provisions also apply:

- if multiple weapons are fired from the same stand, there must be a minimum 5-metre distance between the weapons.

3.10.2.2 Surface danger zone

The surface danger zone for the M72 comprises areas in front of and behind the weapon. The surface danger zone is indicated by the calculated safety template for the individual weapon. A table of input values for producing a safety template for the M72 has been inserted as Appendix 17.

The figure shows the surface danger zone to the rear of the weapon, the discharge of fragments must be expected in this zone:

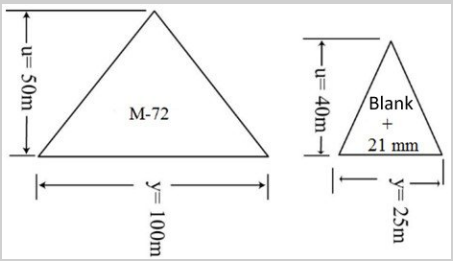


Figure: 3.22

Surface danger zone for fully calibrated M72 to the left.
21 mm training system and blank cartridge to the right.

3.10.2.3 Action in the event of faulty discharge

When firing with an M72 and N72 training system 21 mm, the following applies in the event of faulty discharge:

- pull the trigger again immediately.
- report "MISFIRE", wait 10 seconds, and then pull the trigger's safety catch back towards SAFE until it catches (if a misfire has occurred, it will only move about 1 cm before it stops).
- wait for 1 minute with the weapon pointing in the direction of the target, then remove the weapon from the shoulder and press the locking plate to release the locking mechanism.
- contract the weapon by 15 cm and then re-arm the weapon.
- adopt the firing position, release the safety catch and fire.

If the weapon still fails to discharge:

- pull the trigger again immediately.
- report "MISFIRE", wait 10 seconds, and then pull the trigger's safety catch back towards SAFE.
- wait for 1 minute with the weapon pointing at the target.

- disarm the weapon. Handle the weapon very cautiously, pointing in a non-hazardous direction. Store the weapon at a safe distance from personnel and other ammunition.
- the weapon must then be handled and destroyed by personnel who are qualified to handle UXOs.

3.10.2.4 Unexploded ordnance (UXO)

All personnel must wait at a safe distance (minimum target distance for the weapon in question) from the unexploded ordnance for a minimum of 5 minutes following discharge. Unexploded ordnance must not be touched or moved, but detonated on site. If the rocket motor pipe has broken with the fuse or parts of the warhead still intact, it must be considered an unexploded ordnance and detonated on site.

3.10.2.5 Training system 21 mm

The following additional provisions apply to the training system:

- training systems must be free of grease, sand, moisture, snow and other contamination before loading.
- the barrel must be cleaned and gauged before each round. It must be easy to.pass the gauge through the barrel.
- in case of frequent use, use a finger to check the temperature inside the barrel. It must not be so hot as to prevent the finger being left there for 3 seconds.
- check that the rocket is free of corrosion, dents or other damage.
- loading must occur only in closed position, in with the exception of front and rear covers.

3.10.2.6 Blank cartridge for M72

The following provisions apply to the use of blank cartridges in the M72:

- in the event of a faulty discharge with a blank cartridge, the procedure for the M72 must be followed. If the ammunition does not discharge, it may be treated in the same way as any other malfunctioning small firearms ammunition.
- when moving, a loaded weapon shall be secured and unarmed.
- firing is not permitted if personnel are within the surface danger zone to the front or rear of the weapon. The surface danger zone in front of the weapon corresponds to the surface danger zone to the rear, see point. 3.10.2.2

3.10.3 84 mm Carl Gustaf recoilless rifle (RCLR)

Figure: 3.23
84 mm Carl Gustav during firing

3.10.3.1 Special provisions

The following provisions apply to all use of the RCLR:

- firing is not permitted from a covered position, or an enclosed or partially enclosed space.
- there must be no vertical obstacles closer than 5 metres to the rear of the weapon during discharge.
- the breech must be kept at least 20 cm above the ground during discharge.
- illumination rounds may only be fired from a standing or kneeling position.

During instruction, training and exercises the following provisions also apply:

- if multiple weapons are fired from the same stand, there must be a minimum 5-metre distance each weapon and from other personnel to the nearest weapon.

3.10.3.2 Surface danger zone

The surface danger zone in front of the weapon is shown in the prepared safety templates for the individual weapon. A table of input values for producing a safety template for the RCLR has been inserted as Appendix 18.

See 3.10.3.6 for surface danger zone in front of the weapon when using blank ammunition.

Figurene definerer farlig område bak våpenet:

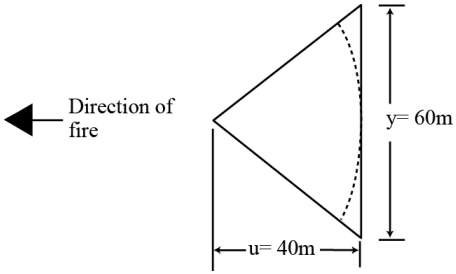


Figure: 3.24

Surface danger zone to the rear of an RCLR using fully-calibrated ammunition

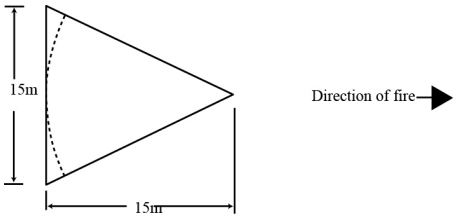


Figure: 3.25

Surface danger zone to the rear of an RCLR with training system, sub-calibre adapter and blank round

3.10.3.3 Minimum target distance

The table in Appendix 18 defines the input values for producing safety templates. A_{min} specifies the minimum permitted safety distance to *the first possible point of impact.*

It is not permitted to fire at a shorter distance than stipulated unless all personnel within this distance from a possible point of impact are under safe cover.

For HE rounds, the minimum distance is 150 m, even with secure cover.

3.10.3.4 Action in the event of faulty discharge

When firing with the 84 mm RCLR, the following applies in the event of a faulty discharge:

- The weapon must be armed immediately following a misfire and the trigger re-engaged
- If the weapon still fails to discharge, report “MISFIRE”, and then wait 1 minute before removing the round.
- If the weapon is very hot and constitutes a risk of self-ignition:
  - Leave the weapon and ensure that all personnel are under safe cover from the weapon. After the weapon has cooled down (normally 30 minutes, the weapon can be unloaded.

- The round must then be kept separate from other ammunition until it has been clarified whether it was the ammunition or the weapon that caused the malfunction.

3.10.3.5 Unexploded ordnance (UXO)

All personnel must wait at a safe distance from the UXO for at least 5 minutes following discharge. UXOs must not be touched or moved, but detonated on site. If the rocket motor pipe has broken with the fuse or parts of the warhead still intact, it must be considered an unexploded ordnance and detonated on site.

3.10.3.6 Blank rounds

The following additional provisions apply to the use of blank cartridges in an RCLR:

- In case of a misfire with a blank round, the same procedure must be followed as for full-calibre ammunition. If the ammunition does not discharge, it may be treated in the same way as any other malfunctioning small firearms ammunition.

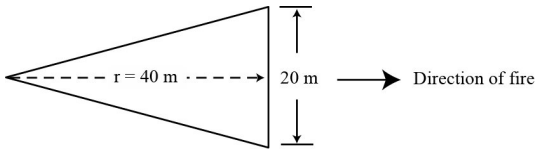


Figure: 3.26
Surface danger zone in front of the weapon when using blank rounds

3.10.4 Javelin

Figure: 3.27
Training with a Javelin

3.10.4.1 Special provisions

The following provisions apply to all use of the Javelin:

- the line of sight from the weapon to the target shall be free of vegetation, and there shall be no vegetation or objects above the anticipated path of the missile (the missile will rise).
- there must be no vertical obstacles closer than 2 metres to the rear of the weapon during discharge.
- when firing from a covered position, there must be an opening to the rear of the weapon allowing exhaust gases to escape. The opening must be at least 30 cm high by 90 cm wide. The firing opening must be at least 30 cm high by 60 cm wide.
- the CLU must not be directed towards the sun or other strong sources of light, as this can damage the CLU.
- battery accumulator BB-390B/U must not be used in connection with live firing.
- firing must not take place if the temperature is below -30 °C or above 60 °C.

3.10.4.2 Personal protective equipment

- Firer and loader must wear helmets and eye protection within zone 1, the firer is exempted from wearing glasses when using a CLU.
- The weapon has a face shield for the gunner. If this shield is damaged/missing, the gunner must sight with his/her left eye to ensure that the face is protected during discharge, or protect him/herself in some other way.
- When firing in poorly ventilated surroundings, personnel must use filter masks (class 3).

3.10.4.3 Surface danger zone

The surface danger zone around and behind the weapon is shown in the sketch below.

- Only the gunner and loader are permitted to be present within surface danger zone 1.
- Friendly personnel are not permitted within surface danger zone 2.
- What was previously designated surface danger zone 1 – in front of the weapon, has been adjusted in the safety template

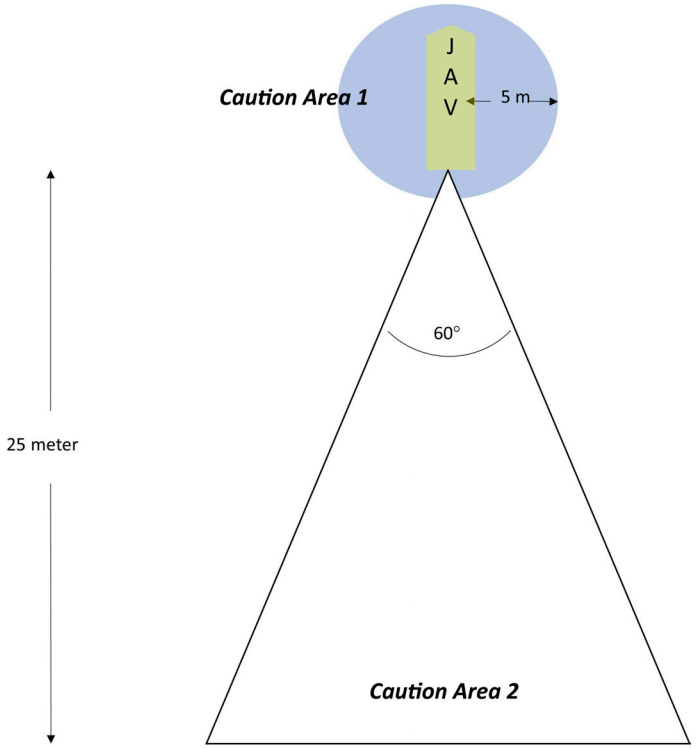


Figure: 3.28
Surface danger zones for firing with a Javelin

3.10.4.4 Action in the event of faulty discharge

Action in the event of Misfire and Missile BIT failure:

- Pull trigger – misfire occurs, report “MISFIRE – misfire 1”
- Attempt to pull the trigger again immediately.
- Release seeker trigger and discharge button.
- Attempt new Lock-on and pull trigger x 2 if weapon continues to misfire, report “MISFIRE – misfire 2”
- Switch off CLU.
- Remove the weapon system from shoulder/tripod.
- Take the CLU off the LTA/missile and lay it on the ground with the handles facing up.
- Clean any connections between the CLU and missile of foreign elements.
- Connect the CLU and LTA/missile.
- Replace the BCU.

- Place the system on the shoulder/tripod and switch on the CLU.
- Repeat engagement.
- If misfiring continues, change the missile.

Immediate action in the event of a hangfire.

- Pull trigger – HANGFIRE occurs
- Attempt to pull the trigger again immediately.
- New lock-on, pull trigger x 2 (if possible)
- If no discharge – report “HANGFIRE – HANGFIRE – HANGFIRE”
- Keep sight of the target for one (1) minute in wartime/five (5) minutes in peacetime
- If the missile has not “departed” on time, switch off the CLU
- Release the LTA/missile from the CLU and lay it on the ground with the handles facing up. The missile must continue to point towards the target area and the back-blast area must be empty.
- Replace missile, repeat engagement.
- Personnel must move a minimum of 25 m away from the missile. Move the missile, where applicable.

3.10.4.5 Unexploded ordnance (UXO)

Armour-piercing missiles that have not exploded upon impact, or because the flight motor has not ignited, must be detonated on site if possible. It is not permitted to detonate an unexploded ordnance until after 60 minutes have elapsed.

Demolition of a Javelin armour-piercing missile may only be performed by personnel with a class III demolition certificate.

If there is unexploded ordnance, personnel must remain under cover or outside the danger area for 60 minutes. Personnel with a class III demolition certificate must then be consulted.

3.10.4.6 Firing from an enclosed room

The following provisions apply when firing from an enclosed room:

- Personnel in the room should use filter masks. Without a mask, personnel must hold their breath and leave the room.
- Loose objects to the rear of the weapon must be removed.
- Doors and windows must be kept open.
- There must be no easily combustible materials in the room.
- Fire-fighting equipment must be available if firing is being carried out in a room containing combustible material (furniture, wooden walls, etc.).
- The gunner must use either the window frame for support or a tripod. When using the tripod, efforts should be made to keep the muzzle 100 cm from the window

opening, and the distance from the muzzle to the upper section of the window frame must be at least 65 cm.

- The room must have the following minimum dimensions:

  Surface area: 370 cm x 460 cm

  Height: 215 cm

  Volume of space: 36 m^3 (calculated as surface area x height)

- The room must contain a minimum of one window and one door of the following size (so that harmful exhaust gases will have the opportunity to escape from the room):

  Window aperture: 0.45 m^2 (61 cm x 77 cm)

  Door aperture: 1.8 m^2 (90 cm x 201cm)

3.11 FIRING FROM AND WITH TANKS AND VEHICLES

3.11.1 General provisions

3.11.1.1 Scope and extent

This chapter stipulates the safety provisions for all firing with turret-mounted and hand-held weapons on tanks and vehicles. Where a provision applies for certain types of vehicle or tank, this is specified.

3.11.1.2 Placement of ammunition

Ammunition must be placed in accordance with the technical manual and packing plans for the respective tanks and vehicles. During all instruction, training and exercises, there must be stringent controls regarding how ammunition is stored in vehicles.

3.11.1.3 Communications

During instruction, training and exercises, communication must be established between the firing commander and all participating tanks/vehicles, as well as with the safety commander/safety supervisors, when this is deemed to be required by the safety organisation or those in charge of implementation. In the event of loss of communication, firing must cease. If only the firing commander has a joint means of communication with the exercising troops, the other safety supervisors must, as a minimum, have established communications with the firing commander. Mobile phones are not regarded as communications in this connection.

3.11.1.4 Use of smoke on tanks/vehicles

The following provisions apply to all use of smoke from permanently installed launchers on tanks/vehicles:

- Prior to or use of smoke ammunition, the wind conditions and fire risk must be assessed locally. In respect of vehicle smoke, the field of fire must also be assessed.
- During discharge of smoke launchers, a sector of 80 m radius and a width of 120° must be free of personnel. The sector is determined based on the direction of fire.

- During instruction, training and exercises, smoke ammunition must normally not be used closer than 200 metres to civilian personnel, animals, inhabited areas and public roads. If the OCE regards it as reasonably safe, this can be reduced to 80 metres.
- ROUND, 76 mm, SPONTANEOUS - HC, DM 45 and DM 45 F1 have a hazardous radius of 25 m.
- If personnel intentionally or unintentionally are present in or in transit through an area containing smoke, protective masks must be used.
- In the event of smoke intoxication symptoms (severe coughing fits, stinging pains, headache, nausea, shortness of breath etc.) personnel must be given fresh air, rest and supplementary oxygen, if necessary. Personnel must be taken to a doctor in a lying position as quickly as possible.
- When loading/emptying the firing tubes, the system's circuit breaker must be switched off.
- When loading, personnel must also ensure that the firing tube’s base plate is secure.

3.11.1.5 Indirect firing

Indirect firing from an RWS-mounted 40 mm GMG on a CV-9030 is permitted with targeting data provided by another vehicle able to transfer target information.

3.11.2 Firing with tanks

3.11.2.1 Before firing

Prior to all firing with tanks, the "Ready for Combat" and "Combat" procedures must be carried out. It is the firing commander's responsibility to check firing logs before instruction, training and exercises commence and to ensure that these are updated when the exercise ends.

3.11.2.2 Surface danger zone

Surface danger zones are described in the safety template for the respective weapon and type of ammunition. The appendices contain a table of input values for the preparation of safety templates. An explanation of how to construct safety templates is provided in Appendix 1.

3.11.2.3 Signalling/tank markings

During instruction, training and exercises, all Leopard 2 and CV-90 tanks the carry ammunition must display flags during daylight hours and, during hours of darkness lights in the same colour must be displayed. The following signals must be used:

	CV9030 SPV, STRILED and OPV	LEO 2
Green flag or light	MK30 (ATK Bushmaster II 30mm):	- Weapons unloaded and inspected

	- Unloaded and inspected or loaded (cartridge in rotor) - Drive shaft disconnected - Mechanically secured - Electrically secured and - Ammunition on vehicle MITR 7,62 (ATK Bushmaster Chain Gun): - Unloaded and inspected or - loaded (cartridge in rotor) - Mechanically secured - Electrically secured RWS (all weapon types: - Unloaded and inspected - Personnel can board or alight from the vehicle	- To be displayed by all vehicles carrying live ammunition - Personnel can board or alight from the tank
Red flag or light	- Weapons loaded - Personnel must not board or alight from the vehicle without their weapons first being unloaded and inspected and a green flag displayed. (This does not apply to personnel taking part in the firing exercise)	- Weapons loaded and ready for firing - Personnel must not board or alight from the vehicle without their weapons first being unloaded and inspected and a green flag displayed. (This does not apply to personnel taking part in the firing exercise)
Red and yellw flag or light	- Weapons loaded A technical fault has occurred - Personnel must not board or alight from the vehicle without an	- Weapons loaded. A technical fault has occurred - Personnel must not board or alight from the vehicle without an order from the tank commander

	order from the tank commander	
Green and yellow flag or light	- Weapons unloaded and inspected. A technical fault has occurred - Personnel can board or alight from the vehicle	- Weapons unloaded and inspected. A technical fault has occurred - Personnel can board or alight from the vehicle

3.11.2.4 Firing with tanks in motion

This type of firing places great demands on both the OCE and personnel participating in the exercise. During an advance, and after the "COMBAT" procedure has been carried out, the following applies:

- the number of vehicles and complexity of the exercise must be adapted to the level of training. The experience and skill of each vehicle commander is especially important with regard to how complex the exercise should be
- the barrel must never be pointed directly at personnel or other vehicles. For example, when passing behind other vehicles the weapon must be electrically secured and barrels elevated until the firing sector is free

3.11.2.5 Firing with tanks above and to the side of personnel

The requirements for firing above and to the side of personnel allow for the opportunity to train in fire support between units. For normal firing, when the option is specified by the ammunition's safety template, firing is not permitted if personnel are within what the template describes as a surface danger zone. For firing above and to the side of personnel, however, this is permitted under certain conditions.

The following points deal with firing above and to the side of personnel with a CV90 30 mm and Leopard 2 120 mm.

Provisions that are common to firing above and to the side of personnel

- The weapon must have been satisfactorily sighted and fitted with an approved sight control.
- The CV90 must utilise full firing guidance functionality. For the Leopard, firing is permitted at all operational levels.
- The firing distance is greater than the sum of l sa + f + s. The factors l(sa) and s are specified in separate appendices. The factor f = 200 metres for all ammunition types for the CV90 30 mm and the Leopard 2 120 mm, given that the firing distance is less than 2,000 m. If the firing distance is greater than 2,000 m, the factor f= 400 m.
- IM-HE-T (120 mm) or similar ammunition that has a timing function and/or a very sensitive fuse ("superquick") must NOT be used. It is permitted to use an IM-TP-T cold round.
- The CV90 must utilise full firing guidance functionality. For the Leopard, firing is permitted at all operational levels.

- The distance between the muzzle and the location at which personnel are being fired above/to the side of must be at least equal to l(sa) for the relevant type of ammunition.
- The furthest boundary of the location at which personnel are being fired over/to the side of must be least f + s from the closest boundary to the impact.
- There must be shield clearance at least equal to the α-angle in the direction of firing all the way out to the furthest boundary of the location at which personnel are being fired over/to the side of + s, as in figures 3.29 and 3.30.

Provisions specific to firing above personnel:

- Tanks must not fire while moving.
- The trajectory must extend at least 8 metres above the highest point of the location at which personnel are being fired above. (height of vegetation/buildings/vehicles/ personnel + 8 metres)

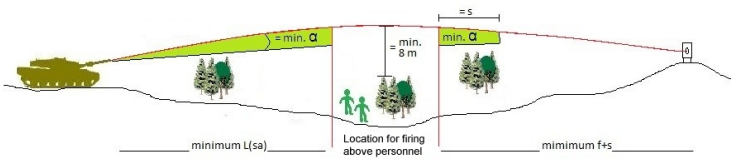


Figure: 3.29

Safety provisions for firing above personnel:

Provisions specific to firing to the side of personnel:

- If the firing tank is stationary, the angle between the bore axis and the location at which personnel are being fired to the side of must be a minimum of 70 mils (in any case, no less than 6 metres).
- If the firing tank is in motion, the angle between the bore axis and the location at which personnel are being fired to the side of must be a minimum of 100 mils (in any case, no less than **10** metres).
- The firing tank must not have a dynamic head start.

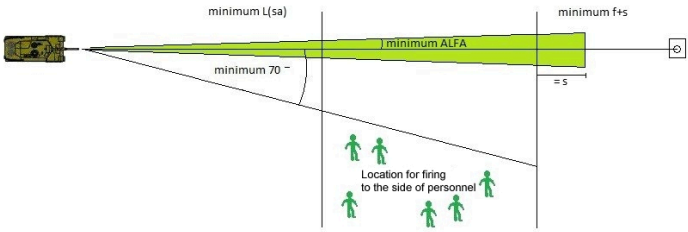


Figure: 3.30
Safety provisions for firing to the side of personnel

The following points deal with firing over and to the side of personnel using an RWS weapon station and a fixed coaxial turret machine gun in driving direction on the CV90 and the Leopard 2:

- Weapons and barrels must have been satisfactorily sighted and fitted with an approved sight control.
- There must be shield clearance at least equal to the α-angle in the direction of firing all the way out to the furthest boundary of the location at which personnel are being fired over/to the side of + s, as in figures 3.29 and 3.30.
- When firing over personnel, the trajectory must pass at least 8 metres over the highest point of the location being fired over (height of vegetation/structures/ vehicles/personnel + 8 metres). If the α-angle (down) is equivalent to more than 8 metres, the over-firing height must harmonise with the α-angle.
- When firing to the side of personnel, the angle between the bore axis and the location at which personnel are being fired to the side of must be a minimum of 100 mils (in any case, no less than 10 metres).
- There must be no possibility of fragments or secondary splinters from objects in the target area.
- There must be no tank movement when firing above personnel.
- The firing tank must not have a dynamic head start.
- Firing above and to the side of personnel with a 40 mm GMG in an RWS is not permitted.

3.11.2.6 Personal protective equipment

The tank crew must use the tank's own helmet headsets as hearing protection. Where required, earplugs must also be used.

When firing the tank gun, all personnel within a radius of 15 metres from the gun muzzle must use eye protection in addition to double hearing protection.

3.11.3 Firing from vehicles and tanks

3.11.3.1 The safety supervisor

In addition to his/her normal duties (item 1.1.4.6) the safety supervisor shall:):

- Direct particular attention to ensuring that gunners have shield clearance during discharge.
- Direct particular attention to the gunners' weapon discharge.

3.11.3.2 Special provisions

The following provisions apply to all firing from vehicles and tanks:

- It is permitted to fire with all types of small firearms from vehicles and tanks. Exceptions:
  - It is not permitted to fire a pistol from a loophole in view of the absence of a fastening point for the weapon and the consequential risk of a ricochet occurring.
- The gunner must sit/stand firmly during discharge.
- The weapon muzzle must be on the outside of the vehicle/tank during discharge. The exception to this is when using an MP7 or HK416K, which have very short barrels. The gunner is then responsible for ensuring shield clearance during discharge.
- If the vehicle/tank is in motion it is the gunner's responsibility to assess whether it is safe to fire, based on his/her own proficiency. During instruction, training and exercises, the speed of the vehicle shall be adapted to the gunner's proficiency.
- When operating small firearms from combat hatches or driver's hatches, all loading and unloading must be carried out past the edge of the hatch.
- Loaded weapons (with a round in the chamber) are not permitted inside vehicles, except when firing through gun slits. During operations where it is considered necessary to operate with loaded weapons inside vehicles, this is permitted, see 0.1.3.2.
- If the weapon is loaded inside the vehicle/tank, it must otherwise be handled in accordance with the weapon regulations.
- When firing through glass panes, full combat gear and face shields in the form of a protective mask/approved dust mask with filter must be used in addition to hearing protection and eye protection.
- When firing though a gun slit or grate, the following must be observed:
  - The muzzle of the weapon must be inside the gun slit/grate
  - In vehicles where weapons can be fastened to the vehicle using the weapon's trigger guard, this must be done before loading the weapon.

3.11.3.3 Firing from a SISU

During instruction, training and exercises, the following provisions apply for firing from a SISU:

- When firing from a hatch and gun slit simultaneously, two safety supervisors must be present, one inside the vehicle and the other on top of the vehicle. A safety commander may reduce the number of safety supervisors to one if the gunner's knowledge and proficiency suggests this is defensible on safety grounds.
- The safety supervisor may ride on the top of the vehicle during firing while the vehicle is in motion. The vehicle's speed must not exceed 10 km/h and the safety supervisor must be secured.

3.11.4 Firing with CV9030 Armoured Infantry Fighting Vehicles/Forward Command Vehicles/OPV

The following points regulate all firing with tank guns from CV9030 Armoured Infantry Fighting Vehicles/Forward Command Vehicles. In addition to these provisions, safety regulations specified in drill books (Regulations for CV9030 Armoured Infantry Fighting Vehicle/Forward Command Vehicle crews), technical manuals and field firing range instructions also apply.

3.11.4.1 Handling weapons

In general

Applies to all weapons:

- MK30 ATK Bushmaster II 30 mm
- MITR ATK Bushmaster 7,62 Chain Gun
- RWS and 12.7 mm heavy machine gun
  - 40 mm GMG
  - 7.62 mm machine gun FN MAG
  - 5.56 mm light machine gun LMG
- An empty weapon check must be carried out before handling any gun. Rotor, breech block and chamber must be checked carefully to verify that they are empty.
- Before firing the tank gun, it must be verified that:
  - there are no foreign objects in the barrel, e.g. snow or ice.
  - CTS procedure and COMBAT procedure, in accordance with the regulations for armoured vehicle crews CV9030 Armoured Infantry Fighting Vehicle/Forward Command Vehicle, have been completed.
- During firing:
  - The fresh air fan is to be switched on (and remain on for at least 10 minutes after firing has ceased)
  - When firing the tank gun, all personnel must have their heads above the hatch and personnel within a radius of 15 metres of the muzzle are to wear splinter-proof goggles or cover their eyes in some other way, for instance by using field glasses or hands

- At lower operational levels, parts of the system's safety functions may or will be disconnected. The tank commander will therefore have to show the utmost vigilance.

- After firing:

  The flexichannel and magazine must be checked. A link break may have occurred during firing, and this may have caused some of the ammunition to slide back into the flexichannel/magazine.

3.11.4.2 Personnel on the turret

During instruction, training and exercises, the safety supervisor for the tank and/or the foot troops are permitted to be on the outside of the turret, seated in equipment rooms 22 and 23. The safety supervisor must wear a helmet or helmet headset, as well as hearing protection and eye protection. The safety supervisor for the tank's crew must be connected to the tank's intercom system. In such situations, the vehicle commander must exercise particular caution when moving the vehicle. Also, the manual limitation in movement for RWS in the sector from 100°–260° in relation to the turret must be entered.

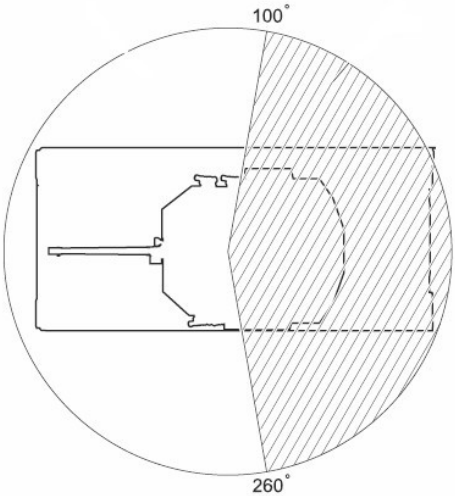


Figure: 3.31
RWS movement limitation

3.11.4.3 Laser range finders

All laser range finders on the vehicles are eye-safe to the unprotected eye. Personnel must not be exposed to lasers within the safety distances stipulated in UD 2-1 unless this has been particularly regulated in the exercise provisions.

3.11.4.4 Laser pointers

During instruction, training and exercises, it is only permitted to use “EYE SAFE” mode. The laser is then considered to be eye-safe to the unprotected eye. Laser pointers are classed as 3B when in “NON-EYE-SAFE” mode.

See point 5.2.7 Laser radiation

3.11.4.5 Surface danger zone around firing tanks in urban areas

When firing an MK30 in a built-up area, the placement of buildings in close proximity to a firing tank may result in pressure injuries to personnel on the ground. In such cases a safety zone of 50 metres must be established around firing tanks within which protective gear such as helmets, goggles and ear protection must be used. Attention must also be paid to glass and other building materials that may shatter/disintegrate and collapse when discharging weapons. Firing tanks must warn other friendly forces before opening fire.

3.11.4.6 Firing at aerial targets with MK30 guns and heavy machine guns

When air target mode is used, uncontrolled aiming of weapons may occur if the target disappears out of the gun’s limitation in movement in height. Manual limitation in movement appropriate to the firing sector must therefore be activated during all firing at air targets in peacetime. In addition there must be at least 20 metres’ distance between firing tanks. See also point 3.15 Firing at air targets.

3.11.4.7 Target data in BMS

After target data is displayed in BMS using a turret weapon or RWS, the target must be verified through the weapon’s sight before firing is permitted.

3.11.4.8 After firing

A link break may occur during firing. This may cause some of the ammunition to slide back into the flexichannel and magazine. This must therefore be checked carefully after firing.

3.11.4.9 Blank ammunition

When firing or practising with 30 mm blank ammunition, the surface danger zone in front of the muzzle is 30 metres and 20° to either side.

3.11.5 Firing with the CV90RWS

The following items regulate firing with an RWS from a CV90RWS. Safety regulations specified in the Regulations for Combat Engineering Vehicle Crews for the CV90RWS STING, Regulations for the mortar crew CV90RWS BK, Manual for the RWS, technical manuals and field firing range instructions apply in addition to these provisions.

3.11.5.1 Personnel on the turret

During instruction, training and exercises, the safety supervisor for the tank crew and the foot troops are permitted to be on the outside of the turret, seated in equipment rooms 22 and 23. The safety supervisor must wear a helmet or helmet headset, as well as hearing protection and eye protection. The safety supervisor for the tank's crew must be

connected to the tank's intercom system. In such situations, the vehicle commander must exercise particular caution when moving the vehicle.

See point 3.9.1.4 for CV90RWS BK.

Also, the manual limitation in movement for the RWS in the sector from 100°–260° must be entered.

3.11.5.2 Target data in BMS

After target data is displayed in BMS using an RWS, the target must be verified through the weapon’s sight before firing is permitted.

3.11.6 Firing from a Leopard 2 A4 NO

The following points regulate firing with a 120 mm gun from a Leopard 2A4. Comprehensive safety regulations may be found in "Regulations for tank crews, Leopard 2 A4 NO /NO2" and technical manuals for the Leopard 2 A4.

3.11.6.1 Special provisions

Weapons must remain directed in the sector of fire until they are empty.

The driver's hatch must be battened down during firing.

Extra rounds may not be taken from the turret ammunition store until the round in the chamber has been fired. The hatch to the ammunition store must always be closed at the moment of firing, and the loader must hold on tight and observe the gun's breech when it is fired. The safety supervisor must perform a technical control of the ammunition store before firing commences.

Firing the tank gun and the turret heavy machine gun when in motion is only permitted at operational level "Stabilised". At other operational levels, "hold fire" must be used.

3.11.6.2 Surface danger zone for guns

During firing exercises involving tanks, personnel on the ground should not be further advanced than the fourth running wheel of the tank and must have visual contact with the vehicle commander on the tank.

3.11.6.3 Surface danger zone around firing tanks in urban areas

When firing with a tank gun in a built-up area, the placement of buildings in close proximity to a firing tank may result in pressure injuries to personnel located on the ground. In such cases a safety zone of 50 metres must be established around firing tanks within which protective gear such as helmets, goggles and ear protection must be used. Attention must also be paid to glass and other building materials that may shatter/ disintegrate and collapse when discharging weapons. Seated personnel may be injured by the back-blast from a discharging weapon and must therefore place themselves at least 10 metres to the rear of a firing tank. Firing tanks must warn other friendly forces before opening fire.

3.11.6.4 Blank ammunition

DM 54 HOFFMANN:

- The surface danger zone is 50 m in front of the muzzle and 25 m to each side of the direction of fire.
- it is prohibited to fire DM 54 blanks in built-up areas or closer to buildings than 150 m.
- DM 54 blank ammunition has no delay and is discharged immediately. This materiel is not to be used in improvised ways or by using improvised firing mechanisms.
- When loading, the main switch and fuse shall be switched off on the control box.
- The blanks' plugs must be covered by the short circuit cap until all the blanks have been placed in the tubes. The loader must stand beside or behind the launching tubes during loading. When the blanks' plugs are put into the socket, there must be no personnel inside the hazardous zone. Emptying is carried out in reverse order of loading.
- In the event of a misfire, blanks must remain in their launching device for a minimum of 10 minutes.

3.12 ARTILLERY, FIRING AT GROUND TARGETS

Figure: 3.32

K9 155 mm field artillery

3.12.1 In general

3.12.1.1 These provisions apply to firing using gun artillery. The weapon platforms will henceforth be referred to as guns. These provisions take precedence over any provisions in the weapon regulations. When firing with other artillery systems in Norway (allied, for example), these safety provisions in UD 2-1 take precedence. Changes for other artillery systems competent authority must be submitted to a competent authority. Special safety regulations concerning operation and use of the weapon, and that are not described in these provisions, apply in full.

3.12.1.2 The gun is loaded once a round, propellant charge and an ignition cartridge have been placed in the barrel and the breech has been closed.

3.12.1.3 The double check principle must be observed throughout the whole fire control sequence.

3.12.1.4 Double hearing protection, or other approved equipment, must be used in the immediate vicinity of firing artillery. (Hearing damage can occur within 100 metres).

3.12.1.5 **Burning propellant powder**

The gun team can themselves burn up to 30 kg of propellant powder. Larger quantities of propellant powder may only be burned by personnel with a class 1B blasting certificate, and this must be done in accordance with HEOD-firing range and training ground.

3.12.2 Leadership and supervision personnel

3.12.2.1 During firing with artillery, responsibility for safety rests with the following personnel:

- OCE
- firing commander (can also be the OCE)
- safety commander (when firing in formations larger than battery)

- safety officer(s)
- safety supervisor(s)
- safety posts (as required)
- target commander, (as required)

3.12.2.2 OCE

The OCE is normally the commander of the exercising unit. Where this is not desirable or appropriate, another qualified officer can be appointed as OCE. Qualification must satisfy the requirements for battalion fire coordination officers/field security officers. During complex exercises, the OCE artillery must carry out planning in advance of the activity.

In addition to the general duties as in 1.1.4.3, the OCE shall:

- draw up the necessary products (Annex D, FSCM etc.) that ensure that firing observes safety distances to own personnel/civilians and fields of fire.
- draw up necessary supplementary regulations to applicable safety instructions and issue these in writing to the exercising forces and the safety personnel
- communicate to participating personnel (including spectators and observers) safety provisions and instructions that apply for the exercise
- establish deployment area(s), OP zones, fields of fire, ideally also target areas, and ensure that the safety personnel are familiar with this

3.12.2.3 Firing commander, artillery

There must be a firing commander for the impact zone. The firing commander must have completed certifying training in commanding firing as provided by the Norwegian Army Land Warfare Centre. When there are multiple firing commanders using the same target area, there must be communication between the firing commanders.

In addition to the general duties as in 1.1.4.4, the firing commander is also responsible for:

a. Before firing:
   - receiving instructions from the OCE
   - check that positions with safety significance are sent to the fire control centre

   The firing commander reports any movements to the safety commander and other firing commanders using the same target area and selects targets that can be fired at with respect to safety.

b. During firing:
   - report to the fire control centre any abnormal shots and stop the firing if necessary if these represent a risk outside the limits of the firing range or inside an area with restrictions
   - stop the firing in case of personnel observed or reported to be inside the surface danger zone

3.12.2.4 Safety commander

There must be a safety commander for each firing unit. The safety commander must have completed certifying training as a fire control centre officer as provided by the Norwegian Army Land Warfare Centre.

In addition to the general duties as in 1.1.4.5, the safety commander is also responsible for:

- determining firing data and carrying out safety checks, also including checking the location of the target against the firing map (paper or electronic)
- obtaining and verifying data for conducting safety checks in accordance with 3.12.3, potentially manual checks in accordance with 3.12.6
- establishing and maintaining the fire control data in accordance with chapter 4 of the indirect fire handbook, including deciding whether the unit has confirmed or unconfirmed fire control data
- stopping firing when this is necessary for safety reasons
- start posting safety posts as instructed by the OCE and the safety commander, and order additional posts if required (for example, to control any traffic in the surface danger zone in front of the guns
- ensuring that safety posts are in contact with both firing commander and safety commander
- using, handling and checking ammunition in the unit, including compliance with regulations and any restrictions.

3.12.2.5 Safety supervisor, gun

Normally the gun commander would be appointed as the safety supervisor for that gun. The safety commander must have completed certifying training as a gun commander as provided by the Norwegian Army Land Warfare Centre.

In addition to the general duties as in 1.1.4.6, this person is also responsible for:

- ensuring that there is no firing within the interior crest
- checking that there are no personnel, aircraft or helicopters in, or on their way into the gun’s surface danger zone
- that on the order "CHECK FIRE", firing must immediately cease, the breech is opened and the charge removed
- that firing takes place according to calculated firing data
- enabling the fire control system to run a safety check based on regulations from the fire control centre when calculating firing data for a gun
- that the gun is being operated in accordance with the procedure for firing the K9 VIDAR
- that the gun is fixated and oriented in accordance with the requirements of the field target basis, and reporting any deviations to the fire control centre
- that the gun crew are using both ear defenders and earplugs, or other approved aids that provide equivalent protection, see also 5.20

- using, handling and checking ammunition at the gun, including compliance with regulations and any restrictions
- that the gun is in a technically correct condition, including compliance of regulations for technical checks and maintenance

3.12.2.6 **Safety supervisor, observation post**

The safety supervisor in an observation post is usually the firing commander. The safety supervisor must have completed certifying training as a firing commander as provided by the Norwegian Army Land Warfare Centre and hold valid certification.

In addition to his/her normal duties (1.1.4.6), the safety supervisor must:

- scan the target area visually before and after firing to ensure that the area is clear
- report points with restrictions and continuously report on safety challenges to the firing commander
- ensure that all internal dialogue, as well as dialogue to and from the observation post, is double-checked
- check impact patterns and report to the fire control centre
- insofar as is possible, count impacts and report any UXOs to the command post

3.12.2.7 **Course students**

When course students taking part in training act in roles that normally entail responsibility for safety, another officer is appointed who is assigned that responsibility for safety. Based on the student's attitude, the OCE can decide that the student is to have the responsibility for safety that goes with that position.

3.12.3 Guidelines for use of the fire control system

3.12.3.1 In order for the fire control system to be able to ensure safety in accordance with peace and wartime provisions, the following data must be entered:

- the weapon's bearing data
- OP positions
- points with restrictions activated in an active map layer
- other own personnel attached to the surface danger zone
- firing range limits with minimum and maximum permitted target heights (peacetime)
- the projectile trajectory's maximum permitted vertex

3.12.3.2 Use of the fire control system's "War Mode" as a safety check is regulated by the commander of the operation by orders, ROE or similar. "War Mode" may not be used to perform safety checks during instruction, training and exercises.

If use of "War Mode" is not permitted for safety checks, safety checks are performed manually using safety templates.

3.12.4 Surface danger zone

3.12.4.1 *The hazardous zone around the guns* is limited by the safety angle (M) in relation to the firing direction and hazardous distance in front of the guns. The safety angle (M) is 500 mils. The hazardous distance in front of the guns is 300 m.

3.12.4.2 *The hazardous zone around the target* is defined by:

a. hazardous distance to impact on this side of the target (f)

b. hazardous distance to impact beyond the target (I)

c. angle of lateral dispersion (W)

d. ricochet angle (Q) and ricochet distance (c)

e. fragment distance (k).

If firing rounds with base bleed components, then in addition to the area around the target, there will also be a corresponding surface danger zone where the round would impact in the event of failure of the component to ignite (shortened firing distance).

Since the effects of some of these factors are dependent on target distance, the surface danger zone around the target will vary accordingly.

3.12.4.3 *The area being fired over*. This hazardous zone includes:

- safety angle (M)
- fragment distance (k).

Firing over this area is permitted when certain requirements are met (see point 3.12.5).

3.12.4.4 *The hazardous zone in height* is the airspace above the hazardous zone(s) up to the highest altitude that will be used during firing, plus splinter distance (k). The highest altitude is determined based on ammunition, charge and elevation. Safe height is calculated based on this and rounded up to the closest 1,000 feet (see Appendix 7).

3.12.5 Firing above personnel

3.12.5.1 Firing over personnel means firing over personnel located in the area being fired over between the gun position and the target.

Firing over personnel is permitted with the following ammunition:

- HE shells with percussion fuses
- HE shells with time fuses in the part of the trajectory which is more than the splinter distance k above the ground
- WP shells with percussion fuses
- illumination shells with time fuses
- BONUS shells with time fuses

3.12.5.2 Firing over personnel with other types of ammunition is prohibited.

3.12.5.3 When firing over personnel, the following conditions have to be met:

- personnel within the safety angle (M) must be at least 300 m from the guns

- personnel must be at least f+k from this side of the target boundary (if precautions have been taken to protect personnel from splinters, the effect of rk can be reduced)
- the height of the trajectory at the point being fired over must be higher than the point’s height plus an additional safety margin in height.
- The safety margin in height is to avoid impact in the area being fired over due to the weapon's height dispersion, inaccuracy in determining the height of the battery and the point being fired over, as well as changes in the effects of the weather. When using the fire control system, the safety margin is the metre value of 4 probable errors in height (wrong trajectory) + 75 metres. In the case of a manual safety check, the safety margin is 20 mils.

3.12.6 Manual use of safety template for safety control during firing exercises:

3.12.6.1 When safety templates are used for safety control, this is to be carried out by a safety commander or an assistant safety commander. It must be carefully ascertained that the template has the right scale and charge. An example of a safety template is shown in fig 3.33.

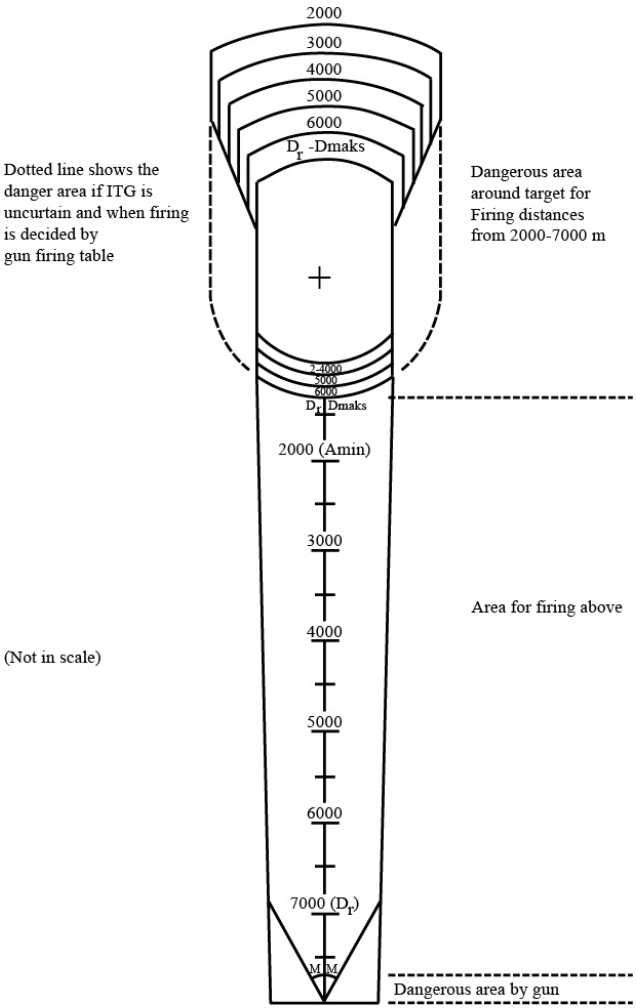


Figure: 3.33

Example of surface danger zone shown on safety template

3.12.6.2 *Preparations for firing* are:

a. Mark on the map:

- the outer boundaries of the designated field firing range
- the position of gun
- OPs and any other restricted points in the area.

b. When firing over an area the lowest acceptable elevation to the area being fired over for charge(s) in question is decided as follows:

- Determine the elevation to the point to be fired over, add the safety addition in height (20 mils)
- Make a note of the lowest acceptable elevation on the safety template for the charge in question (fig 3.33).

3.12.6.3 *Checks when firing*

a. Mark the point (target) on the map for which the gunnery data have to be established. Check that the given target height is between the lowest and highest acceptable target heights.

b. Put the safety template's target point over the marked point and adjust the template so that the centre line (BM line) lies over the gun position. Round the firing distance down to the nearest 1,000 m. Check that the correct safety template is used (scale and charge)

c. Check that no part of the line representing the surface danger zone around the target is outside the limits of the firing range and that no points subject to restrictions or other own personnel are inside the surface danger zone around the target.

   a. Where fire control data is confirmed, the surface danger zone is demarcated by the lines for each firing distance in front of and beyond each target. When firing at ranges over D_r, the surface danger zone is demarcated by the lines for D_r -D_{max}. If firing rounds with basebleed components, the surface danger zone in front of the target is demarcated by the broken arc for each firing distance.

   b. Where fire control data is unconfirmed, the surface danger zone in front of the target is demarcated by the line D_r - D_{max}, the surface danger zone to the side of the target is demarcated by the broken line on the safety template and the surface danger zone beyond the target is demarcated by the line for the shortest firing distance. If firing rounds with basebleed components, the depth of the surface danger zone in front of the target is demarcated by the broken arc for each firing distance, and to the side by a broken line that runs parallel to the direction of firing.

   c. If the firing is in the upper register the danger of ricochets can be neglected. The line D_r -D_{max} demarcates the surface danger zone.

d. When firing over the target check in addition to points a-d that the elevation is greater than the lowest acceptable elevation marked on the template.

e. When firing using rounds/barrel combinations other than the one specified in 3.12.5.1, check in addition to a-c that there are no personnel inside the area being fired over.

f. Check that the maximum vertex is not in breach of regulations.

g. If firing with unconfirmed fire control data, ODIN FSS must be set to unconfirmed fire control data or a safety control must be carried out manually (see points a-g).

If a unit with unconfirmed fire control data driver is conducting fire adjustment, the surface danger zone for unconfirmed fire control data must be used as a safety check for the first shot. For subsequent shots as part of the same firing mission, the surface danger zone for confirmed fire control data can then be used, subject to the following provisos:

- the new sighting point is less than 2000 metres from the original one
- the target height has changed by less than 300 metres
- the same charge size and round type are used
- there has been no confusion between elevation and depression
- if an METCM is used to calculate firing data, firing data for subsequent shots must be calculated using the same weather telegram
- powder temperature is known and has been used when calculating firing data
- it has been up to two hours since the previous shot and on condition that the previous shot was without significant miss distance
- primary methods are used for fixing and orienting the gun

3.12.6.4 Firing with BONUS

When conducting live firing exercises with BONUS shells, use is made of a safety template developed in the same way as for HE shells, but with suitable input values in point 3.12.8. There are additionally three risk zones.

These extend 1,000, 1,500 and 5,000 metres respectively beyond the impact zone, and these are intended to allow for the potential for the sub-warhead components to initiate the slug in an uncontrolled direction. The zones are not considered to be dangerous and prohibited zones like the safety template itself, but there is nevertheless a restriction on the number of personnel who can be present in each of the three zones.

The OCE decides who can be present within the zones based on an assessment of terrain and activity.

3.12.7 Construction of safety template for field artillery

3.12.7.1 For live firing in peacetime, safety templates must be constructed for the charges in question. The templates must be to scale 1:50,000 and/or 1:25,000. A separate safety template is constructed for direct laying. Each template applies to a certain charge and to a certain interval of muzzle velocity (V^o). If two types of guns have similar ballistic properties, they can use the same templates. The final decision about this rests with the Commander of Artillery and AAA. The templates must be marked with scale, type of gun, charge and Vo area. The lay-out and marking of safety templates can be seen in fig 3.33.

3.12.8 Constructing templates

3.12.8.1 Construction of the templates is based on the following factors:

The table with the input data for constructing the safety templates in this point are for the K9. The correct data for M109/ L39 barrels are in appendix 23.

D_{max}:	Max. firing distance which can be achieved with a specific charge/round combination
A_{min}:	Minimum permitted firing distance for a specific charge/round combination
D_r:	If the firing distance is greater that D_r, the danger of ricochets can be disregarded
A:	Actual firing distance (each 1,000 m from A_{min} to D_{max})
Q_p:	The distance from the target to the point from which the ricochet angle Q is to be measured
c:	Ricochet angle
BR_h:	The width of the danger area on this side of the target
k:	Splinter distance, varies with calibre. For 155mm, set k to 600m
M:	Safety angle
Q:	Ricochet angle
W:	Angle of lateral dispersion
l:	Danger distance beyond the target
f:	Danger distance on this side of the target
ΔA_{EC}	Extra distance in metres from the sighting point to where the empty bushing (empty carrier) hits the ground.
Shortened target distance	Shortened firing distance in kilometres if basebleed fails to ignite.

A list of D_{max}, D_r and A_{min} for 155mm NM 28, OEF3 HB/BB and NM269 HB/BB in the K9 is shown in the following table:

Ammunition (155 mm/52 kal)	**Charge**	**D_{max}**	**D_r**	**A_{min}**	**Vo-area**
NM28/ OEF3 HB/ NM269 HB	3W	9000	7000	3000	280-325
	4W	10000	8000	4000	330-365
	5W	12000	9000	5000	390-430
	6W	14000	11000	6000	460-505

	7W	16000	12000	7000	545-590
	2M	12000	10000	5000	405-470
	3M	16000	12000	7000	525-585
	4M	20000	14000	9000	635-730
	5M	24000	16000	12000	760-855
	6M	30000	19000	15000	890-985
OEF3 BB/ NM269 BB	3W	9000	8000	4000	280-315
	4W	11000	9000	4000	335-370
	5W	14000	11000	5000	395-435
	6W	16000	12000	7000	470-505
	7W	19000	14000	9000	550-590
	2M	14000	11000	5000	405-475
	3M	19000	14000	8000	530-590
	4M	24000	17000	11000	645-740
	5M	30000	20000	15000	770-870
	6M	40000	23000	18000	900-1000
BONUS	3M	17000	11000	8000	535-575
	4M	22000	14000	11000	655-725
	5M	27000	16000	13000	770-845
	6M	34000	19000	24000	895-975

When firing Base Bleed ammunition a theoretical possibility must be considered that the Base Bleed element will not function and that the round will therefore have a considerably shorter range than estimated. To allow for this when calculating the safety template, Danger distance on this side of the target must be calculated based on a shortened firing distance A according to the table below:

Round: OEF3 BB/ NM269 BB (155 mm/52 kal)						
	Charge 7W BB	Charge 2M BB	Charge 3M BB	Charge 4M BB	Charge 5M BB	Charge 6M BB
Target distance (km)	Shortened target distance (km)	Shortened target distance (km)	Shortened target distance (km)	Shortened target distance (km)	Shortened target distance (km)	Shortened target distance (km)
5		4,6				

6		5,5				
7		6,4				
8		7,2	7,1			
9	8,0	8,1	8,0			
10	8,8	8,9	8,8			
11	9,6	9,7	9,6	9,7		
12	10,4	10,5	10,4	10,5		
13	11,3	11,2	11,3	11,3		
14	12,1	11,9	12,1	12,0		
15	12,9		12,9	12,8	13,0	
16	13,7		13,7	13,7	13,8	
17	14,5		14,5	14,5	14,6	
18	15,2		15,1	15,3	15,4	15,6
19	15,9		15,7	16,1	16,1	16,4
20				16,9	16,9	17,2
21				17,7	17,7	18,0
22				18,5	18,5	18,8
23				19,2	19,3	19,6
24				19,9	20,1	20,3
25					20,9	21,1
26					21,6	21,9
27					22,4	22,7
28					23,2	23,4
29					23,8	24,2
30					24,4	24,9
31						25,5
32						26,2
33						26,7
34						27,3
35						27,8
36						28,3

37						28,8
38						29,2
39						29,6
40						30,0

Round: BONUS (155 mm/52 kal)				
	Charge 3M BB	Charge 4M BB	Charge 5M BB	Charge 6M BB
Target distance (km)	Shortened target distance (km) / ANBB	Shortened target distance (km) / ANBB	Shortened target distance (km) / ANBB	Shortened target distance (km) / ANBB
8	7,6			
9	8,5			
10	9,4			
11	10,3	10,3		
12	11,2	11,1		
13	12,0	12,0	12,2	
14	12,9	12,9	13,0	
15	13,7	13,8	13,8	
16	14,5	14,7	14,7	
17	15,3	15,5	15,5	
18		16,4	16,4	
19		17,4	17,3	
20		18,1	18,2	
21		18,8	19,1	
22		19,5	19,9	
23			20,7	
24			21,5	21,5
25			22,3	22,2
26			23,0	23,1
27			23,7	23,9
28				24,6
29				25,3

30				25,9
31				26,6
32				27,1
33				27,6
34				28,1

Round: BONUS (155 mm/52 kal)				
	Charge 3M BB	Charge 4M BB	Charge 5M BB	Charge 6M BB
Target distance (km)	ΔA_{EC}	ΔA_{EC}	ΔA_{EC}	ΔA_{EC}
8	3100			
9	2700			
10	2300			
11	2000	2900		
12	1700	2600		
13	1500	2300	3000	
14	1300	2000	2700	
15	1100	1700	2400	
16	900	1500	2100	
17	700	1300	1800	
18		1100	1600	
19		1000	1400	
20		900	1200	
21		800	1100	
22		700	1000	
23			900	
24			800	1100
25			700	1000
26			600	900
27			500	900
28				800
29				700

30				700
31				600
32				600
33				500
34				500

Round: Illumination M485A2 (155 mm/52 kal)								
Target distance (km)	3W	4W	5W	6W	7W	2M	3M	4M
	ΔA_{EC}	ΔA_{EC}	ΔA_{EC}	ΔA_{EC}	ΔA_{EC}	ΔA_{EC}	ΔA_{EC}	ΔA_{EC}
3	3000							
4	2600	3000						
5	2200	2600	2800			2800		
6	1700	2000	2400	2700		2400		
7	1300	1600	2000	2400	2600	2000	2400	
8	1000	1200	1600	2000	2400	1600	2100	
9	800	800	1300	1700	2000	1300	1800	2200
10		600	1000	1400	1700	1000	1500	2000
11			700	1100	1400	700	1300	1700
12			500	900	1200	500	1000	1500
13				700	1000		800	1300
14				500	800		600	1100
15					600		500	900
16					500		400	800
17								700
18								600
19								500
20								400

Danger area is calculated as follows:

For A < D_r (ricochet may occur)

l	= 0,4 x D_r - 0,3 x A
L	= 0,4 x D_r - 0,3 x A + ΔA_{EC}

c	= 0,001 x (D_{max} x W) + 0,1 x (D_r -A)
BR_h	= 0,001 x D_{max} x W
f	= 0,1 x A

NB! f min = 400 meter

For A > D_r (ricochet risk disregarded)

l	= f = 0,1 x D_r
l	= 0,1 x D_r + ΔA_{EC}
c	= BR_h = 0,001 x D_{max} x W

The lines with ΔA_{EC} apply to rounds with payloads, i.e. illuminating M485A2 and BONUS. This is the extra distance flown by the empty carrier from the point of aim.

For BONUS, a required fictive minimum firing distance A_{min} of the same type as HE is achieved by firing at an elevation of 200 mils. The actual minimum firing distance has an elevation that is greater than 200 mils. This is due to a desire to ascertain the area for unconfirmed fire control data in the same way as for HE.

Charge	Fictive A_{min}
3M	6000 metres
4M	9000 metres
5M	11000 metres
6M	15000 metres

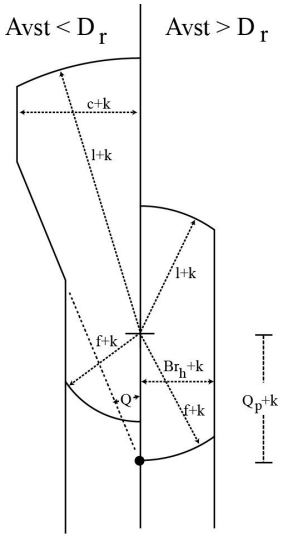


Figure: 3.34
Construction of safety templates for field artillery

3.12.8.2 Common data

a. Q_p= 0,1 x D_r + k NB! Q_p min = 1200 meter

W = 20 (mils)
Q = 400 (mils)
M = 500 (mils)

b. The value for k is calibre-dependent. For 155 mm, k is set to 600 metres.

All distances in the calculation are in metres. Danger area beyond the target is determined by drawing an arc around the target with radius (l+k). Danger area on this side of the target is determined by drawing an arc around the target with radius (f+k).

The area being fired over

The area being fired over has a width BR_h where the danger area on this side of the target ends and narrows to a width of k 300 m in front of the gun.

Danger area when the fire technical basis is uncertain

The area is determined by drawing the line D_r - D_{max} to the maximum width of the danger area beyond the target and then drawing the line for maximum width down to the contact point. The lines are broken(dotted line).

Construction of the template is shown in fig 3.34.

3.12.8.3 For field firing ranges with designated position areas and limited impact areas, a special template is constructed where D_{max} is equal to the longest acceptable firing distance in

the range in question (D_{accept}). The template is to have additional marking SPECIAL. TEMPLATE FOR POSITION AREA GRID..... IN FIELD FIRING RANGE.....

D_{accept} = ...M.

3.12.8.4 Safety template, direct laying (fig 3.35) is constructed for the following firing distances:

- 155mm FH 800-2500 m
- 105mm FH 600-2000 m.

If the firing goes beyond 2,500 m, a template for indirect laying is to be used. The basic data for the construction of a safety template can be found in the following table:

Hazardous distance for impact in front of the target (f)	**Splinter distance (k)**	**Ricochet angle (Q)**	**Ricochet distance (c)**	**Hazardous distance for impact beyond the impact zone (l)**
20% av A_{min} at least 200 m	155mm:600 m	400 mils	0.1 (D_{max} - A_{min})	D 0.4 x D_{max} - 0.3 x A_{max}

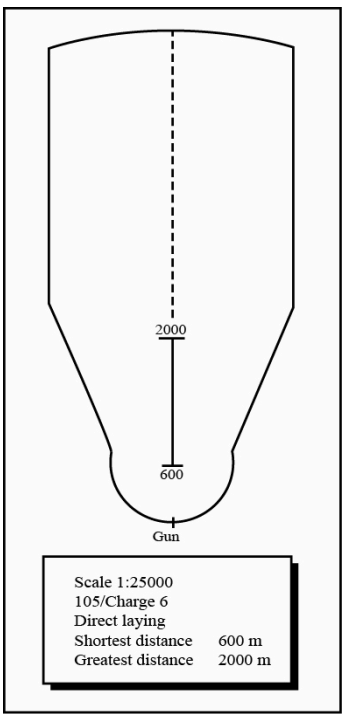


Figure: 3.35

Example of safety template, direct laying. ***NB! Not to scale***

If ricochets are disregarded, the ricochet angle (Q) and the ricochet distance can be omitted.

Dangerous distance for impact beyond the impact area (l) is then calculated as follows:

$l = 0,1 \times D_{max}$.

The side spray angle W is:

- 20 mils for static targets
- 100 mils for moving targets

In practice, safety template for direct laying applicable to both static and moving targets can be constructed as follows:

a. Danger area on this side of the target is calculated as follows (fig 3.36):
   - determine f+k
   - draw a semicircle around the shortest firing distance with a radius f+k

b. Danger area beyond the target is calculated as follows (fig 3.36):
   - mark off Q
   - mark off k from Q
   - mark off f+k from the firing direction where it is greater than Q+k
   - determine c+k and mark off this from the firing direction where it is less than Q+k
   - determine l+k, and with this as radius, draw a circular arc from 2,500 m.

c. Example of marking off the template, see fig 3.35

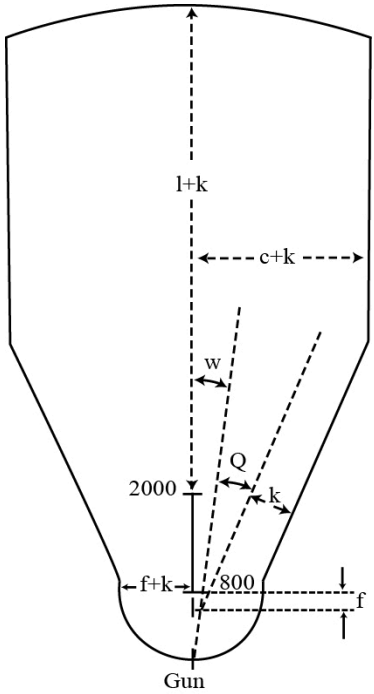


Figure: 3.36

Construction of safety template, direct laying

3.12.9 Laser range finder

3.12.9.1 See point 5.2.7 Laser radiation

3.13 ARTILLERY, TESTING AND TRIAL FIRING

Figure: 3.37
New equipment must be tested

3.13.1 In general

3.13.1.1 The regulations in the section “Artillery, firing against ground targets” also apply for this paragraph. The regulations referred to in this section are additional. Test and trial firing refers to:

- all firing with non-qualified weapons and/or ammunition.

3.13.1.2 Weapons and ammunition must be approved for the test/trial by the competent authority.

3.13.2 Leadership and supervision personnel

3.13.2.1 During test and trial firing the following personnel with responsibility for safety are to be appointed:

- test and trial commander (may also act as firing commander)
- firing commander
- safety commander
- safety supervisor
- safety posts (according to instructions and type of test)

3.13.2.2 The test and trial commander is appointed from among well qualified personnel from the unit/institution responsible for the test/trial. The individual appointed must be very familiar with the materiel to be used in the test/trial. At test and trial firing, the test and trial commander takes over the responsibilities of the OCE (see point 1.1.4). In addition, this person must:

- draw up a plan (description) for the test/trial with the necessary Safety rules. The plan must be presented to the competent authority for approval 1 month before the test/trial is to take place.

- brief all involved personnel on the test/trial and make sure that all personnel have received and understood instructions and orders
- allow deviations from the plan if this is deemed necessary and does not involve considerable consequences in terms of safety

3.13.2.3 The firing commander is appointed from among well qualified personnel. He/she can also act as test and trial commander, and is then to be appointed from the unit/institution with responsibility for the test/trial. His/her duties are described in point 1.1.4. A safety commander is appointed from among qualified personnel. This person has the same duties as described in point 1.1.4. In addition, he/she must:

- decide left/right limitations and max/min elevation.

3.13.2.4 A safety supervisor is appointed if the test and trial commander deems it necessary in order to carry out the test/trial. A safety supervisor must always be appointed in case of test and trial firing with artillery from areas outside a field firing range. The safety supervisor's duties are described in point 1.1.4.

3.13.2.5 Safety posts are appointed in accordance with the current field firing range instructions and if the test/trial commander deems it necessary in order to carry out the test/trial.

3.13.3 Test and trial firing with artillery from area outside field firing ranges – additional regulations

3.13.3.1 The area to be used has to be approved by the DIF.

3.13.3.2 Warning is given in accordance with the Field firing range regulation and the Field firing range drill book and Appendix 7. In addition, the test and trial commander has to decide whether further measures are necessary in any given case.

3.13.3.3 The correct number charges of the right size must be prepared and checked before firing starts. Charges that are left over and powder bags must be removed from the gun before firing starts.

3.13.3.4 When firing with mechanical time fuses, the timer must be checked by the gun commander and safety supervisor.

3.13.3.5 A safety supervisor must be appointed per gun (accordingly). The safety supervisor has the following duties:

- checking that firing takes place within the left and right limitation and max/min elevation
- marking the guns to indicate that the above check has been performed
- checking ready ammunition – correct number and size of charges
- checking extra powder bags, number and condition
- checking the timer of the time fuse when necessary
- stopping the firing if necessary for safety reasons

The safety supervisor cannot be ordered to perform other duties unrelated to safety.

3.14 PRECAUTIONS IN CASE OF MALFUNCTION

3.14.1 General

3.14.1.1 When firing with automatic guns 20mm or larger, except tank guns (see point 3.11.6) and machine cannons MK 30 – Bushmaster (see point 3.11.2.3), the following precautions must be taken in case of malfunction:

a. If there is malfunction (no firing), a new attempt at firing must be made if the trigger mechanism can be cocked without having to open the sliding wedge or the breech block or if locking of this is revoked. If there is still no firing, wait for one minute until the sliding wedge or the breech block is opened and the cartridge is removed from the chamber.

b. For weapons where the trigger mechanism cannot be cocked again without opening the sliding wedge or the breech block or/and revoking the locking, wait for one minute after after trying to fire before opening the sliding wedge and the breech block and removing the cartridge.

c. After the cartridge has been removed from the weapon, it is to be kept separate from other ammunition until it has been examined to find out if there is something wrong with the ammunition or the gun that has caused the malfunction. If it is established that that there is something wrong with the ammunition (cartridge), it must be removed from all other materiel and be destroyed as soon as possible.

d. If the fault lies in the gun, the cartridge can be re-loaded and fired in another weapon or the same weapon after the fault has been rectified.

e. Before the sliding wedge and the breech block is opened to remove a cartridge which has not fired, non-essential personnel must be evacuated to cover or to a safe distance from the weapon.

f. The muzzle of the gun must remain pointed towards the target at all times and all personnel must stay away from possible muzzle blast.

g. If a gun with a very hot chamber is loaded and the cartridge does nor fire and cannot be removed from the gun within 15 seconds, no attempt must be made to remove the cartridge until the chamber has cooled.

h. For the 20mm RH 202, the following routine applies when a malfunction occurs:

In case of malfunction, wait for 30 seconds before the cartridge is removed from the chamber. If more than 75 rounds have been fired, the gun must be considered to be hot. If the gun is considered to be hot, the cartridge must be removed from the chamber within one minute. If the cartridge cannot be removed from the chamber within 1 minute from the time of malfunctioning, non-essential personnel must be evacuated and the barrel cooled until it can be touched without any problem. The cartridge can then be removed from the chamber.

3.14.1.2 Firing with:

- 40 mm guns, all types of ammunition (except automatic guns and tank guns, see point 3.11.6 and the above point)
- 75 mm guns, all types of ammunition

- 105 mm guns, all types of ammunition, the following precautions must be taken when a malfunction occurs:

  a. If there is a malfunction (no firing) two more attempts at firing are made if the trigger mechanism can be cocked again without opening the sliding wedge or the locking is revoked. If there is still no firing, wait for 2 minutes after the latest attempt before the sliding wedge is opened and the cartridge is removed.

  b. For weapons where the trigger mechanism cannot be cocked again without opening the sliding wedge or the locking being revoked, wait for 2 minutes from the latest attempt at firing before the sliding wedge is opened and the cartridge is removed.

  c. After the cartridge has been removed from the weapon, it is to be kept separate from other ammunition until it has been examined to find out if there is something wrong with the ammunition or the weapon that has caused the fault. If it is established that that there is something wrong with the ammunition (cartridge), it must be removed from all other materiel and be destroyed as soon as possible.

  d. If the fault lies in the weapon, the cartridge can be re-loaded and fired in another weapon or the same weapon after the fault has been rectified.

  e. Before the sliding wedge and the breech block is opened to remove a cartridge which has not fired, non-essential personnel must be evacuated to cover or to a safe distance.

  f. The muzzle of the gun must remain pointed towards the target (non-hazardous direction) at all times and all personnel must stay away from possible muzzle blast.

  g. If a gun with a very hot chamber is loaded and the cartridge cannot be fired or removed from the gun within 5 minutes, all personnel must be evacuated to a safe place for two hours. After two hours, the weapon must be moved to a safe or remote location, and the cartridge removed. If the weapon is moved, the following must be observed:

     - If using separate ammunition that requires the sliding wedge to be closed, then the casing must be removed before moving the weapon and the chamber and the sliding wedge are covered with e.g. cotton waste to protect the chamber and the front of the breech in case the shell falls out during transport.
     - If using fixed ammunition, do not empty the gun until it has been taken to the new location.

  h. When emptying weapons under the conditions described above, an ammunition officer should be present.

3.14.1.3 Special comments. For all types of ammunition with fuses, shells/cartridges that have been ejected from the chamber from the front must not be used. If the cartridge is stuck

in the chamber, it might be due to a dimensional defect (casing and/or projectile), in addition to which the fuse may be damaged during the process of ejection.

Ejecting 155 mm ammunition:

Qualified personnel can assess whether ejected ammunition can be reused or whether it has to be destroyed.

3.14.1.4 High pressure in the gun. Certain conditions however may cause excessive pressure, and to eliminate this possibility, the following must be observed:

- Ammunition with temperatures outside given limits must not be used
- Avoid loading when the chamber is too hot
- Only the right booster charges for the types of ammunition and/or weapon may be used
- Nor is it permitted to use more powder bags than required as full charge for the special ammunition and weapon type.

3.14.1.5 Additional information is to be found in the respective weapon regulations.

3.15 FIRING AT AIRBORNE TARGETS

Figure: 3.38
Drone breaking up in air-firing exercise

3.15.1 In general

Double hearing protection must be used on the field firing range during live firing exercises.

3.15.2 Firing guns at airborne targets

3.15.2.1 When radar tracking is used for aiming guns, firing must cease when the target aircraft is no longer visible to the eye.

3.15.2.2 The OCE is required to assign personnel to the recovery of released tow wires, unless otherwise expressly indicated (for example, in the prevailing contractual provisions of the aviation company). Personnel must be instructed not to touch the tow wire before ascertaining that it is not in contact with a power line.

3.15.2.3 In the case of direct aiming, the telescopic sight (direction-finding instrument) must be equipped with an eye-protector and forehead support pad, when this forms part of the equipment.

3.15.2.4 In the event of a misfire, the gun must remain pointing in the direction of fire. Personnel who are not under cover must not be present in front of or at the same height as the muzzle when the fault is being rectified. Otherwise, the provisions of the weapons regulations should be observed.

3.15.2.5 When firing across the sea, one (or two, if necessary) manned motor boat(s) with communications to the OCE must be present, so that both sector borders can be effectively guarded against seaward approach. Safety boats may be dispensed with if the OCE has the necessary overview of the firing sector from the stand, or via observation posts beyond the stand, so that attention can be paid to all traffic passing within the field firing range.

3.15.2.6 If an auxiliary weapon is mounted on the gun, the applicable safety provisions for auxiliary weapons also apply.

3.15.2.7 During firing exercises involving Norwegian units on foreign field firing ranges, the safety regulations of the relevant field firing range must be observed. Providing the provisions of the field firing range do not infringe upon the provisions specified in UD2-1, the provisions of the field firing range should be applied in full. In the event of inconsistency between the provisions of the field firing range and UD2-1, the most stringent interpretation of the safety regulations must be adopted.

3.15.3 Leadership and supervision personnel

3.15.3.1 For firing exercises, the following personnel must normally be assigned:

- OCE (firing commander)
- safety officer
- safety supervisor(s)
- assistant safety supervisor(s)
- safety plotter
- safety plotter post(s))
- safety post(s)

3.15.3.2 OCE

The OCE issues orders to the safety officer(s) as required, e.g. when there is firing from two stands at the same time, or using different weapons. In addition to the general duties in point 1.1.4.2, the OCE must also ensure that:

a. Before firing:
   - ensure that an ammunition inspection is carried out
   - verify the orientation of guns

b. After firing:
   - ensure that remaining ammunition is counted up
   - check that the guns have been emptied
   - ensure that ammunition is transported away, where applicable
   - ensure sentry duty is established for any ammunition that is not to be transported away

3.15.3.3 Safety officer

The safety officer must hold the rank of an officer. He/she is in command of all safety personnel in the unit. In relation to the OCE, he/she is responsible for ensuring that the safety service is organised in accordance with safety instructions and issued orders, and for taking charge of the safety service. In addition to the general duties referred to in item 1.1.4.5, he/she is required to:

- instruct safety supervisors in respect of the provisions applicable to the specific exercise
- monitor the activities of safety supervisors and keep them regularly updated regarding maritime and air traffic, or similar, in the area

- inspect personnel equipment (helmets, ear protection, flags, etc.)
- ensure that the provisions regarding misfires are observed
- ensure that no-one is present in front of the muzzle after the order to load has been issued
- instruct safety posts
- allocate, instruct and monitor safety plotter posts
- ensure that firing can take place before the order to open fire is issued
- notify the OCE when firing may commence and when this is restricted for reasons of safety
- cease all firing:
    1. When the gun is pointing towards or in front of the target aircraft, or at a point to the rear of the aircraft closer than ¼ of the tow wire's length
    2. When aircraft and/or maritime vessels are within (or, during the firing exercise, expected to enter) the hazardous zone
    3. When the target aircraft could be exposed to danger due to ricochets, etc.
    4. When the shell(s) (tracer) is(are) observed to pass close to the target aircraft (within half the length of the tow wire)
    5. When the target aircraft is about to crash, has suffered engine damage or has given the signal to stop firing (radio or light signal).

The safety officer must be in possession of a siren in order to issue a cease fire command when this is deemed necessary, for example when a weapon discharge prevents personnel from hearing an ordinary whistle signal.

3.15.3.4 Safety supervisor

The safety supervisor. A safety supervisor is assigned to each weapon. A safety supervisor is assigned to tracking radar when remote-controlled guns are being used. In addition to the general duties referred to in point 1.1.4.6, the weapon safety supervisor must:

- ensure that the gun is not aimed beyond the side angle limit and elevation stipulated by the safety officer, and that the gun is not pointing towards or in front of the target aircraft, or at a point to the rear of the aircraft closer to the aircraft than ¼ of the wire's length (see point 3.15.3.3)
- when the target is being tracked, give a sign to indicate that there is nothing preventing the weapon from being fired. To indicate that firing may commence, he/she should hold up a red flag. With remote-controlled guns, he/she should stand in such a way as to not sustain injury in the event the gun rotates swiftly.

The radar safety supervisor monitors materiel and targets and gives permission to open fire when everything is working normally and the guns' safety supervisors are holding their red flags up.

3.15.3.5 Assistant safety supervisor. An assistant safety supervisor is assigned to each gun:

- when firing over or to the side of troops

- when firing at approaching targets when the horizontal projection of the angle of attack is < 20 degrees

The assistant safety controller by the gun must:

- notify the safety supervisor when the gun is aimed outside of the stipulated limit of lateral direction or elevation
- assist the safety controller in accordance with his/her specific instructions

3.15.3.6 The safety plotter. To be assigned when observational conditions make this necessary. Based on reports from the safety plotting posts, the safety plotter must continuously plot maritime vessels, etc. in the hazardous zone and keep the safety officer updated about this.

3.15.3.7 The safety plotting post. A safety plotting post is assigned when observational conditions make this necessary. The plotting post may be equipped with a radar set. The plotting post must be manned by a suitable number of personnel (minimum of two) with a sufficiently high level of experience in operating the instrument. The plotting post is required to:

- continuously monitor the stipulated maritime and/or land zone
- notify the safety plotter of boats, etc. not taking part in the exercise, which are present in or approaching the hazardous zone
- submit notification in the event that the mission cannot be carried out due to tiredness, poor visibility, etc.

3.15.3.8 The safety post. To be assigned in accordance with requirements for air zone monitoring.

3.15.4 Hazardous zone

3.15.4.1 During firing (except mirror prism firing) the target pilot, as well as personnel required for the exercise, may be present in the hazardous zone. Special provisions apply regarding target pilot safety. Remaining personnel are not required to take cover at the point of weapon discharge.

3.15.4.2 The nature of firing at airborne targets (extensive firing zone, fast-moving targets) renders it necessary for the boundaries of the hazardous area to be simplified, compared to firing at ground targets. It is not usually possible to completely cordon off the hazardous zone. Thus, in addition to the hazardous zone, it is generally necessary to make provision for a temporary inner hazardous zone that tracks the target. In the case of simultaneous firing at two towed targets, provision should be made for two (inner) hazardous zones. If vessels etc. enter the hazardous zone, firing may continue providing it can be safely ascertained that the vessel has not entered the inner hazardous zone.

3.15.4.3 The hazardous zone is determined and adapted as specified in the field firing range handbook. The appearance of the hazardous zone is shown in the example in fig 3.39.

3.15.4.4 A split hazardous zone is permitted providing that:

- firing occurs with a combination of projectiles and guns that are compatible with a split hazardous zone

- the trajectory within the area in which personnel are located extends at least 8 metres above ground level and 6 metres above terrain objects.

3.15.4.5 When firing over and to the side of troops with anti-aircraft machine guns and anti-aircraft automatic guns, as well as guns with mechanical aiming, precautions should be taken to ensure that the gun is not pointing in a hazardous direction.

Projectiles and fuses	**Split hazardous zone permitted**	**Muzzle distance r in metres**	**Safety angle M in mils**	**Angle of lateral dispersion W in mils**
12.7 mm and smaller calibres	Yes	50	100	100
20 - 40 mm, all solid projectiles	Yes	50	100	100
All HE rounds including MP rounds	Yes	V^o	250	100
All anti-tank rounds	No	V^o	250	100

3.15.4.6 An inner hazardous zone comprises a sector:

- with its tip at the gun
- with the centre line through the lead point
- with the outer limit equal to an arc with radius h
- with an angle of lateral dispersion W.

An inner hazardous zone should not be established when firing with guns via remote controlled radar aiming. This means that personnel and aircraft/maritime vessels may not be present in hazardous zones at any time. In the case of manual aiming/close-controlled and remote-controlled optical aiming, an inner hazardous zone may be established. All firing must cease immediately when aircraft (with the exception of target towing aircraft) enter the hazardous zone, regardless of whether or not an inner hazardous zone has been established. The gun's hazardous zone is determined by:

- safety angle (M)
- muzzle distance (r)
- splinter distance (h).

These values are calculated by using the tables in 3.15.4.5.

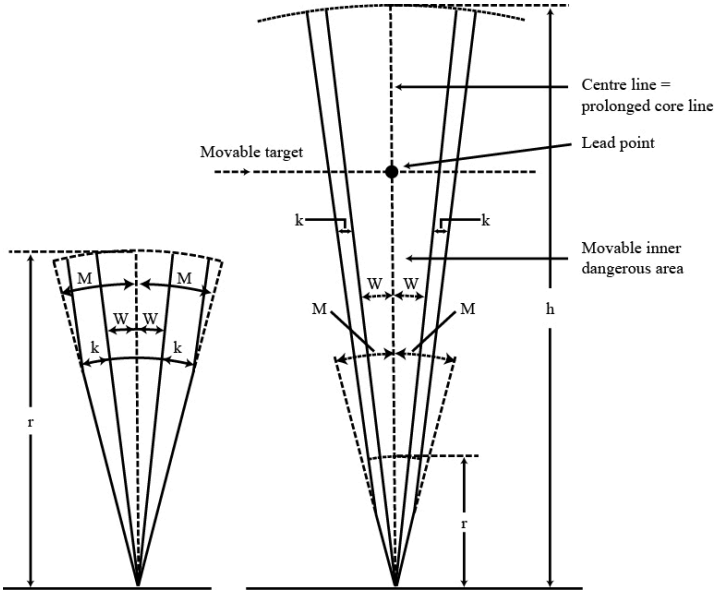


Figure: 3.39

Example of moveable inner danger area when firing at air targets.

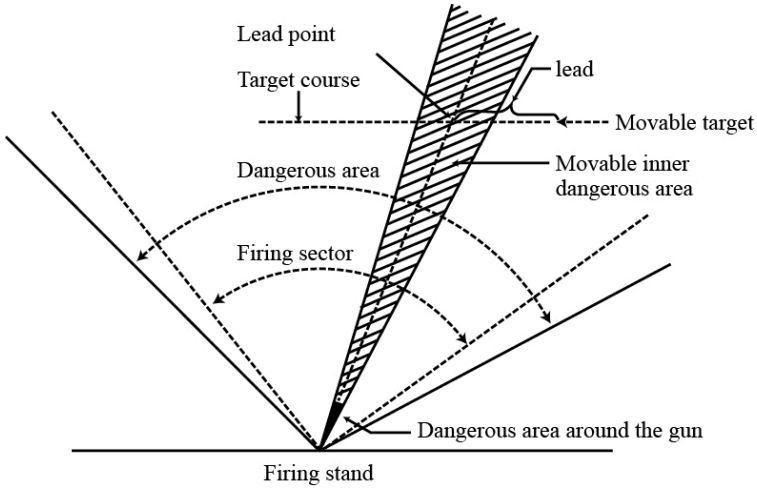


Figure: 3.40

Example of hazardous zone and inner hazardous zone which can be used when firing at air targets using manual aiming/close-controlled and remote-controlled optical aiming. With remote controlled radar aiming, the firing sector is the same as the hazardous zone minus 25 degrees on either side. (Inner hazardous zone is not used in case of remote-controlled optical aiming).

3.15.4.7 Dangerous distance in direction of firing (h) and splinter distance (k).

			K	
Calibre	**h**	**HE and MP rounds**	**Cold projectiles and exercise rounds**	
			Anti-tank rounds	**Exercise ammunition**
12,7mm	7 000 m	50 m	25 m	25 m
20mm	7 200 m	75 m	40 m	40 m
40mm L/60	12 000 m	400 m	75 m	75 m
40mm L/70	14 000 m	400 m	75 m	75 m

3.15.4.8 A hazardous zone (inner hazardous zone) is determined in accordance with the ground (sea) area of the preceding zone. When firing, the hazardous zone (inner hazardous zone) includes the airspace above this land (sea) zone, up to the following heights:

Calibre	**Height**
20mm	5 000 m

40mm L/60	8 000 m
40mm L/70	9 000 m
>40mm	12 000 m

3.15.4.9 The maximum permitted elevation is 65 degrees. This elevation may only be exceeded in the case of special test firing. When firing anti-aircraft machine guns (with the exception of 40 mm auxiliary weapons and larger guns) and 20 mm anti-aircraft automatic guns towards targets on an approaching course (horizontal projection of the angle of attack is < 20 degrees), firing may only commence once the towing aircraft has achieved an angle of elevation (target angle) of 65 degrees.

3.15.5 Firing missiles at airborne targets

3.15.5.1 Firing with NASAMS is an air force activity and regulated by the chief of the Air Force’s competent authority.

3.15.5.2 During operations, all principal components of the NASAMS weapon system are electrically powered. Personnel must never perform work on electronic equipment carrying hazardous voltages, as stated in the relevant technical manuals, without at least one other person being present who is aware of the danger of operating the materiel and who is qualified to give first aid. All components must be earthed in accordance with technical manuals (two-man-rule).

The two-man-rule addresses hazards in connection with electricity.

3.15.5.3 The various missiles used against airborne targets have different "Safety Traces". Safety Trace is a tool for assessing the risk associated with airborne target weapons and that takes account of the missile’s characteristics and manoeuvrability. Safety Trace is graded and is for use when planning live firing against airborne targets using missile systems, as it generates guides for where the weapon system can fire from and where the target drone can fly.

3.15.5.4 High Mobility Launcher (HML)

An HML can contain multiple missiles. It can fire missiles in an arc of almost 360° and there is no certainty as to the direction in which it is fired.

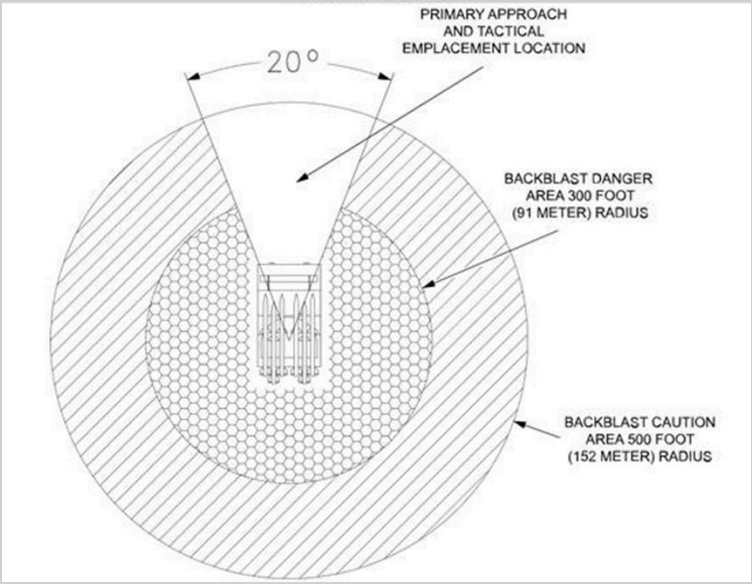


Figure: 3.41

Figure: 3.42

3.15.5.5 NASAMS Launcher

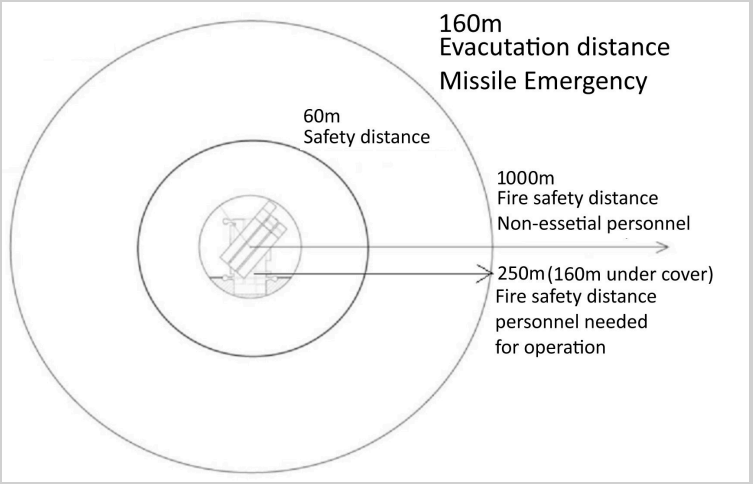


Figure: 3.43

Safety distance from launcher is 60 m. Contact the launcher team leader for guidance if positioned close to a launcher.

When loading missiles, only trained personnel should be present near to the launcher.

Helmets must be worn during loading, and no communication equipment or clothing may be used that might damage the missile.

There is also a complete prohibition on heat sources, including cigarettes during missile-loading.

Missile emergencies are situations such as misfires, rocket motor ignition or other incidents, such as a launcher overturning. In such situations, personnel must evacuate to a safe area, or at least 160 m from the launcher.

In case of fire spreading to a launcher and it is not possible to extinguish the flames, the heat may cause the missile's warhead to detonate. Personnel required for the operation evacuate the area immediately to 250 m from the launcher (160 m under cover). Non-essential personnel evacuate immediately to a safe area, 1000 m from the launcher.

3.15.5.6 Safety organisation live firing

When live firing with NASAMS, a dedicated safety organisation must be appointed. The table is based on the Andøya field firing range, as Norway’s only approved field for firing with NASAMS. There may be variations when using other field firing ranges. The safety supervisors should not be included in the line of command in a firing unit and must have independent communications at their disposal. Standing Operating Procedures for NASAMS Live Firing describes instructions for safety supervisors.

Function	Responsibility	NASAMS role
Commanding officer	Commander of firing battalion	
OCE	Commander of firing unit	
Firing commander	Appointed by OCE	
Safety officer	Appointed by OCE	
Safety supervisor	Authorised operators	NASAMS Security Officer (NSO)
		FDC Security Officer (FSO)
		LCHR Safety Officer (LSO)
		Missile Assembly Safety Officer (MASO) (LSO can be MASO)

Personnel located within 85 metres of a launcher must use of double hearing protection during live firing.

3.15.5.7 Loading missiles into a CL and HML

When loading missiles, only trained personnel may be present near to a CL or HML.

Helmets must be worn during loading.

Communications equipment or clothing that may damage the missile must not be used.

There is a complete prohibition on heat sources, including cigarettes during missile-loading.

3.15.5.8 Missile Emergency

Missile emergency is a situation such as a misfire, ignition of a rocket motor or some other undesired event, such as a CL overturning. In such situations, personnel must evacuate to a safe area, or at least 160 m from the CL/HML.

If fire spreads to a CL/HML and it is not possible to extinguish the flames, the heat may cause the missile's warhead to detonate. Personnel required for the operation must immediately evacuate to a distance of 250 m from the CL/HML (160 m if under cover). Non-essential personnel evacuate immediately to a safe area, 1220 m from the CL/HML.

3.15.5.9 NASAMS Electro-optical (EO) sensor MSP 500

Laser range finder

Product name	NASAMS MSP500, 6 Hz MOLEM
Hazard class	1M (ihht. IEC 60825-1)
Wavelength	1543 nm

4 DRIVING AND TRANSPORT DUTY

4.1 GENERAL PROVISIONS REGARDING THE RIGHT TO DRIVE AND INSTRUCTION

Figure: 4.1
SISU driver

4.1.1 Instruction requirements

In order to drive Norwegian Armed Forces vehicles, drivers must have a driving licence in the appropriate class, code, and possess a Norwegian Armed Forces driving permit for the relevant vehicle.

No distinction is made between personnel who are undergoing basic training/completing refresher exercises, military staff and civilian employees.

4.1.2 Requirement to have a driving licence

See Appendix 25

4.1.3 Exceptions from a requirement to have a driving licence

4.1.3.1 Age requirement for acquisition of a right to drive vehicles in heavy classes:

Military personnel in service with the Norwegian Armed Forces or Civil Defence who possess a Class B driving license are able to take the practical driving test for Classes C, CE, C1, C1E, D1 or D1E. For classes D and DE, the practical driving test may not be taken until the age of 20.

A Norwegian Armed Forces' driving permit is issued after passing the Norwegian Public Roads Administration's driving test and undertaking military-specific training on the relevant vehicle. The Norwegian Armed Forces' driving permit together with a Class B driving licence gives the right to drive in the relevant class for personnel who have not reached the minimum age for issuance of a civilian driving licence.

On reaching the minimum age for acquiring a civilian driving licence in the relevant class, the exception ceases and a civilian driving licence must be issued.

4.1.3.2 MB 240GD/290GD with permitted total weight up to 3,500 kilos

Can be driven on a Class B driving license after completing MB military light utility vehicle driver training, regardless of number of seats.

Having completed class B, the MB 240GD/290GD with permitted total weight up to 3,500 kilos can be driven with a trailer with a permitted total weight within the vehicle's limits after completing driver training for MB military light utility vehicle with an additional module for trailers.

4.1.3.3 Vehicles with permitted total weights over 7,500 kilos

Vehicles with permitted total weights over 7,500 kilos can be driven with a trailer with a total weight of up to 5,000 kilos with a class C right to drive after completing vehicle driver training for the vehicle type and additional module for trailers.

4.1.3.4 LTV-winter (snowscooter)

When being used in the service of the Norwegian Armed Forces, drivers of LTV/Ws are required to possess a Class B driving license, and to have passed vehicle driver training on LTV/Ws. The Norwegian Armed Forces' driving permit together with a Class B driving license provides a right to drive LTV/Ws in the service of the Norwegian Armed Forces.

4.1.3.5 Code 160 (emergency response driving)

For personnel who do not meet the age requirements in section 6 of the emergency response driving regulations, the Norwegian Armed Forces' driving permit is issued on passing the military emergency response driving course. This right to drive is valid only when in service with the Norwegian Armed Forces or the Civil Defence during basic training or refresher courses.

4.1.4 Driver certification

Before military-specific driver training commences, the driver must possess a driving license in the class that the vehicle requires, unless otherwise specified in an approved training programme or curriculum. The minimum requirement in respect of a Class B driving licence may never be waived.

Certification as a military driver must be undertaken by an approved instructor in accordance with an applicable programme. The qualification gained by the successful completion of the training must be recorded immediately in the personnel file. Registration in the personal file provides the basis for the issuance of a Norwegian Armed Forces driving permit. A Norwegian Armed Forces' driving permit with time limit is also valid after the expiry date.

4.1.5 Repair shop personnel

Repair shop personnel and technicians in Norwegian Armed Forces' repair shops, as well as repair team foremen and field mechanics, must have completed the necessary documented training stipulated by the shop foreman or an commanding officer in order to be able to use and test-drive vehicles in connection with repair work. The job order for the assignment must be brought along. Repair shop personnel do not require a

Norwegian Armed Forces driving permit in connection with repair work. A valid civilian driving licence and job order must be presented.

4.1.6 Use of vehicle-mounted work equipment

In accordance with § 3-2 of the Working Environment Act and chapter 10 of the Regulations on work, the use of work equipment and associated technical requirements, as well as Regulations for land materiel, documentation of approved training in the use of work equipment is required. Examples of vehicle-mounted equipment are tail lifts, hook lifts, cranes, winches and such like. Documentation of completed training must be put on record.

4.2 GENERAL PROVISIONS FOR THE USE OF VEHICLES

Figure: 4.2
SPV in terrain

4.2.1 Seat belts and harnesses

All drivers and passengers in military vehicles must use seat belts and harnesses where such items have been installed. An exception to this is where reference is made in other parts of UD 2-1 that seat belts do not have to be used due to the nature of the driving. Vehicles transporting unsecured personnel must not exceed 40 km/h except where otherwise specified in the vehicle's special provisions.

4.2.2 Use of combat helmets and combat vests during driving

It is not permitted to use combat helmets and/or combat vests when driving wheeled vehicles on public roads outside the Norwegian Armed Forces' field firing ranges and training grounds and defined training zones When driving in field firing ranges, training grounds and zones in which combat helmets and/or combat vests are deemed necessary, the use of such equipment must be a separate item in the risk assessment. The maximum speed when driving with a combat helmet and/or combat vest is 40 km/h unless operational need indicates otherwise.

4.2.3 Rest for drivers

The officer in charge is responsible for planning and documenting adequate rest for drivers. Drivers are responsible for not driving if they are too tired or weary, see Section 21 of the Road Traffic Act.

4.2.4 Driving with night vision, blacked-out vehicles and shielded lights

Exercises with night vision, blacked-out vehicles and blackout lights on roads should only be undertaken within Norwegian Armed Forces firing ranges and training grounds or requisitioned training zones with regulatory markings. The commanding officer must approve the activity based on the risk assessment. When driving with shielded lights or in a blacked-out vehicle, night vision devices must be ready and easily accessible to tank drivers and commanders or gunners so that these can be used for observations.

In the case of live exercises, observations can be made using night vision and weapon sights in daylight and darkness when such movements take place along prepared trails. If movement crosses or is along roads used by the general public, the vehicle's driving lights must be used, see section 15 of the Traffic Regulations.

4.2.5 Directing vehicles

Standard signs and signals for giving direction as outlined in STANAG 2284 AP-P14A are to be used. The tank driver remains responsible even if an assistant or signaller is used.

4.2.6 Working around, on or beneath vehicles

When performing work on a vehicle which requires presence around, on or beneath the vehicle, there must always be a risk assessment in every individual case, with a particular focus on falling and crushing injuries. Never crawl under a jacked-up vehicle unless the vehicle has been secured against jack failure. Securing is achieved by means of vehicle lifts, support stands, wheel chocks etc. Work beneath a vehicle supported only by a jack, crane, forklift or similar is not permitted. Before starting work on or inspection of vehicles, the person in charge of repair/inspection must check that:

- any ignition key has been removed from the vehicle and the stop lever has been pulled out of diesel vehicles fitted with such levers (if the work does not require the engine to be running)
- vehicles that do not have their engines running have their parking brakes engaged and a low gear selected
- there is no-one else in the vehicle's cab unless this has been agreed and is necessary in order to carry out the work
- vehicles that are required to have their engines running because of inspection/ work have their parking brakes engaged
- vehicles on slopes or on smooth surfaces are secured in order to prevent rolling or sliding by means of chocks, possibly wedge-shaped wooden chocks (minimum angle 35 degrees), rocks etc.

Exercise particular caution when moving around vehicles on inclined smooth surfaces, or where there may be a risk of the vehicle overturning. When doing work in the vehicle's engine compartment, the vehicle's ignition key must be removed so that the engine cannot be started unintentionally. Exercise particular caution when performing work in engine compartments that requires the engine to be running.

When using a "Hi-Lift" jack, particular caution must be exercised when selecting the location of the jack and the ground on which it is placed. When working on vehicles on roads used by public traffic, all personnel must wear reflective vests/reflective clothing in accordance with standard EN 471 or better.

4.2.7 Driving on floating ice sheets

Floating ice sheets are any ice cover on running water. When driving on floating ice sheets, the provisions in the "Manual for Military Ice Classification" must be complied with.

4.2.8 Transporting personnel

The number of persons in the vehicle must not exceed the number stipulated in the vehicle's registration document. Exceptions to this are specified under vehicle-specific provisions. Personnel must not be transported in the same compartment as unsecured goods. Towing or towed vehicles must not be used for transporting personnel unless this is a mobility-improving measure. When transporting personnel with personal weapons, barrels must be pointing down.

4.2.9 Driving with personnel in the gunner's position

In respect of wheeled vehicles, it is permitted to drive with personnel in the gunner's position during exercises and training in Norway, as well as on international operations. This is subject to the condition that vehicles are registered with and in use by the Norwegian Armed Forces. Dispensation for driving with personnel in the gunner's position does not permit the vehicle's registered number of seats to be exceeded except when on a training ground. Wheeled vehicles, when driven with personnel in the gunner's position, must be equipped with wire cutters where these are available for the vehicle type. Driving with personnel in the gunner's position during exercises and training must be subjected to particular risk assessment by the commanding officer.

4.2.10 Wading with wheeled vehicles

"Wading" refers to crossing water/waterways in the course of which the tow strap fastening point is underwater. Prior to wading with wheeled vehicles:

- All vehicles must be made ready with a fixed tow strap.
- The vehicle must be prepared according to provisions in a technical manual.
- Seat belts and harnesses must be loosened, and any roof hatches opened.

See point 7.2.1 for general provisions regarding wading with vehicles

4.2.11 Crossing temporary bridges

During exercises and operations, MLC 60/70 Leguan bridges may only be crossed by trained personnel. "Trained personnel" means personnel who have undertaken previous training in the crossing bridges of this type. The following provisions apply when crossing a Leguan bridge:

- The vehicle must be lined up before being driven onto the bridge.
- The maximum speed is 16 km/h.
- MLC 80-carrying vehicles can cross MLC 70 bridges if driven cautiously (walking speed)
- Avoid excessive turning on the bridge.
- Avoid rapid acceleration/deceleration on the bridge.
- The entire vehicle must have left the bridge before turning.
- The surface of the bridge must be sufficiently free from ice, snow, mud etc. in order to ensure that the vehicle has sufficient grip.
- Once a bridge has been paid, a bridge guard must be posted. This person must ensure that there is compliance with provisions.

4.2.12 Transporting materiel

All loads must be secured according to the LADOC loading safety programme. Where there is no information in LADOC, the load must be secured in accordance with applicable civil regulations. When transporting dangerous goods, there must be compliance with applicable civil ADR provisions.

4.2.13 Recovering military vehicles

When conducting recovery operations, a recovery supervisor must be appointed who must ensure compliance with safety provisions. When conducting self-recovery, personnel must have completed training in accordance with the Norwegian Armed Forces' training programme for drivers for the vehicle in question. When executing 1st, 2nd and 3rd line recovery, personnel must have been trained in accordance with the Norwegian Armed Forces' training programme for recovery. When towing a vehicle, there must be compliance with the technical manual for the vehicle in question. If towing or recovering a vehicle without brakes, the weight of the recovered vehicle must not exceed the weight of the towing vehicle. Towing on public roads using a rope, strap, cable or similar is limited to a maximum distance of 1 km and a maximum speed of 10 km/h. The maximum towing speed on public roads using a towing bar is 60 km/h.

4.2.14 Stationary use of vehicles/precautions against carbon monoxide poisoning

After driving in terrain, the exhaust system must be examined for breakages and other damage before the vehicle's engine is used in stationary mode.

When personnel are in the vehicle while the vehicle's engine is running, a petrol/diesel heating apparatus is being operated, or a vehicle-mounted heating unit is being used, one hatch of window must be kept open at all times. In order to avoid carbon monoxide poisoning, one person must remain awake at all times. It is the responsibility of the commanding officer to ensure that the above-mentioned provision is complied with.

4.2.15 Towing personnel on skis behind vehicles

- There must be a commander for each towed team. The towing commander must take the last place in the towed team. He must appoint a look-out on the towing vehicle. He must also ensure that all personnel follow applicable provisions, including ensuring that the personnel release the rope when required due to the terrain. The look-out on the towing vehicle must be in communication with the driver.
- If multiple vehicles are towing personnel together, there must be a minimum of 50 metres between the last man in the towed team and the next vehicle.
- When driving in the dark, the last man in the towed team must wear a reflective vest and a lightstick.
- The speed when towing must not exceed 30 km/h.
- The number of skiers towed must be adjusted according to the vehicle type and its limitations and to the local conditions. See also UD 11-15 Use and handling of the BV-206.

4.3 10,500 LITRE DEMOUNTABLE FUEL TANK

Personnel who are to use the Norwegian Armed Forces' demountable tank must have completed documented training.

4.3.1 Pre-transport check

4.3.1.1 The following points must be prepared by the user, but must be checked by the driver.

The driver must:

- Check that the main electric switch is turned off
- Check that the emergency trigger is in and shut (98 series)
- Check that the lid is shut and the railing is down
- Check that the cover on the dome frame is closed and locked (FTC series)
- Check that the ADR signs and transport emergency cards are in place and in accordance with the load
- Walk around the tank container and check that there is nothing loose in the compartments, check that all doors are shut and that there is no visible damage.

4.3.2 The driver's duty to check before transport

4.3.2.1 The driver must check that the following items are in place:

- Transport document/freight bill
- WRITTEN INSTRUCTIONS - Actions in case of accidents and emergencies
- Certificate of acceptance of the demountable tank
- ADR certificate of acceptance for the vehicle
- An ADR-tank certificate of competence must be kept by the driver together with the driving licence

4.3.3 Driver's duty to check before unloading

4.3.3.1 The driver must:

- step out of the vehicle and check that the ground is level and flat in order to avoid inflicting damage on the demountable tank when it is placed on the ground
- check that there is no leakage from the bottom of the demountable tank.

4.3.4 Check before use

4.3.4.1 Safety regulations before use:

- marking the area
- absorbent materials must be prepared
- earthing of the tank container
- bfire extinguishers are set out
- protective clothing is worn
- sounding of the tank container

4.3.5 Safety distances for setting up a fuel tanking site

4.3.5.1

Public areas and roads	7,5 metres
Railway/High voltage power line	25 metres
Naked flame	50 metres
Quarters/kitchen	50 metres
Between stacks of cans	3 metres
Ammunition dump	400 metres

4.4 MILITARY LIGHT UTILITY VEHICLES

4.4.1 MB military light utility vehicles

4.4.1.1 Transporting personnel

- "Unsecured personnel" refers to personnel in seats without seatbelts.
- Transporting unsecured personnel on public roads is not permitted.
- Transport of unsecured personnel internally within firing ranges and training grounds, in military camps and during exercises in civil areas where a training area has been requisitioned and marked out is permitted after an commanding officer has produced a risk assessment for the activity.
- The maximum speed when transporting unsecured personnel is 40 km/h.

4.5 PATROL VEHICLES

4.5.1 In general

4.5.1.1 Supplementary provisions are described in the "Training Programme for Patrol Vehicle Drivers".

"Patrol vehicle" is a collective term to describe vehicles fitted with mounted weapons, where the vehicle itself is essential to the execution of an assignment.

All materiel must be secured before driving commences. It is especially important to ensure that the vehicle is not loaded in a way that increases the risk of overturning and that fittings can withstand the stresses to which the equipment is subjected while driving.

All objects to be transported inside the vehicle must be secured in accordance with the user manual. Loose objects should be kept to an absolute minimum, and especially objects that could harm personnel in case of overturning, running off the road, running onto mines etc.

4.5.2 Further instruction and training for patrol vehicle drivers

4.5.2.1 In respect of further instruction and training for patrol vehicle drivers, the safety provisions of point 4.23 apply, with the exception of the first sentence of point 4.23.1.2Responsibility. In respect of further instruction and training for patrol vehicle drivers, instructors should be approved by a commander for manoeuvres.

4.5.3 IVECO LMV

Figure: 4.3
IVECO LMV

4.5.3.1 In general

Supplementary provisions are provided in

- Iveco LMV LAV 3

  TH 9-2320-25/240-10
- Iveco LAV 4

  TH 9-2355-25/101-10

Due to the risk of head injury, the use of helmets protecting against impact and strike must be considered in light of the operation, threat and terrain to be crossed.

4.5.4 MB MULTI 3

Figure: 4.4
MB Multi 3

4.5.4.1 Supplementary provisions are provided in TH 9-2320-25/243-10.

Due to the risk of head injury, the use of helmets protecting against impact and strike must be considered in light of the operation, threat and terrain to be crossed.

Multi III is approved for use as a four-seater when driving on public roads. The rear bench on the left-hand side may be used, but only at speeds not exceeding 50 km/h. The side-facing back seat and seat slings may only be used on public roads in connection with military tactical exercises and operations.

Winches may not be mounted at the front or rear during/transit on public roads. Items inside the vehicle must be secured with straps. A mounted winch may only be used on public roads in connection with military tactical exercises/operations.

Windscreens must be secured with straps when on a public road.

During transportation/transit, any weapon stations for MG3/Minimi (A-pillar and at the rear) must be placed in a suitable location to reduce the risk of injury to personnel in the event of a sudden stop/collision.

4.5.5 DINGO2

Figure: 4.5
Dingo 2

4.5.5.1 In general

Supplementary provisions are provided in:

- DINGO2_MRAP_Brukerdokumentasjon_1103_3v0_1105
- The general safety provisions under 4.5.1 and 4.5.2 are applicable for the DINGO2.

4.5.6 FUCHS

Figure: 4.6
Fuchs CBRN

4.5.6.1 In general

Supplementary provisions are provided in:

- TH 9-2320-25/245-10 AFV, Fuchs NBC NOR
- TH 9-2320-25/245-13B AFV. Fuchs NBC NOR

4.5.6.2 Movement of the FUCHS within the camp area can be directed from the vehicle under the following conditions:

- The vehicle commander must be standing up in the from right hatch.
- The vehicle must be locked in first gear and move at walking pace.

4.5.6.3 During backing of Fuchs within the camp area, TWO guides must always direct the movement from the ground.

4.5.6.4 When backing is led from the vehicle, the rear safety will assist the vehicle commander with observation and commands.

4.5.6.5 When there are personnel in the combat compartment, a rear safety must be appointed. The rear safety's tasks are:

- to convey the vehicle commander's commands and communications
- to indicate "**Clear in the rear**", when people are sitting in their respective seats with safety belts on and the back door closed and locked, that there is free space behind the vehicle.

It is the vehicle commander's responsibility to ensure that the rear safety is familiar with the safety rules applicable to the Fuchs.

4.5.7 SISU

Figure: 4.7
Medical vehicle version of the SISU

4.5.7.1 In general

Supplementary provisions are provided in:

- TH 9-2350-25/216-10 AFV, wheeled, XA-203
- TH 9-2320-25/216-24E AFV, wheeled, XA-203

4.5.7.2 Movement of the Sisu within a camp zone may be directed from the vehicle under the following conditions:

- A vehicle commander must be positioned standing in the front right-hand hatch.
- The vehicle must be locked in first gear and move at walking pace.

4.5.7.3 During backing of the Sisu within the camp area, TWO guides must always direct the movement from the ground.

4.5.7.4 When backing is led from the vehicle, the rear safety will assist the vehicle commander with observation and commands.

4.5.7.5 When there are personnel in the combat compartment, a rear safety must be appointed. The rear safety's tasks are:

- to convey the vehicle commander's commands and communications
- to indicate "**Clear in the rear**", when people are sitting in their respective seats with safety belts on and the back door closed and locked, that there is free space behind the vehicle.

The VC must ensure that the rear safety is familiar with the safety rules applicable to the SISU.

4.6 LIGHT ALL-TERRAIN VEHICLES, SUMMER (LTV/S)

Figure: 4.8
LTV/S in difficult terrain

4.6.1 General provisions

For a definition of LTV/S, see point 0.2.

Before starting up an LTV/S with variator drive, the driver must ensure that the accelerator cable is working freely.

The maximum wading depth for an LTV/S is 60 cm. For further information, refer to point 7.2.1.1.

When recovering an LTV/S, reference should be made to item 4.1.6 in general, and especially to the technical manual for vehicles and winches.

When driving an LTV/S in unfamiliar terrain, the axis must be planned and reconnoitred, so that allowance is made for factors such as environmental restrictions and the technical limitations of the vehicle.

Before removing the protective cover from the variator, the key must first be removed from the vehicle.

When crossing roads, the crossing point must be first be reconnoitred in advance so that the crossing can proceed without hindrance. The crossing must be executed in such a way as not to obstruct or disrupt other traffic.

4.6.2 Requirements for personal protective equipment

Both driver and passenger must wear E-marked helmets.

During tactical exercises or operations where personal basic equipment includes helmets, Norwegian Armed Forces' helmets can be used by order of the commanding officer. In such cases there must be a risk assessment (ORM), movements on public roads must be avoided wherever possible, and the maximum permitted speed limited to 40 km/h, unless otherwise indicated by operational need. Reflective vests must be worn by all personnel on an LTV/S when driving on public roads.

When driving at speeds above walking pace, goggles must be worn. During vehicle operation, clothing must be worn that provides adequate protection from the effects of cold and crush injuries. It is recommended that hearing protection and back protectors are used.

4.6.3 Speed restrictions

The maximum speed for an LTV/S is 60 km/h.

- With a trailer attached, the maximum speed is 40 km/h.
- With a trailer containing personnel attached, the maximum speed is 30 km/h.

The maximum speed for an LTV/S with chains fitted is 40 km/h.

If driver or passengers use helmets other than E-marked helmets, the maximum speed is 40 km/h.

4.6.4 Transporting personnel

Up to 2 people including the driver can be transported on an LTV/S. It is permitted to transport up to 2 people in a trailer.

4.7 LIGHT ALL-TERRAIN VEHICLES, WINTER (LTV/W)

Figure: 4.9
LTC/W on patrol

4.7.1 General provisions

Before starting up an LTV/W with variator drive, the driver must ensure that the accelerator cable is working freely.

If emergency stop cords are fitted, these must be attached to the body prior to operation of the vehicle. When driving in demanding terrain in which there is a significant risk of the vehicle overturning or injury being sustained due to the emergency stop being triggered, the officer in charge of the activity, following a risk assessment, may order the driver not to attach the emergency stop cord.

When driving a LTV/W in unfamiliar terrain, the axis must be planned and reconnoitred in order that factors such as floating ice sheets, potential avalanche risks in the area, environmental restrictions and the vehicle's technical limitations are accounted for.

Crossing frozen rivers and lakes, point 7.2.7.2.

Driving on roads outside the Norwegian Armed Forces firing ranges and training grounds is permitted only in exceptional cases where hard shoulders or other off-road routes are unavailable.

When crossing roads, the crossing point must be first be reconnoitred in advance so that the crossing can proceed without hindrance. The crossing must be executed in such a way as not to obstruct or disrupt other traffic.

4.7.2 Requirements for personal protective equipment

Both driver and passenger must wear E-marked helmets.

CE-marked and approved alpine helmets can be used, see Regulation on the use of personal protective equipment when operating motor vehicles, section 2 (g), and the maximum permitted speed is limited to 40 km/h.

During tactical exercises or operations where personal basic equipment includes helmets, Norwegian Armed Forces' helmets can be used by order of the commanding officer. In such cases there must be a risk assessment (ORM), transit on public roads must be avoided wherever possible, and the maximum permitted speed limited to 40 km/h, unless otherwise indicated by operational need.

Reflective vests must be worn by all personnel on an LTV/W when driving on public roads.

When the vehicle is driven at speeds above a walking pace, goggles shall be worn. During vehicle operation, clothing that provides adequate protection from the effects of cold and crush injuries should be worn. It is recommended that back protectors and hearing protection are used.

4.7.3 Speed restrictions

The maximum speed in terrain and on roads not open to public traffic is 60 km/h.

The maximum speed with an attached sledge off-road and on roads not open to public traffic is 40 km/h.

The maximum speed on public roads is 30 km/h.

If driver or passengers use helmets other than E-marked helmets, the maximum speed is 40 km/h.

4.7.4 Transporting personnel

Up to 2 people including the driver can be transported on an LTV/W. Up to 4 people can be transported in a sledge.

4.7.5 Transporting materiel

Off-road and on roads not open to public traffic, the load must be properly secured, and the load must not be able to shift or fall off during transport. On public roads, general requirements concerning proper and regulatory loading apply.

4.8 MOTORCYCLES

4.8.1 In general

4.8.1.1 Motorcycle riders and pillions must always wear E-marked (approved) crash helmets. Motorcycle suits, boots, gloves and high-visibility vests must also be worn. Weapons must be strapped to a rack or carried on the back with the barrel pointing towards the right shoulder.

4.9 TRUCKS

4.9.1 Scania P92/P93/P113 TRUCKS

4.9.1.1 Transporting personnel

The transport of personnel additional to registered seating is not permitted on public roads. The transport of personnel additional to registered seating internally in firing ranges and training grounds, in military camps and in connection with exercises in civil areas where a training area has been requisitioned and marked out is permitted. When transporting personnel in a Scania P93, the following number of people may be transported additionally to registered seating, see Regulation on the use of vehicles, section 3-1 point 2b.

Vehicle type	Number of persons
Scania P93 5 tonne	20
Scania P93 8 tonne m/ Crane	20
Scania P93 8 tonne	26

- Trucks used for personnel transport must be equipped with roll bars, benches with seatbelts, tarpaulins and communication facilities between the driving compartment and the cargo compartment.
- The commanding officer must draw up a separate risk assessment for the activity.
- In order to drive in winter road conditions, the vehicle driver must have completed an HGV safety course on a test course.
- The maximum permissible speed is 40 km/h.
- Personnel and materiel (with the exception of personal combat gear) must not be placed in the same vehicle.
- It is not permitted to transport personnel on trucks with tail lifts.

4.9.1.2 Risk of rolling

When the Scania P92/P93 is used to transport containers, particular caution must be observed with respect to the risk of rolling.

4.10 TRACKED VEHICLE 206

Figure: 4.10
Tracked vehicle going off road

4.10.1 General provisions

4.10.1.1 The BV 206 must be operated with closed hatches and doors unless otherwise required due to special activities and procedures. Exceptions are approved by the commanding officer and there must be a risk assessment for the activity. When operating a BV206 in unfamiliar terrain, the axis must be planned and reconnoitred in order that factors such as floating ice sheets, potential avalanche risks in the area, environmental restrictions and the vehicle's technical limitations are accounted for.

The commanding officer must ensure that transported personnel are familiar with procedures for evacuating the vehicle in case of fire. When driving in winter, the commanding officer must ensure that transported personnel are familiar with procedures for evacuating the vehicle in case of falling through ice.

4.10.1.2 **Training requirements in addition to BV206DN6 basic driver's course**

If driving on snow and ice-covered roads and terrain is anticipated, the driver must have BV206DN6 low-friction supplementary training.

If driving in terrain where there is a risk of avalanche and break-through into ice-covered water is anticipated, the driver must have BV206DN6 winter driving supplementary training.

If the vehicle is to be used to cross water deeper than wading depth, the driver must have BV206DN6 swimming supplementary training.

If the hook lift add-on unit is to be used, the driver must have BV206DN6 hook lift supplementary training, see Requirement of documented completed training, 4.1.6.

4.10.2 Requirements for personal protective equipment

During operation, hearing protection must be used by all personnel in the front vehicle. Requirement of hearing protection, point 5.20.2.3

4.10.3 Speed

The maximum permitted speed in a BV206 is 40 km/h.

4.10.4 Transporting personnel

The number of of people in the front and rear vehicles must not exceed the number of seats .

The transport of personnel additional to registered seating internally in firing ranges and training grounds, in military camps and in connection with exercises in civil areas where a training area has been requisitioned and marked out is permitted on the order of the commanding officer.

4.10.4.1 Driving with personnel in the gunner's position

In respect of tracked vehicles, it is permitted to drive with personnel in the gunner's position during exercises and training in Norway, as well as on international operations. Dispensation for driving with personnel in the gunner's position does not permit the vehicle's registered number of seats to be exceeded except when on a training ground. Driving with personnel in the gunner's position during exercises and training must be subjected to particular risk assessment by the commanding officer.

4.10.5 Transporting materiel

Off-road and on roads not open to public traffic, the load must be properly loaded, and the load must not be able to shift or fall off during transport. On public roads, general requirements concerning proper and regulatory loading apply.

4.10.6 Special provisions for different types of tracked vehicles

4.10.6.1

The tracked vehicles will be present in multiple configurations with very different accessories, note the requirements in 4.1.6 and 5.15.1.1 for correct training and documentation of training.

4.10.6.2 Tracked vehicle with hooklift module

Due to the risk of crushing injury when working on top of the hooklift module, the driver must check that the vehicle's automatic gearbox is in "N", the handbrake is on, the hydraulic system is deactivated and the control box's emergency stop button is pushed in. There must be no-one in the driver's position or operating the steering wheel during this operation.

4.10.7 Wading

Wading with a tracked vehicle is defined as crossing water and watercourses where the depth at the wading site is at no point greater than 1 metre.

Wading must comply with the provisions for wading, point 7.2.1.1.

4.10.8 Preparing for swimming with a tracked vehicle and trailer sledge.

Swimming with a tracked vehicle is defined as operating a floating vehicle. Such operation must be ordered by the division commander or a person authorised by the division commander. When swimming with a tracked vehicle, the provisions in chapter 7, point 7.2.2.1 must be followed. The mortar, mid-frame and hooklift versions of the BV206 are unable to swim.

4.10.8.1 Preparing for swimming with a tracked vehicle and trailer sledge.

The driver must check the following:

- wave height does not exceed 10 cm.
- flow velocity does not exceed 1 m/s.
- the drain bungs are securely tightened.
- the roof hatches on the vehicle are open
- the door seals have been cleaned and the doors are tight.
- the alarm signal between the front and rear compartments has been checked.
- the bilge pumps have been tested using at least 20 litres of water for each compartment.
- the front air intake has been be fitted with a tarpaulin and the lattice wall erected at the rear.
- steel wire and ski rope have been attached to the tow-bar and placed in an open coil with a float on the roof of the front compartment.
- the vehicle's side hatch is open when carrying personnel in the rear compartment.
- passengers and cargo in the rear compartment are evenly distributed throughout the compartment; equipment and seat belts have been removed.
- all personnel must use approved category 2 flotation devices.
- if a trailer sledge is used: check that any drain plugs are securely tightened check that the base is watertight and that the sealing strip on the tailgate is in place.
- an assistant must stand up in the roof hatch and look for obstacles in the water.
- the assistant must visually inspect the seals, drain bung and bodywork of the front compartment to ensure they are not letting in water.

4.10.8.2 Emergency procedure when swimming with a tracked vehicle

If it becomes necessary to evacuate a tracked vehicle, use "Emergency procedure in the event of going through the ice" (point 4.10.10.2).

4.10.9 Driving a tracked vehicle across frozen rivers and lakes

General provisions for driving across frozen rivers and lakes, point 7.2.7. The driver must check that:

- all the base bungs must be screwed in
- if there are personnel in the rear compartment, the side hatches must be opened and fastened at the top
- personnel must be drilled in the emergency procedure/drill.
- a roughly 30 m-long rope is attached to the towing hook. The rope must be arranged in an open coil with a float or empty fuel can attached to the end.
- Loosen seat belts, if used.

4.10.9.1 Crossing marshy land in winter with a tracked vehicle

When there is difficulty determining whether or not the vehicle is being driven over frozen water and rivers, the driver must prepare and check measures for tracked vehicles in accordance with point 4.10.10.

4.10.10 Emergency procedures

As a pre-departure check, the driver must ensure that transported personnel are able to carry out “emergency procedure in case of fire”. During winter, “Emergency procedure in the event of going through the ice”.

4.10.10.1 Emergency procedure in case of fire

- Notified by sounding short warning signals.
- All personnel evacuate as quickly as possible into the wind and assemble at least 30 metres from the vehicle.

Driver’s actions in the event of fire

- notify “initiate emergency procedure in the event of fire” by using the signal button to issue short blows until evacuation commences
- turn off the engine
- evacuate the personnel being transported at least 30 metres away from the vehicle against the direction of the wind
- account for evacuated personnel
- secure the scene, including by preventing unauthorised parties from getting closer than 200 metres
- ensure that the fire in the tracked vehicle is reported to the fire brigade
- take mitigating action if this can be done without putting lives and health at risk.

4.10.10.2 Emergency procedure in the even of going through the ice

- Notified by a long warning signal.
- all personnel remove personal equipment
- all personnel evacuate through doors/windows marked “emergency exit”.
- personnel assemble on the roof of the front/rear compartment until further evacuation is organised.

Driver’s actions in the event of going through the ice

- notify “initiate emergency procedure in the event of going through the ice” by using the signal button to issue a long blow until evacuation commences.
- turn off the engine .
- check that all personnel have evacuated to the roof of the front/rear compartment.
- initiate further evacuation to safer ice as soon as possible, using a safety rope if possible.
- Further evacuate via existing tracks to safe ground.
- Secure the accident site; prevent access by unauthorised persons.

- Report having gone through ice in line with procedures.
- account for evacuated personnel.

4.11 GENERAL PROVISIONS FOR ARMOURED TRACKED VEHICLES

Figure: 4.11
Armoured recovery vehicle on assignment

4.11.1 In general

4.11.1.1 The commands "FREEZE" and "EVACUATE" have priority over other orders. These orders can be given by any member of the crew.

"FREEZE" means that all current activities cease/freeze, and the vehicle is stopped as quickly as possible.

"EVACUATE" means that the vehicle is stopped as quickly as possible to allow the crew to exit it quickly and safely.

4.11.1.2 Personnel whose primary function is connected to activities on armoured tracked vehicles must wear approved combat vehicle crew suits with the following guidelines:

- All zip fasteners must be closed.
- Footwear must be laced up and any loose laces must be inside the footwear.
- The length and design of footwear uppers must be such that the battledress can be pulled down over the outside.
- Nothing may be worn over combat vehicle crew suits when sitting.
- If body armour is used, this must be worn beneath the crew suit.
- Personnel sitting or standing in open hatches are permitted to wear jackets over their combat vehicle crew suits.

4.11.1.3 When the engine is running, the following options are available:

- the driver’s position is manned by a crew member

- the vehicle must be parked in accordance with the following provisions:
  - the vehicle must be parked on the most level ground available
  - the parking brake, and possibly a steering wheel lock, must be on
  - parking lights must be used on public roads
  - stabilised systems must be de-activated
  - weapons must be unloaded/secured
  - the gear selector must be in neutral

4.11.1.4 A Local Coordinating Authority (LCA)/Garrison Major can authorise movement within camp areas without the use of signallers on the ground.

The signaller is required to:

1. direct the movement of vehicles within the camp area, in and out of buildings, inside buildings, when loading and unloading from trailers, boats, railway trucks and in harbour areas and in bivouac
2. use standardised signs and signals
3. before the vehicle sets off, ensure that there is no-one beneath, just in front of or behind the vehicle
4. be at least 5 m away from the vehicle
5. ensure that there are no personnel between a vehicle with an engine running and a fixed object if the distance is less than 10 metres
6. ensure that there are no personnel on the outside of the vehicle while it is in motion
7. quickly be able to establish eye contact with the driver
8. move at walking pace
9. only move forwards or sideways, but never backwards
10. use an assistant when reversing and in terrain where there is reduced visibility

4.11.1.5 *Smoking* and the use of naked flames in the vehicles are not permitted.

4.11.1.6 Hatches and doors and loads carried on top of the vehicle must be secured and hatch clearance verified before moving of.

4.11.1.7 When personnel move between the turret and the hull, the turret must be locked and the stabilisation mechanism must be de-activated. The only exemption for this is for the K9 and similar self-propelled artillery systems.

4.11.1.8 Vehicles can only be used when fire-fighting and first aid equipment is present and in working order.

4.11.1.9 In situations in which there are personnel on foot nearby, all crew members must be aware of this. The vehicle commander or loader must observe from an open hatch and remain particularly aware of these personnel.

4.11.1.10 The crew must use the vehicle's headsets and also earplugs when required. See point 5.20.

4.11.1.11 Transporting personnel on top of the vehicle/riding is not permitted. Exceptions to this are during wading operations, and for safety supervisors when these are required.

4.11.1.12 Boarding and alighting is permitted only when it is stationary and the parking brake is on. For the crew, stabilisation/targeting systems must also be de-activated and weapons secured. Boarding and alighting is done under the direction of the vehicle commander.

4.11.1.13 When the engine is running, the driver must be notified of all boarding and alighting.

4.11.2 Movement on and off road

4.11.2.1 All movement must be directed by an authorised vehicle commander. Regulations for using signallers are an exception. Authorisation requirements for vehicle commanders are shown in appendix 25

The vehicle commander must be in a position from which he/she can best direct the vehicle, which is usually in his/her own hatch. The vehicle commander must be in contact with the vehicle driver via the internal communication system. If the vehicle commander is unable to exercise effective command from the vehicle, he/she must dismount and direct the vehicle from the ground.

4.11.2.2 The vehicle commander's duties

The vehicle commander is required to:

1. make sure that any personnel being transported are aware of the safety regulations
2. have command of all personnel on the vehicle
3. check that the turret is locked and weapons are secured prior to boarding and alighting
4. give directions for boarding and alighting
5. check that the vehicle is ready to march (RTM)
6. always make sure that the ground around the vehicle is clear before moving off
7. warn personnel being transported when necessary
8. follow ordinary general provisions for shooting from/using vehicles. See point 3.11

4.11.2.3 The vehicle’s crew must be in internal communication. In fighting compartments, at least one person must be connected to the internal communication system.

4.11.2.4 The vehicle driver’s hatch must be closed when traversing the turret.

4.11.2.5 When driving, the vehicle commander must ensure that antennae do not come into contact with electrical conductors.

4.11.2.6 Crew members must sit/stand in their respective places during driving. If safety belts are installed, these must be used.

4.11.2.7 Instructors/safety supervisors may be present on top of moving vehicles during training or live firing exercises. The instructor/safety supervisor must then be in internal contact with the rest of the crew and be secured, and particular caution must be observed with respect to speed and manoeuvring. The turret can be traversed during such training.

The safety supervisor must also comply with provisions in point 1.1.4.

4.11.2.8 All vehicles must use driving lights when using public roads. Off-road manoeuvring is permissible without lights.

However, each vehicle commander is obliged to consider whether combat lights should also be used together with night vision equipment even when manoeuvring off road. When driving in conditions of reduced or no light, night vision headsets must be prepared and readily available for use by the vehicle commander or loader/gunner so that they can be used for observation for directing and warning about any obstacles.

Combat lights should be used when there are personnel present on the ground closer than 40 metres to the vehicle.

4.11.3 Reversing camera

4.11.3.1 Even if a reversing camera is used, the tank commander must ensure that the area behind the vehicle is free before moving the vehicle.

4.11.4 Joint exercises/service between armoured tracked vehicles and infantry

4.11.4.1 See point 5.1 Conduct of personnel on the ground when tracked armoured vehicles participate in exercises

See point 5.7 Training in military operations in built-up areas/urban terrain (OBUA/ FIBUA)

4.11.5 Driving with periscopes/closed hatches

4.11.5.1 When manoeuvring with the vehicle driver observing through a front camera or a periscope, in light or dark conditions, the vehicle commander or the loader/gunner must observe from an open hatch.

4.11.5.2 If the vehicle commander is sitting down in order to operate the vehicle commander’s sight during tactical march, the loader/gunner must observe from his hatch and warn about any obstacles when manoeuvring.

4.11.5.3 Where there is a safety supervisor outside and on top of the vehicle, manoeuvring with all hatches closed is permissible. This is conditional on the safety supervisor being in contact with the crew via internal communication, and the training taking place in an appropriate area.

4.11.5.4 During live firing exercises, manoeuvring is permitted without observation through a hatch on the firing range being used. This is also permitted during dry firing exercises, as long as there is compliance with the firing range’s instructions for guarding.

4.11.6 Using vehicles in wading operations

4.11.6.1 An OCE, or some other qualified officer appointed by the division commander, must at all times assess how the safety service is to be organised. The OCE must take into account the specific conditions at the site, including water depth, current, wind, wave conditions, ground conditions, traffic, light conditions, season and the division's level of training. See also point 7.2.1.

4.11.6.2 Before wading or crossing bodies of water, the vehicle must be made ready in accordance with applicable regulations and the vehicle-specific technical manual.

4.11.6.3 Before wading or crossing bodies of water, personnel must first have trained in evacuating from vehicles.

4.11.6.4 Requirements for crossing places:

- the shoreline and the bottom must allow the vehicle to drive and wade in a direction that is as perpendicular as possible to the launching and landing spots
- at the launching and landing spots, there must be a smooth slope above and below the water and the bottom should fall away gradually
- the launching and landing spots must be free of obstacles, both above and below the water, and they should not be boggy
- the launching and landing spots must not be so steep as to allow water to inadvertently enter through the vehicle's hatches
- the water's surface must be free from large branches, logs etc.
- the bottom at the crossing point must be sufficiently firm to support the vehicle and be free of obstacles
- the current and the water flow must not entail a risk of the vehicle being carried away by the current

4.11.6.5 Wading operations must be preceded by reconnaissance in accordance with 7.2.1.1.

4.11.6.6 When crossing bodies of water wider than 100 metres, a rescue boat must first be made ready. See point 7.1.5.

4.11.6.7 When wading or crossing frozen rivers and lakes, there must be radio connection between all participating vehicles and the OCE.

4.11.6.8 If the body of water is less than 100 metres wide, there must be one recovery vehicle, but if the body water is more than 100 metres wide, there must be a recovery vehicle on each bank. Recovery vehicles must be stationed downstream.

4.11.6.9 When wading across bodies of water that are so deep or the current so fast as to prevent personnel from wading, all personnel, except the vehicle driver, must sit on top of the vehicle wearing life jackets. The vehicle driver's life jacket must be readily accessible outside the vehicle, but it may not be worn inside.

4.11.6.10 During wading operations, the water may come up above the actual water depth, depending on the wave resulting from the speed of the current or of the vehicle. It is the height of the wave that determines the practical water depth for the vehicle.

4.11.6.11 When wading/crossing water that is so deep or the current so fast as to prevent *personnel* from wading, the following materiel/personnel must be in readiness at the crossing point:

- diver
- recovery vehicle (made ready/checked for wading up to the deepest prepared wading depth for the vehicles taking part in the wading operation)
- rescue boat, see point 7.1.5.

4.11.6.12 When wading over brooks and smaller watercourses with little water flow, where there is no risk to personnel or materiel, the requirement for a boat/recovery vehicle may be dispensed with.

4.11.7 Manoeuvres close to frozen water and bogs

4.11.7.1 The following apply to manoeuvres close to frozen water and bogs:

- Evacuation must be thoroughly practised prior to the exercise
- Exercising on terrain that is unknown to the division must be preceded by safety briefing and terrain assessment
- The vehicle commander must use maps and BMS, if available, in the briefing
- Snow-covered surfaces without vegetation should be avoided
- Vehicles are driven with hatches open. Exceptions from this are the drivers of tanks and infantry fighting vehicles.
- Evacuation routes must be prepared

4.11.7.2 If it is suspected that a vehicle has driven out over frozen water or bog, the following must be done immediately:

- Evacuate the vehicle
- Report position and situation to the division
- await orders for further action from an immediate superior officer

4.11.7.3 Planned crossing of frozen water

- Planned crossing of frozen water requires the approval of the battalion commander or superior officer.
- The ice thickness and water depth must be ascertained. See Details for execution and the ice thickness requirements, see point 7.2.7 to point 7.2.12
- The vehicle must be made ready for deep wading
- During peacetime, personnel may not remain in the personnel compartment when crossing frozen water

4.12 LEOPARD TANK 2A4NO, ARMOURED RECOVERY VEHICLE NM217, WISENT 2 BPV ARMOURED ENGINEERING VEHICLE NM189 AND WISENT 2I AND ARMOURED BRIDGE-LAYING VEHICLE NM190

Figure: 4.12
Leopard 2A4 NO

4.12.1 In general

4.12.1.1 Supplementary provisions are provided in:

Regulations for the armoured company, Leopard 2 A4 NO/NO2

Handbook for the armoured platoon in the field

TH 9-2350-25/203-13B Leopard 1, hull, inspection instructions

TH 9-2350-25/203-10 Leopard 1, vehicle

TH 9-2350-25/204-10 Leopard 2 A4, vehicle

TH 9-1015-25/200-10 Leopard 2 A4, turret

Handbook for the specialised armoured platoon in the field

TH 9-2350-25/228-10 Armoured bridge-laying vehicle, bridge-laying part

TH 9-2350-25/228-13B Armoured bridge-laying vehicle, inspection instructions

TH 9-2350-25/275-10 Tank, Engineering, Full-tracked, Wisent 2I

TH 9-2350-25/275-13B Tank, Engineering, Full-tracked, Wisent 2I, inspection regulations

TH 9-2350-25/227-10 Tank, Engineering

TH 9-2350-25/227-13B Tank, Engineering, inspection regulations

TH 9-2350-25/264-10 Tank, Recovery, Full-tracked, Wisent 2 BPV

TH 9-2350-25/264-13B Tank, Recovery, Full-tracked, Wisent 2 BPV, inspection regulations

TH 9-2350-25/219-10 Tank, Recovery

TH 9-2350-25/219-10D Tank, Recovery

TH 9-2350-25/219-13B Tank, Recovery

SO 9-2350-25/219-10 Tank, Recovery

4.12.1.2 For the Leopard 2 A4 NO all crew positions in the turret must be occupied when operational level “stabilised” is used.

4.12.1.3 When driving in water with a depth of 40 cm or more, the diving hydraulics must be activated.

4.13 M-113 SERIES ARMOURED VEHICLES

Figure: 4.13
From the hatch of an M-113

4.13.1 In general

4.13.1.1 Supplementary provisions are provided in:

TH 9-2340-24/230-10

TM for specific vehicle

4.13.2 Boarding and alighting

4.13.2.1 Boarding and alighting may only take place when the vehicle is stationary. Loading and unloading should be carried out on the ramp or through the door. The driver, vehicle commander and gunner may board and alight at the front. Boarding and alighting from the side is not permitted.

4.13.3 Chains

When using chains, chains must be used at all installation holes. Any damaged or broken chains must be removed immediately and the remaining chains rotated so that at least 4 chains are in contact with the ground at all times.

Damaged chains must be replaced as soon as possible.

4.14 K9 and K10 Artillery Systems

Figure: 4.14

K9 Transportation on TT

4.14.1 In general

4.14.1.1 Supplementary provisions are provided in:

TH 9-2350-25-350-10 and TH 9-2350-25-351-10

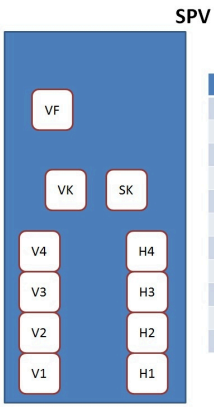
4.15 CV90

Figure: 4.15

4.15.1 In general

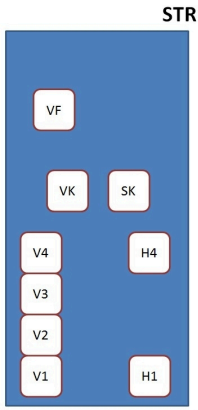
4.15.1.1 The following items regulate all movement and transportation of the CV9030. Safety rules stipulated in the exercise regulations (Regulations for CV9030 SPV/STRILED - Armoured Infantry Fighting Vehicle/Forward Command Vehicle crews - , Regulations for CV9030RWS STING Combat Engineering Vehicle crews), technical manuals and training programmes also apply.

4.15.1.2 Restrictions are in place on the total height of personnel in each seat in the vehicle in order to increase the on-board personnel's chance of survival in the event of a mine/IED detonating underneath the vehicle.



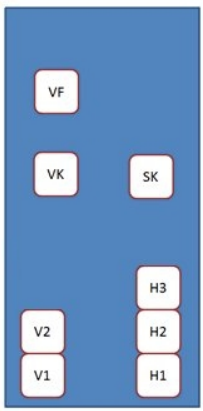
Place	Height (cm)
VF	185
VK	-
SK	-
V1	191
V2	188
V3	191
V4	172
H1	191
H2	188
H3	191
H4	172

Figure: 4.16
SPV



Place	Height (cm)
VF	185
VK	-
SK	-
V1	191
V2	188
V3	191
V4	172
H1	180
H4	172

Figure: 4.17
FCV



Place	Height (cm)
VF	178
VK	191
SK	191
V1	191
V2	191
H1	191
H2	191
H3	191

Figure: 4.18
CV90 RWS

4.15.2 Manoeuvring using a video system

4.15.2.1 Provided the vehicle's video system is operational and visibility permits it, the following actions are permissible:

- Reversing inside a camp or bivouac, in and out of buildings, inside buildings, loading onto and unloading from a trailer may be performed with a supervisor standing behind the vehicle while the driver uses the reversing camera for observation.

- On the orders of the vehicle commander, the driver can move the vehicle using the camera for observation. When reversing, the driver MUST always activate the reversing camera and use it for observation for as long as the vehicle is in motion.
- It is permitted to practise manoeuvring with (all) hatches down where this is defined as a particular goal of the exercise. The OCE, in consultation with the commanding officer, must adapt the complexity of the exercise to the participants' level or training and experience. All participants and other nearby personnel must be informed before such exercises commence.

4.15.3 Hatch combat

4.15.3.1 "HATCH COMBAT" exercises and training must take place in suitable terrain. The complexity and pace of the exercise must be adapted to each participant's level of training and experience. On the CV9030, "SECTOR FRONT" must be activated as long as the vehicle is in motion during manoeuvres in undulating terrain with vegetation, in the dark or in poor visibility, which could create a risk of the gun barrel striking trees, buildings, etc.

4.15.4 Manning the driver's position

4.15.4.1 Provided the driver has parked the vehicle in accordance with procedures, the engine may be left running even when the driver is not in the driver's seat. For the CV9030, the engine may also be started and stopped from the turret when APS has been activated.

4.15.5 Using RADAR on the CV90 OPV

4.15.5.1 All use of RADAR involves a risk of personnel being exposed to electromagnetic radiation. For hazardous zone and safety distance for RADAR on the OPV, see Appendix 8D. RADARSETT BLIGHTER 2.

Adherence to the following regulations is required when RADAR is used on the CV90 OPV.

- Mast must be in down position when moving.
- Make sure there are no personnel inside the hazardous zone before the RADAR is put into operation.
- Make sure there are no objects that could reflect the radar beams inside the hazardous zone before the RADAR is put into operation.
- RADAR must not be used indoors.
- RADAR must only be used when the mast is raised more than half its height. Risk of reflection in the vehicle's turret. The driver must ensure that no part of the vehicle is within the radiation angle. The driver must remain below the hatch.
- Do not leave or enter the turret when the RADAR is in use and the mast is not raised to its maximum height.
- Exercise particular caution when leaving or entering the turret when the RADAR is in use and the mast is raised to its maximum height.

4.16 RAILWAY TERMINALS, SAFETY REGULATIONS

4.16.1 In general

4.16.1.1 All transit at railway terminals is regulated by authorised personnel. Transported units must comply with the instructions issued by these personnel. Before the start of loading/ unloading, a safety briefing must be given by authorised transport control personnel. In addition to information about the loading/unloading operation, the safety briefing must also cover hazards, safety zones, personal protective equipment and other traffic.

4.16.1.2 Vehicles must not drive onto or cross a railway zone before permission has been given by authorised transport control personnel.

4.16.1.3 When there are overhead power lines for electric locomotives in the railway zone, aerials must be lowered before vehicles are driven into the area. They must not be raised again until the area has been vacated Aerials must also be lowered when crossing railway tracks where overhead power lines are present.

4.16.1.4 When a vehicle is to cross a railway track within a station area that is not secured by a barrier and/or colour light signals, a sentry must be positioned at the crossing point. Standardised signals must be used and there must be visual contact between the sentry and driver. If there are several parallel tracks at the crossing point, several sentries must be positioned to ensure that the railway tracks may be safely crossed.

4.16.2 Loading and unloading from railway wagons

4.16.2.1 All personnel participating in loading/unloading on the railway must wear high-visibility vests. Personnel securing the cargo or removing securing systems must wear gloves.

4.16.2.2 Loading and unloading must not commence until permission has been given by authorised transport control personnel.

4.16.2.3 Before loading/unloading commences, transport control personnel must obtain confirmation from an authorised railway employee that:

- the train is standing on the correct track
- the railway wagon’s brakes are engaged and connected to the hook on the end ramp
- the electric current to any overhead power lines has been switched off and there are no other live cables in the vicinity

4.16.2.4 It is not permitted to climb onto a vehicle’s roof or load until a go-ahead signal has been given by authorised transport control personnel. The go-ahead signal will be given when the authorised transport control personnel are satisfied that the current to the overhead power lines has been switched off and earthed.

4.16.2.5 During loading and unloading of goods wagons, freight must be handled with care so that the freight, or the person handling the freight, is not in hazardous proximity to the overhead power lines, or other live components (hazardous proximity is regarded as a distance of less than one metre from live components).

4.16.2.6 In the case of a track change that requires the overhead power lines to be switched on, ALL work on the relevant track must be suspended. Work may not re-commence until permission has been given by authorised transport control personnel.

4.16.2.7 A guide must be available for each vehicle that is driven onto or off of a railway wagon. If the guide is required to move during loading/unloading, the vehicle must be stopped, and the guide must move to the new position and continue directing from there.

4.16.2.8 In the case of any loading/unloading from an open line (outside a station area), special safety measures must be adopted in consultation with the line owner.

4.16.2.9 Loading/unloading and securing of vehicles must take place in accordance with AmovP-4(A)

4.17 PORT TERMINALS, SAFETY REGULATIONS

4.17.1 In general

4.17.1.1 All transit at port terminals is regulated by authorised personnel. The transported must comply with instructions issued in a briefing before arriving in the port area.

Before the start of loading/unloading, a safety briefing must be given by authorised transport control personnel. In addition to information about the loading/unloading operation, the safety briefing must also cover hazards, safety zones, personal protective equipment and other traffic.

4.17.1.2 Driving into a port area may only take place on the orders of transport control personnel or an authorised port employee. Vehicles driving into a port area must use hazard warning lights or ordinary rotary flashing lights in order to be visible.

4.17.1.3 Military personnel moving around a port area must wear reflective vests and must also wear helmets if ordered to do so by port officials or transport control personnel.

4.17.1.4 Military personnel must not move about within a port area without permission from transport control personnel. All military transport must be organised so as not to impede other activity in the port area.

4.17.2 Loading onto and unloading from ships

4.17.2.1 The port authority is responsible for the port's safety. Loading onto and unloading from ships must not commence until permission has been issued by transport control personnel. Each deck of the vessel must have an authorised deck commander who is to ensure safe and controlled loading/unloading. In order to reduce the risk of carbon monoxide poisoning during loading and unloading, idling must be kept to a minimum. Military personnel on deck must be rotated.

4.17.2.2 When embarking and disembarking from amphibious landing craft and ships, the driver and the commander, if present, may remain in the vehicle.

Standardised signs and signals must be used when directing vehicles in the port area and when loading onto/unloading from ships. Tracked vehicles (except the BV206) must use signallers for all movements on board ships and in the post area.

4.17.2.3 It is the duty of the authorised officer from the transported unit to inform all military personnel to be transported in the port are or participating in transport, of the regulations stipulated in this UD 2-1 Armed Forces Safety Rules and Regulations.

4.18 LOADING/UNLOADING TRACKED AND WHEELED VEHICLES ONTO/FROM ARTICULATED TRAILERS (HEAVY GOODS VEHICLES)

4.18.1 In general

4.18.1.1 The driver of an articulated trailer (heavy goods vehicle) is responsible for loading/ unloading. High-visibility vests should be worn.

The area used must be unobstructed. Other traffic must be alerted and, if necessary, directed when loading and unloading on a public road.

The vehicle must use parking lights.

Standard signs and signals for giving direction as outlined in STANAG 2284 APP14A are to be used.

In poor visibility, when it is not possible to give hand signals, signals must be given with a flashlight.

All personnel, with the exception of the driver of the vehicle being directed – as well as any assistant to the person directing the vehicle – must maintain a distance that is equal to at least four times the length of the vehicle that is being loaded or unloaded.

If there is a requirement for an assistant to be present during loading/unloading, the assistant should stand at a safe distance and maintain eye contact with the person directing the vehicle, until the vehicle is stationary with its engine switched off and its brakes engaged.

The driver of the vehicle being directed may only move the vehicle once he has established eye contact with/received a signal from the individual who is directing the loading/unloading.

It is forbidden for personnel to be situated on the articulated trailer's body when the vehicle is loaded and its engine is running.

4.18.1.2 Loading

When the vehicle being directed is driven/directed onto ramps, the person directing the loading must immediately move away from the articulated trailer's body and take up a safe position on the swan neck before giving any further directions.

If the ramps need to be adjusted after the vehicle has driven up to them, the vehicle must be directed to return and its engine switched off.

The directed vehicle must remain stationary at the ramp until the person directing the vehicle has moved from the articulated trailer's body and onto the swan neck.

4.18.1.3 Unloading

Unloading must take place in reverse order.

All personnel, with the exception of the driver, must remain at a safe distance from the vehicle, as stipulated in point 4.18.1.1, point 6.

The person directing the vehicle must be in position on the articulated trailer.

The vehicle's driver must NOT start the engine until he/she has established eye contact with and received a signal from the person directing the vehicle.

When unloading an armoured tracked vehicle, the vehicle's driver should release the steering levers/wheel and roll down in a controlled manner when the vehicle is tilted down onto the loading ramps.

The person directing the vehicle must remain in position until the vehicle has been unloaded from the articulated trailer.

4.18.1.4 Securing/releasing fasteners.

Before fasteners are secured/released, a loaded vehicle must be stationary with the engine switched off and the brakes engaged.

4.19 STATIONARY USE OF VEHICLE/PRECAUTIONS FOR PREVENTING CARBON MONOXIDE POISONING

4.19.1 In general

4.19.1.1 After driving in terrain, the exhaust system must be examined for breakages and other damage before the vehicle's engine is used in stationary mode.

4.19.1.2 When it is necessary for personnel to remain in the crew compartment or driving compartment and the vehicle's engine is running in stationary mode, and a petrol/diesel heating device is in operation or a generator is being used, one hatch must remain open at all times and one person must be awake at any given time in order to ensure that resting personnel are not subjected to carbon monoxide poisoning.

4.19.1.3 It is the responsibility of the commanding officer to ensure that the above-mentioned prohibitions/orders are complied with. For first aid in respect of carbon monoxide poisoning, see point 5.19.4.

4.20 INSPECTION AND WORK UNDER, IN FRONT OF OR TO THE REAR OF MOTOR VEHICLES

Figure: 4.19
Repairs to a vehicle in the field

4.20.1 In general

4.20.1.1 Never crawl under a jacked-up vehicle unless the vehicle has been secured against jack failure. The vehicle should be secured with a trestle, or similar.

4.20.1.2 Before starting work on or inspection of vehicles, the person in charge of repair/ inspection must check that:

- any ignition key has been removed from the vehicle and the stop lever has been pulled out of diesel vehicles fitted with such levers

- vehicles that do not have their engines running have their parking brakes engaged and a low gear selected
- there is no-one else in the vehicle's cab unless this has been agreed and is necessary in order to carry out the work
- in vehicles that have to have their engines running for inspection/work, must have their handbrakes engaged
- vehicles on slopes or on smooth surfaces are secured in order to prevent rolling or sliding by means of chocks, possibly wedge-shaped wooden chocks (minimum angle 35 degrees), rocks etc.

4.21 AIR TRANSPORT

Figure: 4.20
Boarding a C-130 Hercules

4.21.1 In general

4.21.1.1 The safety regulations for air transport below are in accordance with:

- BSL E 4-1 "Regulations regarding access and transit at land-based airports"
- BTF 4-002 "Provisions for the transport service of the Norwegian Armed Forces"
- BTF 4-005 "Provisions for the transport service of the Norwegian Armed Forces", planning and implementation of air transport during peacetime
- IATA "International Air Transport Association"
- AFMAN US Air Force Manual 24-204

4.21.1.2 The provisions in this section deal principally with the transportation of personnel by aircraft. In respect of transportation of materiel – and especially dangerous goods – see the provisions of IATA and AFMAN.

4.21.2 Responsibility

4.21.2.1 *The division being transported* is responsible for informing personnel of the applicable safety regulations for transportation by aircraft before arrival at the terminal. In the case

of transportation of materiel (goods), the dispatcher should contact the transport control organisation's representatives or NDLO/Transport.

4.21.3 Movement at airports

4.21.3.1 All movement at airports must be regulated by authorised personnel. Transported units must comply with the instructions issued by these personnel.

4.21.4 Loading and unloading

4.21.4.1 Loading and unloading must be directed by authorised personnel.

4.21.4.2 The following safety provisions apply:

- Smoking is forbidden.
- Ear plugs or ear protection must be used when personnel are assembled within 50 metres of propeller aircraft and within 150 metres of jet aircraft with engines running.
- Loose headgear such as caps, berets, etc., must not be worn.

4.21.5 During flights

4.21.5.1 From the moment that an aircraft has been loaded and prepared for departure, the aircraft’s captain has command over all personnel on board, regardless of rank. Personnel must use ear protection/ear plugs during transportation when ordered to do so.

4.22 HELICOPTER TRANSPORT

Figure: 4.21
Transporting wounded

4.22.1 In general

4.22.1.1 The safety provisions, as well as provisions particular to the various helicopter types, must be complied with. See also TF 4-2 (Parts 1 and 2), Helicopter transport in the field.

The division being transported is responsible for informing personnel of the prevailing safety regulations for transportation by helicopter before arrival at the loading site.

Personnel assembling in or by a helicopter must ensure that their mobile phones are switched off when the helicopter is in operation.

4.22.1.2 Personnel being transported must pay particular attention to the following risk elements when the helicopter is on the ground with its engine running (see fig 4.22):

- the main rotor blade's height above the ground
- the tail rotor blade's height above the ground
- exhaust gas from helicopters with gas-turbine engines .
- the noise level that makes it impossible to hear a warning shout, for example
- the downdraft from the main rotor blades (loose objects, sand, snow, etc.)
- several helicopters simultaneously or directly after one another at the same landing zone
- possible engine failure during landing, take-off or hovering If this occurs, the helicopter should move to the LEFT, while personnel on the ground should move to the RIGHT, as viewed from the direction of flight.
- Protruding aerials, etc., in the noses of certain types of helicopter may easily be damaged/deformed if, for example, personnel hold onto or collide with them. Therefore, personnel moving in proximity to the helicopter's nose must pay attention.

4.22.2 Danger zone

4.22.2.1 In connection with helicopter transport, an area extending from the helicopter and 15 metres outside the path of the rotor blades (outer tip of main and tail rotor blades) is defined as a danger zone (*ref. ATP-3.2.49.3.2 Helicopter Air movement TTP's*). The movement of personnel and vehicles in the danger zone should be directed/controlled and should only occur when a go-ahead signal has been given by the helicopter's crew, and in designated directions/sectors. In sloping terrain, the movement of personnel should take place *downhill* from the helicopter.

4.22.3 Responsibility

4.22.3.1 *The division being transported* is responsible for studying/providing instruction in the applicable safety regulations for transporting personnel and materiel by helicopter. The required assistance can be obtained from the supporting helicopter division. *The helicopter division* is responsible for ensuring that:

- helicopters are equipped in accordance with the assigned mission
- personnel are equipped with life jackets, as well as being instructed in the use of life jackets if the helicopter is to fly over water
- the user/transported division is provided with instructions regarding safety regulations and actions to be taken in the event of an emergency landing, as well as any particular conditions for the relevant helicopter type
- all cargo is properly secured in accordance with provisions
- underslung loads are checked/approved

IMPORTANT: NEVER WALK BACKWARDS ALONG THE HELICOPTER'S TAIL BOOM (BEHIND THE HELICOPTER'S FUSELAGE) NWHEN THE HELICOPTER'S ENGINE IS RUNNING!

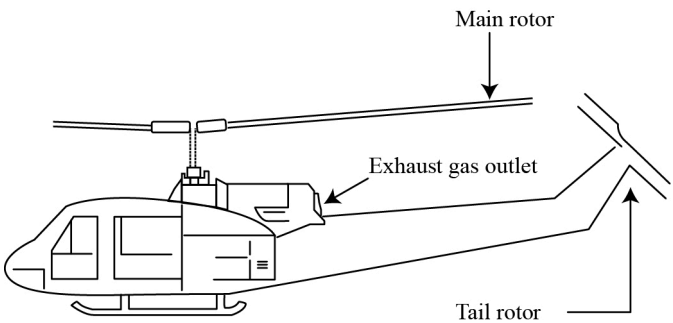


Figure: 4.22
Helicopter risk areas

4.22.4 Smoking/naked flame

4.22.4.1 Smoking and any other use of a naked flame is forbidden in and on the ground within a 30 metre radius of a helicopter.

4.22.5 Hearing protection

4.22.5.1 Ear plugs or any other type of approved hearing protection should be used by all personnel assembled on the ground within a 50 metre radius of a helicopter. For the assembly of personnel in a helicopter, see point 5.20

4.22.6 Landing zone

4.22.6.1 At the *landing zone*:

- good order must prevail at all times, as well as careful leadership and management of the operation
- only personnel who have been ordered to serve in direct relation to helicopters, or personnel who are boarding/deplaning, should be present
- ground marking tarpaulins or other loose materiel used for marking the zone should be *removed before any helicopters land*, in order to avoid any such materiel being sucked up into the rotor blades
- the movement of personnel and vehicles must be directed/controlled. When a helicopter is on the ground, a go-ahead signal should be given by the helicopter's crew before any movement is undertaken (see point regarding 4.22.2.1 above).
- adequate first aid and organisation of fire-fighting must be established. The minimum requirement per landing point is:
    1. Bag, medical orderly.
    2. Stretchers.
    3. 6 kg fire extinguisher.

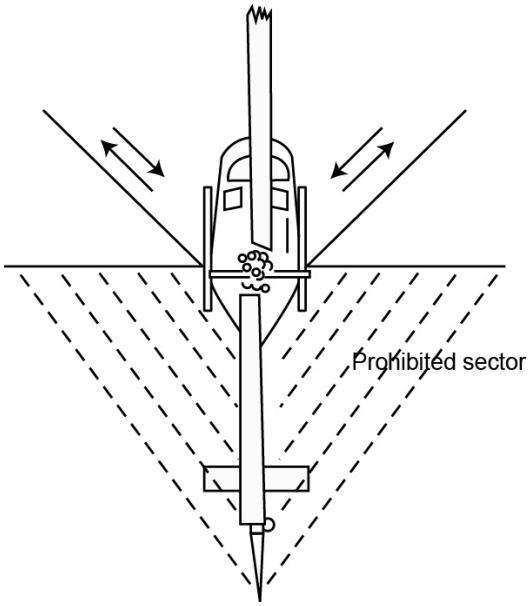


Figure: 4.23

Movement to and from a helicopter

4.22.7 Transporting personnel

4.22.7.1 *The following should be observed during boarding:*

- boarding of personnel should be directed by a previously instructed transport leader
- personnel ready for boarding should remain in their respective holding areas until receiving the order to board .
- boarding commences after the go-ahead signal has been received from the helicopter's crew. Movement from the holding area to the helicopter should proceed from an angle at the front, preferably from the helicopter's right-hand side, as viewed from the direction of flight, or, if in sloping terrain, on the downward side of the helicopter (see fig 4.23).
- Kitbags should be carried loosely over the shoulder/by hand and placed in the helicopter. *Kitbags and equipment must never be thrown into or out of the helicopter*.
- Weapons must be unloaded and secured.
- Long items (skis, poles, weapons, aerials, etc.) should be carried *horizontally*.
- When moving beneath the helicopter's main rotor blades, personnel should bend forward and hold onto caps and any other loose, light items.

- Seatbelts should be securely fastened and kept fastened from the time that personnel are seated in the helicopter until the order to deplane has been given.
- The helicopter's doors should be securely closed so that they are not distorted by the downdraft from the rotor blades.

During flights:

- All personnel should remain seated with their seatbelts fastened until the order to deplane has been given.
- Weapons should be held between the knees with the *butt facing up* (in order to avoid possible damage to the cargo compartment's ceiling).
- For reason of aircraft safety, instructions/orders from the helicopter's crew, as well as any instructions/orders from the transport leader, must be fully and immediately complied with.
- Upon receiving notification of an emergency/emergency landing (see the table in point 4.22.9 below) follow the set procedures and orders issued by the helicopter's crew.

  Generally, the following applies:

  1. Lay any weapon on the floor, place both feet on the weapon. Tighten the safety belt, bend forward as far as possible and grasp arms tightly under the knees. Remain in this position until the helicopter is stationary.
  2. After landing: Remain in the helicopter until the crew or the transport leader gives the order to deplane.
  3. Landing on water: Do not inflate life jackets until you have exited the helicopter.

Deplaning:

- if personnel are required to exit the helicopter quickly on one side or on both sides, depending on helicopter type and instructions, unload any divisional equipment and lie on the ground within the path of the rotor blades.
- Be particularly aware of other helicopters in the vicinity.
- Once the helicopter has taken off again, personnel may be led away from the landing zone.

4.22.8 Transporting materiel

4.22.8.1 *Preparation:*

- Hazardous cargo (ammunition, explosives, combustible or corrosive fluids/ materials, gas cylinders, etc.), for *interior loading*, require the prior approval of the helicopter division/crew.
- Check packaging and particularly ensure that containers for combustible fluids and gases are sealed.
- Check that the lifting device for underslung loads is undamaged and has adequate lifting capacity (SWL/WLL).

- Check that each helicopter cargo has been properly prepared and packed in nets/ secured with straps and that the cargo's load does not exceed the maximum stipulated load.

Loading and unloading:

1. When transporting materiel as an *interior* or *exterior load*, loading and unloading should take place in accordance with instructions from the helicopter's crew.
2. When transporting materiel as an underslung load, the following points must be observed:
    - There must be a signalman for each landing point. The signalman should be equipped/marked in a way that enables the pilot to easily identify who is responsible for directing air traffic.
    - The number of people working *beneath* the helicopter on hooking up a load must be kept to a minimum.
    - Both the signalman and the person responsible for hooking up the load (and any assistant) should be equipped with goggles to protect their eyes from sand or snow swirling around as a result of the downdraft from the rotor blades. The person responsible for hooking up the load should use an earthing set, due to the static electricity generated by the helicopter while hovering.
    - In the event of engine failure while hooking up a load, the helicopter should move to the left (as viewed from the helicopter's longitudinal direction).

In such cases, personnel beneath the helicopter should move as quickly as possible to right (see fig 4.24)

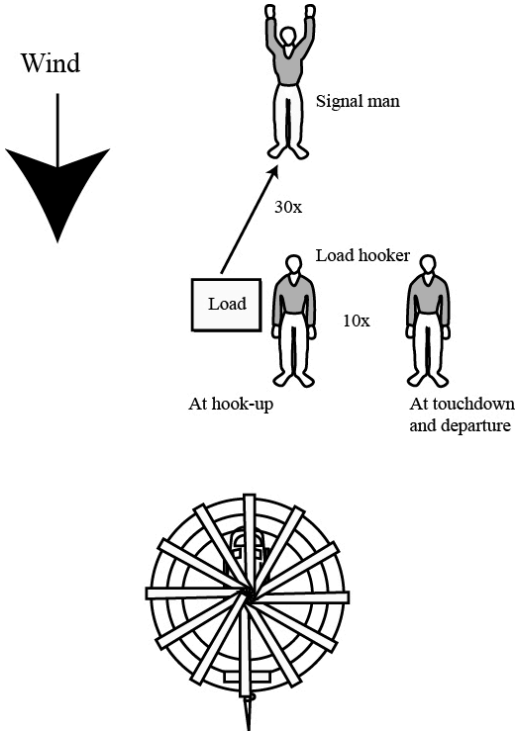


Figure: 4.24

Placement of personnel when flying with an underslung load. (see ATP490g TF4-2-1)

Emergency procedure Helicopter moves to the LEFT, personnel move to the RIGHT

4.22.9 Overview of signs and signals

4.22.9.1 Signs and signals given in accordance with ATP 49.

4.22.9.2 In general

Image intensification goggles/night vision have become a common tool for helicopter operations at night. They provide the advantage of allowing the crew to fly practically just as they would during daytime, while also being provided with the cover of darkness.

4.22.10 Procedures within loading and unloading zones

4.22.10.1 It is important that lights are used as little as possible in a loading and unloading zone during operations using night vision as this will disturb the helicopter's crew. If necessary, a lighting plan should be prepared in which conventional lights or IR lights are used.

Red lights should be avoided as this is the colour reserved for marking obstacles to air traffic. In addition, night vision goggles are sensitive to this colour. Individual landing points may be marked using a light stick or flashlight.

If there is a risk of swirling snow, grass, sand or similar, the marking of the landing points must be undertaken with a view to ensuring good reference points for the crew during landing and take-off. In such cases, personnel at the landing point can act as useful points of reference.

4.22.11 Planning operations using night vision

4.22.11.1 Generally, the planning of an operation with night vision requires more detailed planning than a similar operation undertaken during the day.

4.23 SAFETY REGULATIONS FOR OPERATIONAL DRIVING, ESCORT SERVICES AND MILITARY BODYGUARD SERVICES

4.23.1 In general

4.23.1.1 *These safety provisions apply to the following training/exercises and driving courses: VIP driver, tactical driving course, technical driving course, as well as escort-user and instructor courses.*

The safety provisions must be reviewed with students before driving lessons are undertaken.

4.23.1.2 Responsibility

FMPA – The Norwegian Armed Forces Military Police Department – is the competent authority for all types of driving as described in point 4.23.1.1 The responsible instructor must be approved by a competent authority (FMPA).

In addition, instructors must be approved by the commanding officer. The number of students per instructor must not exceed 6. Students must have a Class B right to drive (submitted before the driving course commences) and must have been driving a car for at least one year.

The provisions of the Road Traffic Act are applicable.

The OCE is responsible for ensuring safety when conducting exercises, including responsibility for carrying out vehicle inspections. The OCE must also assign qualified medical personnel to ensure medical and accident preparedness. The OCE is also responsible for knowing the map reference of the medical post.

Instructor(s) have a right and duty to reject personnel and terminate their training in the event of repeated undesired incidents, and/or personnel who do not follow instructions.

4.23.1.3 Vehicle inspection

All vehicles used for training must be registered, inspected and approved in accordance with the Road Traffic Act and vehicle regulations.

The following points must be considered during vehicle inspection prior to individual exercises and course-driving:

- tyres, (air, wear and tear, rips, bulges, foreign objects in the rubber, etc.)
- wheels (whole wheel, examine the reverse of the wheel, wheel nuts firmly tightened)
- spring units and shock absorbers (broken spring, possible leakage or wear to shock absorbers)
- brakes (booster brake, brake fluids, consistent braking effect, brake pedal play, breakage/system leakage)
- engine (be particularly aware of: oil level, oil leakage, any oil cooler, coolant, leakage in the fuel system)
- the vehicle's general ability to complete the planned exercise
- seats, headrests, seatbelts (condition and any damage, head rest adjustment options, seat adjustment)
- windows (intact, can they be opened?)
- door locks (can they be opened?)
- battery (ensure that battery and battery terminals are firmly tightened)

Before the exercise commences, students should undergo training in the correct handling of damaged vehicles, accidents, actions in the event of a fire, environmental damage, etc. When conducting exercises in barricade breeching, vehicle contact at speed and fishtailing, as well as driving on high-speed courses, the following must be in place:

- medical equipment, stretchers + evacuation vehicle
- crowbar, sledgehammer, window breaker, seatbelt cutter
- four 6 kg fire extinguishers (inspected)
- mobile phone and other means of communication

4.23.1.4 Exercises

All technical driving exercises must be undertaken on a closed course, cordoned off from other traffic by means of traffic cones and/or mine tape. Separate zones may be designated to provide students with the opportunity to practice on their own. These zones must be similarly marked.

Parking, rescue and rest zones on the course must be defined and made known to all participating personnel.

ONLY exercises that have been taught by the instructor may be practiced. In the case of exercises that are complex in relation to drill, as well as exercises requiring a particularly high degree of focus on safety, the exercise must be performed by the instructor before students attempt to carry it out.

The exercise must only be practised once the instructor has given the order to do so.

Students and/or the instructor are responsible for aborting an exercise when a hazardous situation arises.

Regular breaks and safety measures must be included that contribute to reducing risk during exercises.

4.23.1.5 Exercises

The instructor must ensure that regular breaks are taken.

Seatbelts must be used by all personnel in the vehicle.

Windows must be closed.

A specific assessment must be carried out by the OCE with regard to the potential use of helmets to reduce risk in the event of an accident.

During exercises on an individual skills course, exercises in barricade breeching, vehicle contact at speed and fishtailing, all vehicles must be free of loose equipment, or else such equipment must be attached in accordance with the provisions specified in the Regulations on the Use of Vehicles (FOR-1990-01-25-92).

4.23.2 Technical driving exercises

4.23.2.1 Technical driving

Technical driving, in this instance, refers to isolated exercises or training focussing on the technical performance of the individual, e.g. driver training on a closed course, cone driving, emergency braking, evasive manoeuvres, barricade breeching, tilting, vehicle contact at speed, etc.

When performing closed course training and cone driving as part of basic driver training or as refresher training in vehicles, personnel with expertise in the vehicle in question may provide instruction in this without instructor authorisation from the FMPA, on condition that the activity has been risk-assessed and approved by a unit commander.

4.23.2.2 Driving exercises on an individual skills course

The general rule is that only one vehicle may be on the training course at any time. Exceptions to this rule are at the command of the instructor, for the purpose of practising interaction between multiple vehicles simultaneously.

When braking exercises are being undertaken, the course must be free of any obstruction.

Instructors must be positioned in such a way as to avoid exposing themselves to any danger and should usually not stand on the road.

Students must comply with any signs/signals given by the instructor.

The return route and holding point must be defined in all exercises.

4.23.2.3 Exercises in barricade breeching, vehicle contact at speed and fishtailing

A suitable lightweight helmet and gloves must be used. The helmet must weigh no more than 500 grammes and will usually be a CE-approved climbing helmet.

Protective goggles must be used

any sharp objects removed from the vehicle.

Speeds must not exceed 30 km/h, but in the case of vehicle contact at speed and fishtailing, deviation from this may be allowed at the instructor's discretion and subject to risk assessment in each case.

The vehicle must not be locked from the inside.

Vehicles with broken window panes must not be used for such exercises.

4.23.2.4 Driving on a high-speed course

Local safety instructions for the relevant course must be reviewed by the students and the instructor before exercises and/or driving commences.

4.23.3 Tactical driving exercises

4.23.3.1 Tactical driving

Tactical driving, in this instance, refers to exercises or training focussing on combined tactical actions, e.g. front/rear blocking, two-car driving, positioning in connection with driving onto/off the road, crossroads and roundabouts, loading drill, impact drill, withdrawal drill, etc.

4.23.3.2 Military training zone

The Road Traffic Act and relevant regulations must be observed during all forms of driving.

The local SO must be complied with.

Exercises must be reviewed before being carried out.

The instructor must set the rate of progress and pace.

The instructor must provide notification of/mark roads upon which exercises are taking place that may obstruct other traffic.

Drivers must pay particular attention to loading drills and impact drills.

4.23.3.3 Outside military training zones

The instructor must ensure that traffic regulations are observed.

The civilian police must be notified of any ongoing activity.

In the event of exercises requiring particular attention on the part of the general public, vehicles must be marked: "Forsvaretøvelse pågår" (Armed Forces – exercise in progress).

Any local instructions for the area must be reviewed and complied with

5 EXERCISES AND OTHER DUTY

5.1 CONDUCT OF PERSONNEL ON THE GROUND WHEN TRACKED ARMOURED VEHICLES PARTICIPATE IN EXERCISES

Figure: 5.1
Armour-infantry joint operations.

5.1.1 In general

5.1.1.1 During instruction, training and exercises, personnel on the ground must move away from shelters, hollows, dugouts, etc. and make their presence clearly known when armoured vehicles approach closer than 50 metres.

5.1.1.2 Particular attention must be paid by seated personnel operating in conjunction with vehicles.

5.1.1.3 Sleeping underneath or less than 20 metres behind or in front of tracked armoured vehicles is prohibited. Exceptions may be made at command posts where the rear tent attached to the vehicle is also used for sleeping, provided at least one person inside the tent/behind the vehicle remains awake.

5.1.1.4 During instruction, training and exercises between armoured vehicles and infantry, the following apply:

- All personnel in vehicles and on the ground must pay particular attention in order to prevent accidents.

  The vehicles' dead zones to the side and rear must be avoided. Movement is permitted in spaces between tanks and fixed objects as little as 5 metres as long as there is eye contact between personnel on the ground and the vehicle's crew. The requirement is otherwise a minimum of 10 metres.

- It is not permitted to adopt a position (sitting, lying, standing) in front of or to directly to the rear of tanks. An exception can be made when a ramp/door is open

for unloading equipment and materiel to be used by foot soldiers. Time spent in such a position must be as short as possible.

- Signs and signals must be agreed and established between the vehicle and foot soldiers that the area is clear before the vehicle can move.
- A tank commanders and any rear safety (applies to armoured infantry fighting vehicles) must have made sure that this is possible (e.g. avoiding the risk of crushing injuries to personnel situated between the vehicle and buildings).
- When operating the CV90 in OBUA/FIBUA, an exception is given that the ramp must be closed when manoeuvring the vehicle. No-one must enter or exit the vehicle while it is in motion. It must only be driven forwards and at walking pace.

5.1.1.5 During instruction, training and exercises in uneven terrain, OBUA/FIBUA, position systems, etc., in which there is a potential risk of driving into or over personnel, the OCE must ensure that a safety supervisor is present who can ensure this does not occur.

5.2 THE USE OF SOURCES OF RADIATION DURING TACTICAL TRAINING AND EXERCISES

Figure: 5.2
FAC in Iraq

5.2.1 In general

UD 2-1 regulates the use of sources of radiation during land-based operations. General requirements for radiation protection and radiation protection organisation are provided in the Radiation Protection Directive.

Radiation protection is the sum of all technical, operational and administrative measures that result in a correct radiation environment. A radiation environment is a working environment within a defined physical area in which various types of radiation are present. Radiation occurs both a consequence of own use of sources of radiation and from background radiation, as well as use of sources of radiation by others. In a military context, an operational environment will constitute a radiation environment.

The Norwegian Armed Forces manage sources of radiation and deal with radiation environments on a daily basis. This includes radiation from ionising and non-ionising

radiation sources, such as lasers, radar, jamming devices, radioactive sources and industrial and medical X-ray equipment. In land-based operations, the following use of radiation is of particular relevance:

- lasers and laser systems
- industrial x-ray equipment in EOD operations
- medical x-ray equipment
- radioactive sources in CBRNE operations
- communication and radar systems
- powerful lighting

5.2.1.1 Qualification requirements for radiation protection

The general qualification requirements in the field of radiation protection must be issued a radiation protection supervisor in the Norwegian Armed Forces. This entails a radiation protection supervisor issuing qualification requirements for training in radiation protection in all relevant radiation activities. Individual radiation activities are intended to operationalise qualification requirements for training in radiation protection in separate training plans.

5.2.1.2 List of radiation sources

Unit commanders must ensure that there are lists of radiation sources in line with section 21 of the radiation regulation. A unit's list of radiation sources helps in observation of the requirement of a duty of notification.

5.2.1.3 Notifiable radiation sources

Observation of requirements regarding notifiable radiation sources (section 13 of the radiation regulation) is shared between the Norwegian Defence Materiel Agency and the Norwegian Armed Forces. As a consequence, the Norwegian Defence Materiel Agency has responsibility for registering radiation sources regarded as "structural materiel" (military materiel requiring screening) and the Norwegian Armed Forces have responsibility for registering radiation sources regarded as "operating materiel" (non-military materiel requiring screening). The reason for this division of responsibility between the Norwegian Defence Materiel Agency and the Norwegian Armed Forces is to avoid double-reporting of radiation sources in use by the Norwegian Armed Forces (Doculive 2018042963-02 *Ruling on an adapted reporting arrangement for radiation sources in the Norwegian Armed Forces and summary of foreign forces' radiation sources*, Doculive 2018042963-04 *Ruling on an adapted reporting arrangement for radiation sources in the Norwegian Defence Materiel Agency*).

Allied military forces use radiation sources during exercises and training in Norway. As an inspection agency, the Norwegian Radiation and Nuclear Safety Authority (DSA) needs to maintain an overview and control of this radiation usage. The Norwegian Armed Forces therefore have a duty to ensure that foreign military forces have an overview of notifiable radiation sources used during exercises and training in Norway, see section 6 of the occupational safety and health regulations.

5.2.1.4 Risk assessment and preventive measures

Unit leaders must ensure that their own units draw up and update written risk assessments for the handling and storage of radiation sources. Measures for addressing radiation risk in line with the risk assessment must form a part of the unit's operational control.

5.2.1.5 Dealing with non-conformances and incidents as part of radiation protection

The requirement of notification only has to be in one place. All competent authorities that need to be notified in some cases can find this in chapter 1, point. 1.1.5. The aim is that there should be no safety information missing for competent authorities.

5.2.2 Radiation protection organisation

A radiation protection organisation has been established within the Norwegian Armed Forces in order to satisfy requirements in the law on radiation protection, the radiation protection regulations and the occupational safety and health regulations.

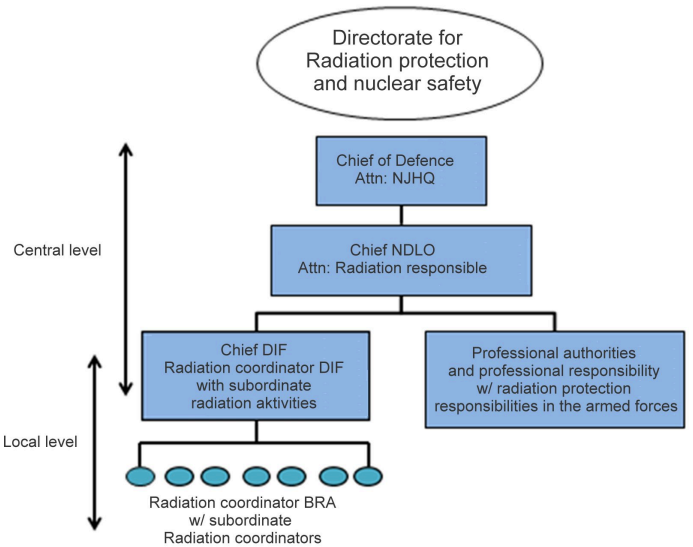


Figure: 5.3

The Norwegian Armed Forces' radiation protection organisation

The radiation protection organisation is divided over two levels: a central level and a local level. The radiation protection organisation has to be split in this way in order to address the hierarchical employer's responsibility.

Each department must have a radiation protection organisation at local level. The departmental radiation protection coordinator is the highest representative for radiation protection at local level. In addition to a radiation protection coordinator DIF, radiation protection coordinators must also be appointed in sub-units all the way down to

installation level to an extent required by radiation protection challenges. All personnel who manage radiation sources must be familiar with their local radiation protection organisation and their own unit's internal control system for radiation protection.

Coordination of the Norwegian Armed Forces' radiation protection organisation is based on the following five safety areas:

- materiel safety
- personal safety
- environment protection
- operational safety
- security service

5.2.2.1 Departmental radiation protection coordinator

The departmental radiation protection coordinator is the highest representative for radiation protection at local level. Naming of the departmental radiation protection coordinator is the radiation protection coordinator and the name of the department. An example of naming of a radiation protection coordinator at department level is radiation protection coordinator Army.

The departmental radiation protection coordinator is a role with responsibility for following up on radiation protection throughout the department. There may be a need for radiation protection coordinators for sub-units in a department, depending on the number of radiation sources their use. The departmental radiation protection coordinator and radiation protection coordinators for sub-units in a department must have a general view and control of radiation sources managed in their own unit.

The responsibility and authority connected with the role of radiation protection coordinator must be formalised in the job description for each radiation protection coordinator.

All radiation protection coordinators must have completed the "Basic radiation protection course for radiation protection coordinators in the Armed Forces" in order to be able to fill the role of radiation protection coordinator.

5.2.2.2 Radiation protection coordinators with special responsibility within a radiation activity

Radiation protection coordinators with special responsibility within a radiation activity must complete a subject-specific course according to requirements from a radiation protection supervisor in the Norwegian Armed Forces. The courses are established in the Norwegian Armed Forces' course portal.

Radiation protection coordinators who are to deal with a particular radiation activity are named as follows:

- Radiation protection coordinator laser
- Radiation protection coordinator industrial x-ray EOD
- Radiation protection coordinator medical x-ray

- Radiation protection coordinator radio frequency radiation
- Radiation protection coordinator CBRN

Radiation protection coordinator laser

Radiation protection coordinator Laser is a radiation protection coordinator with responsibility limited to lasers and laser safety. In English this is referred to as a Laser Safety officer (LSO).

Radiation protection coordinator industrial x-ray EOD

This is a radiation protection coordinator with responsibility limited to x-ray sources and x-ray usage within EOD activities

Radiation protection coordinator medical x-ray

This is a radiation protection coordinator with responsibility limited to x-ray sources and x-ray usage in medical activities.

Radiation protection coordinator radio frequency radiation

This is a radiation protection coordinator with responsibility limited to radio frequency radiation sources, such as radar, communications equipment and jamming devices.

Radiation protection coordinator CBRN

Radiation protection coordinator CBRN has responsibility for the use of radioactive sources within CBRN.

5.2.3 Use of radioactive sources

5.2.3.1 CBRN units in the Norwegian Armed Forces manage their own radioactive sources and are able to detect and deal with unspecified radioactive sources in the event of a CBRN incident. The Norwegian Armed Forces' ABC school (FABCS) have technical responsibility within CBRN protection, and issues requirements for training in CBRN protection for all military personnel.

See point 5.5.3, Radioactivity, and 5.5.4 Live agent training

5.2.4 Use of medical x-ray equipment

The competent authority for medical and veterinary activities within the Norwegian Armed Forces, the Norwegian Armed Forces' Joint Medical Services (FSAN), regulates aspects in connection with justification and optimisation within the use of medical x-ray equipment covering patient treatment and patient safety. The Norwegian Armed Forces' logistics organisation is the competent authority with respect to radiation protection, and it is required to follow up on HSE aspects in connection with the use of medical x-ray equipment.

Military units that use medical x-ray equipment must have valid operational approval in accordance with section 9 of the radiation protection regulations. A list of valid operational approvals for the Norwegian Armed Forces can be found on the intranet, on the radiation protection site (http://intranett2.mil.no/fag/Logistikk/Straalevern/Sider/default.aspx).

5.2.4.1 Qualification requirements for tactical use of medical x-ray equipment

Qualification requirements for tactical use of medical x-ray equipment are regulated and followed up by the competent authority for medical and veterinary activities within the Norwegian Armed Forces, the Norwegian Armed Forces' Joint Medical Services (FSAN).

5.2.5 Use of industrial x-ray equipment in EOD operations

The Norwegian Armed Forces' ammunition and EOD school (FAES) is the competent authority for EOD in the Norwegian Armed Forces. The use of industrial x-ray equipment in EOD operations must be in accordance with regulations and technical plans issued by the commander of the FKL (The Norwegian Armed Forces Education Center for Logistics and Support).

Military units that use industrial x-ray equipment in EOD activities must have valid operational approval in accordance with section 9 of the radiation protection regulations. A list of valid operational approvals for the Norwegian Armed Forces can be found on the intranet, on the radiation protection site (http://intranett2.mil.no/fag/Logistikk/Straalevern/Sider/default.aspx).

5.2.5.1 Qualification requirements for tactical use of industrial x-ray equipment in EOD

Qualification requirements for tactical use of industrial x-ray equipment in EOD operations are regulated and followed up by the Norwegian Armed Forces' ammunition and EOD school (FAES), which is the competent authority for EOD.

FAES certifies EOD operators and EOD instructors for the sue of industrial x-ray equipment. The following courses qualify personnel for the use of industrial x-ray systems in EOD operations:

- Operator course, x-ray system, EOD
- Instructor course, x-ray system, EOD

5.2.6 Use of communications and radar systems

Communications and radar systems emit radio frequency radiation. The recommended limit values for exposure to radio frequency radiation were issued by a working party under the auspices of the World Health Organization (WHO), called the International Commission on Non-Ionizing Radiation Protection (ICNIRP). These limit values are recommended by the Norwegian Radiation and Nuclear Safety Authority (DSA). The ICNIRP also issues recommendations as to how measurements should be performed.

The impact of radio frequency radiation on the human body is dependent on frequency. In the frequency range from approx. 1 MHz to approx. 10 GHz, the radiation acts inside the body. The resultant absorption of energy causes heating of the body's tissues. For frequencies greater than 10 GHz, penetration inside the body tapers off and heating occurs increasingly in the skin.

The limit values have been given with a relatively high safety margins in respect of what is produces known medical effects. For the general population, the recommended limit values according to the ICNIRP are 50 times below the level at which injury to health is detected.

5.2.6.1 Qualification requirements for tactical use of communications and radar systems

Qualification requirements for tactical use of communications and radar systems are regulated and followed up by the competent authority and other commanders with competent authority for the use of radio frequency radiation sources in the Norwegian Armed Forces.

5.2.7 Tactical use of lasers – laser safety

5.2.7.1 In general

Tactical use of lasers is based on implementation of STANAGs ratified by Norway. STANAG 3606 – ARSP4 and STANAG 4495 – AEP 4495 are of the greatest importance in respect of laser use and laser safety.

All lasers used must be approved for use (AFU). The use of lasers for exercises and training must comply with one or more of the following:

- 1. Safety distances (NOHD) stipulated in appendix 13 to UD 2-1.
- 2. Exercise orders, firing tables or training set-ups stipulated by the Norwegian Army Land Warfare Centre (LWC) and/or the division's radiation protection coordinator, lasers, who regulates laser safety in such detail as to be considered safe in any one case.

5.2.7.2 Risk

The use of laser range-finders and other laser-based equipment can cause eye injuries in personnel who are struck by the laser beam, either directly or via a reflection. Injuries may occur if the distance between the laser and the person is less than the laser's safe working distance (NOHD [1]). With a sufficiently high level of intensity, a laser beam can also cause serious burns to personnel (skin, clothing), as well as fire damage to materiel.

Lasers in the visible range may also result in a risk of dazzling personnel performing critical functions, e.g. aircraft pilots or vehicle and crane drivers.

In the case of tactical units, a radiation protection coordinator, laser, can approve the use of lasers based on a deterministic risk assessment method in accordance with the regulations and advice provided in STANAG 3606 – ARSP-4.

5.2.7.3 Laser hazard classes

In accordance with the international standard IEC 60825-1, lasers are classified in the following hazard classes:

Class 1:	Lasers that do not represent any real risk of causing eye injuries
Class 1M:	Lasers that are only hazardous if an individual looks directly at the beam through a magnifying lens

1) Nominal Occular Hazard Distance based on recommended international limit values for optical radiation

Class 2:	Lasers with a wavelength in the visible part of the spectrum, which will not cause injury as long as the eyes have their natural blink reflex
Klasse 2M:	Lasers with a wavelength in the visible part of the spectrum, which do not usually represent a hazard because of the eyes' natural blink reflex (see Class 2), but which can cause injury if an individual looks directly at the beam through a magnifying lens.
Class 3R:	Lasers that represent a potential, but low risk of causing eye injuries. This means that personnel would have to be extremely careless or unfortunate to receive a permanent eye injury.
Class 3B:	Lasers that represent a gradually increasing risk of radiation injuries to the eyes and skin. Lasers in this class will usually cause eye injuries if the individual receives the full effect in his/her eyes, with the extent of the injury increasing with effect. Minor skin injuries may also occur.
Class 4:	Lasers that represent an extremely high risk of radiation injuries to the eyes and skin. Such lasers may also cause eye injury if an individual is looking at a diffuse reflection from the point where the beam strikes. They may also result in serious burns to the skin, clothing, etc.

5.2.7.4 Safety distances and risk zones

All lasers, with the exception of lasers in hazard class 1, can cause eye injuries to personnel located within a given safety distance. The safe distance from the naked eye is usually referred to as the NOHD (nominal ocular hazard distance). If a laser beam is looked at through binoculars, the energy that strikes the eyes increases, and the safe distance will increase in proportion to the power of the binoculars. Thus the term EOHD (extended ocular hazard distance) is used. The safe distance is determined by the laser’s characteristics, such as power output, pulse energy, pulse rate, wavelength and beam divergence (angle of dispersion). If several lasers are used simultaneously from the same platform, the safety distance could increase even more. A list of lasers used by the Norwegian Armed Forces, with specifications of hazard class and NOHD and EOHD values, is provided in Appendix 13.

Tactical use of lasers over large distances with little spread of the laser beam (beam divergence) may result in lasers in the lower hazard classes potentially retaining their radiation risk, while lasers in higher hazard classes with greater divergence may be non-hazardous at similar distances. When using laser tactically, risk assessments for laser use must therefore be based on the safety distances (NOHD) provided in Appendix 13.

Objects in the target area with **reflective surfaces** can result in increased risk from laser use, as the laser beams reflect in unplanned directions. Examples of such surfaces could be window glass, vehicle driving mirrors and shiny metal components.

Reflective surfaces in exercise areas must therefore be covered or removed prior to using a laser whenever possible or necessary.

During training and exercises, the safety distances (NOHD and EOHD) in Appendix 13 must be used. These indicate risk zones and in which sectors laser beams may be used. The potential for the laser beam to strike reflective surfaces in the target area must also be taken into account. It is essential for safety that the OCE, the safety officer and the laser operators are aware of the safety distances (NOHD) in Appendix 13. For lasers with exercise mode and attenuation filters, a radiation protection coordinator, laser, can approve the use of lasers at distances shorter than the safety distances shown in Appendix 13, subject to the following condition:

- Point 5.2.7.11 and point 5.2.7.12 must be complied with.
- A risk assessment has been drawn up and approved by a radiation protection coordinator, laser. The documentation must be traceable.

5.2.7.5 Eye protection

If it is necessary for personnel to be located in a risk zone during an exercise (corresponding to Nominal Hazard Zone as described in ARSP-4), such personnel must be equipped with adequate eye protection. This could be special goggles with high optical attenuation of the relevant laser wavelengths or it may be attenuation filters that are fitted to observation equipment (binoculars, etc). A table showing the connection between optical attenuation and correction factors used to calculate adjusted safety distances may be found in Appendix 13.

Only goggles with technical and administrative approval may be used as risk-reducing measures during training with lasers. The use of goggles must be in accordance with protection requirements identified by completed risk assessments.

5.2.7.6 Protection of skin and clothing

When Class 4 lasers are being used, attention should be paid to the risk of burns to the skin and the combustion of clothing or other articles.

In the case of lasers with a wavelength in the ultraviolet range (less than 400 nm), it may be necessary to protect the skin in order to avoid ‘sunburn’ and to reduce the risk of major skin injury.

5.2.7.7 Approved training grounds

Lasers should be used primarily at approved locations. In case of exercises outside of approved field firing ranges, a radiation protection coordinator with the DIF grants approval for the use of lasers. Such approval may be given in the form of general conditions and qualification requirements and not necessarily on a case-by-case basis.

Laser instructions for using lasers in firing ranges and training grounds (FRATG) issued by the Norwegian Defence Estates Agency stipulate general regulations for the use of lasers in a FRATG.

Force commanders or subordinate unit commanders can authorise training and exercises with lasers based on the probability-based method. All use of lasers that requiring probability-based risk management must be submitted to the Officer in charge of Radiation in the Norwegian Armed Forces for approval by a force commander, see Directive on radiation protection in the Norwegian Armed Forces, point 5.1.

A radiation protection coordinator, laser, with the approval of an commanding officer, can recommend and approve exercises and training in the use of lasers based on a deterministic risk assessment method.

All use of lasers covered by "the Norwegian Armed Forces' dispensation for use of lasers" requires the approval of the Officer in charge of Radiation in the Norwegian Armed Forces.

The use of safety distances for lasers in classes 3R, 3B and 4 without attenuation filters or in exercise mode in deviation from defined safety distances in Appendix 13, must be applied for in accordance with Appendix 26 – Application for deviation from UD 2-1.

5.2.7.8 Indoor use of lasers

The responsible instructor or operator must ensure that laser use takes place in a safe manner that does not result in third-party risk. Safety measures must be in accordance with the laser class and must be approved by a person with competence within laser safety.

5.2.7.9 Marking

Permanent training grounds must be marked with warning signs. When using temporary training grounds and training grounds requiring application to be made where radiation sources stronger than class 2M are used, the outer boundary of the risk zone must be clearly marked. It is emphasised that magnifying optical devices can extend the risk zone, and that there must be awareness of this risk when preparing appendices to an application for the use of temporary training grounds. An OCE, in consultation with a local radiation protection coordinator or local laser safety supervisor, must assess the extent of additional local measures and information about this must be provided to all parties involved.

5.2.7.10 Additional measures

When using lasers with wavelengths within the visible spectrum, an assessment of risk must be carried out in respect of dazzling drivers, aircraft and marine pilots and other personnel who are critically dependant upon their eyesight in order to perform their duties, and the identified safety measures must be implemented.

Direct illumination by lasers of sensitive optical and infra-red detection equipment such as a TV camera or light amplifier, must be avoided.

During use, it must be noted that a laser may also cause eye injuries to animals.

5.2.7.11 Personnel for command and control

The responsibility for safety in respect of the use of lasers is assigned to the following personnel:

- OCE, see point. 1.1.4.3
- Safety officer, see point. 1.1.4.5
- Assistant safety commander (when measuring from several stands simultaneously)
- Laser system operator, see point. 1.1.4.5

OCE

If the OCE does not possess the required authorisation to prepare safety instructions, he/she should delegate this task to an authorised adviser. A radiation protection coordinator may carry out this task if he/she has received the required training in laser safety.

Laser system operator

A laser system operator must:

- have completed training in laser safety in accordance with point 5.2.7.13
- be an authorised user of the relevant laser system
- be familiar with safety instructions in respect of laser use firing ranges and training grounds (FRATG)
- prior to use, ensure that the materiel is not visibly damaged
- ensure that the laser is always directed towards the target area when the power source is connected, or directed in a non-hazardous direction when it is not appropriate for it to be directed towards the target area
- never activate the laser before the required warning has been issued to all personnel involved in the exercise
- never point the beam towards any personnel located in the risk zone if there is uncertainty as to whether such personnel are using mandatory eye protection
- during mandatory use of a laser in exercise mode, ensure that the laser has been activated

5.2.7.12 Risk assessment

When using lasers in classes 3R, 3B and 4, an OCE must ensure that a risk assessment is produced that is incorporated into the exercise orders. All personnel involved in the exercise must be familiarised with the risk assessment, which must contain the following information:

- Requirements for training of laser operators and other involved parties
- Types of laser systems being used and their hazard classes
- NOHD og evt. EHD for de enkelte systemene
- Which authorised observation systems (binoculars, etc.) are permitted for use
- Specification of risk zones

- Requirements for marking of risk zones
- Requirements for protective equipment (goggles, filters, etc.) if personnel are to be located within the risk zone, and verification of same
- How the laser systems should be used (e.g. where it is permitted to direct the beam, whether the exercise mode should be used, etc.)
- How reflective objects should be handled (covering, etc.)
- Warning procedures (how all involved personnel should be warned prior to laser activation and how such personnel should be notified that lasers are no longer in use, or permitted to be used)
- Access control (how unauthorised personnel and personnel not in possession of approved protection are prevented entering the risk zone)

5.2.7.13 Training

The Norwegian Defence Logistics Organisation (NDLO) is allocated technical responsibility for radiation protection and is responsible for laser safety training within the Norwegian Armed Forces. The following laser courses are established in the Norwegian Armed Forces' course portal:

- Radiation protection coordinator - laser safety
- Laser safety course for chief instructors
- Laser safety course for laser operators

Units are themselves responsible for ensuring that the necessary materiel-specific training of laser operators, focusing on the correct use and handling of laser materiel, is completed before laser operators are authorised.

Personnel who do not have the required training in laser safety and authorisation for using specific laser materiel must not use laser materiel.

5.3 EXERCISES WITH AN ACOUSTIC SHOT LOCALISATION SYSTEM

5.3.1 In general

The following provisions apply to training in the use of an acoustic shot localisation system with live ammunition.

5.3.2 Personnel

Training in the use of an acoustic shot localisation system with live ammunition must be under the direction of a qualified officer. 'Qualified' means that the officer in question has completed a shot localisation system instructor course and the commanding officer regards the officer as being qualified to take command of such exercises.

5.3.3 Firing above and to the side of personnel

Firing above and to the side of personnel must be conducted in accordance with the provisions of point 3.3.4.

In the event of exercises being conducted with non-armoured vehicles or outside of bullet-proof cover, gunners should be qualified marksmen, see point 3.3.3.5.

5.3.4 Materiel/ammunition inspection

The acoustic shot localisation system must be checked and made ready for combat before the exercise commences.

Weapons must be sighted and test rounds should be fired.

5.3.5 Communications

Radio communications must be established with the OCE, gunners and vehicles/stands with acoustic shot localisation systems.

In addition to radio communications, an unambiguous term for "cease firing" should be agreed with the OCE, gunners and vehicles/stands.

5.4 USE OF SIMULATORS FROM SAAB TRAINING SYSTEMS

5.4.1 In general

5.4.1.1 All lasers being utilised are safe to the eyes (Class 1).

Detailed descriptions of each simulator and of precautions to be taken by users are contained in the instructor manuals and user manuals (folders) available on the Norwegian Armed Forces intranet (CTC/Norwegian Army Land Warfare Centre website and in SAP DMS).

Safety provisions for the use of standard blank ammunition are provided in point 3.4.1.6 Blank ammunition.

When using blank ammunition and pyrotechnics for simulators, the mandatory safety equipment must be used (fig. 5.4)

Detailed descriptions of each simulator and of precautions to be taken by users are contained in the instructor manuals and user manuals (folders) available on the Norwegian Armed Forces intranet. (CTC/Norwegian Army Land Warfare Centre website and in SAP DMS).

Pyrotechnic holders, indicating that a vehicle has been hit (Target Effect Signature Simulator - TESS) er montert på alle pansrede kjøretøy. Pyroteknikken (rød røyk) utløses automatisk når kjøretøyet blir slått ut.

After delivery, all pyrotechnic ammunition must be stored in separate cases when not loaded in the simulators.

Figure: 5.4
Use of hearing protection and combat goggles.

5.4.2 User requirements

The issue and use of simulator materiel requires training by an approved instructor. Units that loan simulator materiel must have personnel who have completed instructor courses in the respective simulators.

5.4.3 Specific provisions

Simulator for protective mask filter The simulator does NOT offer protection against smoke/gas.

When using pyrotechnic ammunition for weapon simulators, the following safety distances apply for the NM-72, CG84 and Javelin:

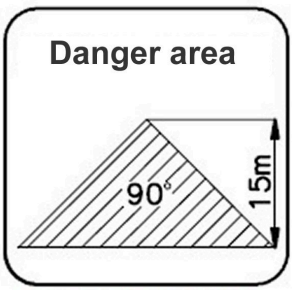


Figure: 5.5
NM-72, CG84

Figure: 5.6

Javelin

TESS (Target Effect Signature Simulator) on armoured vehicles. Hazardous area surrounding the holder: distance 0.5 m (vertically and horizontally).

Launching unit for simulated firing Hazardous area surrounding the holder: distance 0.5 m (vertically and horizontally).

Hand-held explosion markers Point away from the body during use. The aluminium tube can become extremely hot (burn injuries/fire hazard).

Signal pen, explosion marks Fired up into the air with the firing hand above head height. Ensure that no obstacles are in the trajectory of the marking charge being fired. Do not point at personnel, live creatures or aircraft.

UTS (Universal Target System)

When electrically-charged sensor equipment is located on the bonnet of a vehicle and the vehicle is being driven in darkness or poor visibility, LED lights facing back towards the driver must be covered (danger of the driver being dazzled if the vehicle receives simulated damage or is hit).

5.5 CBRN TRAINING, EXERCISES AND OPERATIONS

5.5.1 Inspecting protective masks for air-tightness

Protective masks must be inspected for air-tightness at least once a year. The airtightness check must be performed using CS tablets or the Portacount system.

5.5.1.1 Airtightness check using CS tablets

The inspection is conducted in a (specially constructed) gas booth/room, or a suitable tent. The airtightness check must be performed with a coarse check followed by a fine check:

- A low concentration must be used during the **general inspection**. The number of tablets is calculated by dividing the volume of the room in m^3 by 30. Always use whole tablets and round the number down to the nearest whole tablet (minimum 1 tablet). EXAMPLE: If the room is 70 m^3, the calculation is 70 m^3 divided by 30 = 2.3, therefore 2 tablets.
- A high concentration must be used during the **detailed inspection**. The number of tablets is calculated by dividing the volume of the room in m^3 by 4. Always use whole tablets and round the number up to the nearest whole tablet. EXAMPLE: If the room is 70 m^3, the calculation is 70 m^3 divided by 4 = 17.5, therefore 18 tablets.

With coarse checking (low concentration) the following exercises are permitted:

- inspection of the tightness of the protective mask before a high concentration is used
- tolerance exercise for no more than 10 seconds (see below)
- drinking from the integral drinking system
- filter cartridge replacement
- personal cleaning
- other critical tasks required to be practised in a contaminated zone, operating weapons, communications or providing first aid

With fine checking (high concentration), the activity must be limited to checking the mask for airtightness by conducting the following exercises:

- move the head from side to side as far as possible
- move the head up and down as far as possible
- bending forward, move the head from side to side as far as possible
- conversing and practising communication
- jumping on the spot up to 10 times

Whichever tolerance exercise method is selected, its must be emphasised that it is voluntary. Soldiers must not in any circumstances be ordered to remove their protective masks in a gas-filled space, even at low concentration.

5.5.1.2 **The tolerance exercise can be conducted in one of two ways:**

- EITHER by those wishing to experience the effects of CS gas either being allowed to remain in a gas booth after a low concentration is obtained, and removing their own masks inside the booth. The individual leaves the booth on their own volition (max. 10 seconds). No-one may be restrained or be required to declare a change of mind or similar.
- OR having performed the high concentration and completing the airtightness check, once everyone has assembled outside the gas booth, allowing those who so wish to open the door of the gas booth without wearing a protective mask. No-one may enter the booth in which there is a high concentration.

In both cases, there must be an instructor present inside the gas booth and outside, ready to intervene in case of problems.

5.5.1.3 **Airtightness check using the Portacount system**

The test is conducted in a room without active ventilation. The room does not have to be purpose-built and its size is dependent on the number of test subjects and the number of available particle generators. Salt particles are used as the test substance, meaning that no discomfort is experienced if the mask is not airtight.

The following exercises are performed in the course of the test to ensure the most accurate results possible:

- heavy breathing
- normal breathing
- move the head from side to side
- moving the head up and down
- grimacing
- miming/simulating speech

5.5.2 Chemical

5.5.2.1 Storage and handling of CS and simulants, chemical combat agents

CS is classified as ammunition and must be stored in accordance with the guidelines for ammunition. CS tablets must always be stored in their original packaging. Data sheets must be available at the storage location.

Protective gloves must be worn when handling and using CS tablets.

Simulants must not be stored in buildings permanently housing personnel or together with explosives, flammable substances, electronic equipment, optical instruments or foodstuffs. Simulants must be stored in a locked room. Data sheets must be available at the storage location. Simulants must be transported in their original packaging wherever possible. If different packaging is used, the nature of the contents must be clearly labelled.

Simulants must be handled using a protective mask and gloves. Simulants must not be used on unprotected personnel.

The simulants C-yellow (non-persistent nerve agent) and C-green (persistent nerve agent) are irritants and caustic to varying degrees.

The simulant C-red (mustard agent) is classified as hazardous to health and environmentally dangerous, class 9 hazardous goods with hazard number 90 and UN number 3082.

C-red can cause poisoning and skin contact can result in irritation. It can be very toxic to water organisms and can have harmful long-term effects in aquatic environments.

The simulants SIFON, SIFOS and SIFOX are being phased out of the Norwegian Armed Forces but will continue to be used until stocks have been depleted.

5.5.2.2 Use of CS during training and exercises

When using CS tablets for tightness checks, the minimum distance to infrastructure shall be 50 m. In the event of unfavourable wind conditions, the distance must be increased.

CS grenades must not be used:

- closer than 800 m upwind of civilian buildings or locations in which civilians usually assemble
- closer than 500 m upwind of aircraft or helicopter landing grounds when flight operations are in progress
- closer than 500 m to operational facilities at air control radar and radio stations for air traffic control
- in closed rooms, tents or vehicles
- when multiple CS grenades are being used, the reciprocal distance must be at least 20 m, positioned crosswise to the wind direction.

During exercises in which CS is used, the OCE must ensure that participating personnel are:

- fully briefed that CS may be used
- aware of the effects of CS and the measures to be taken if severe discomfort should occur
- equipped with protective masks carried in the standby position
- trained in the use of protective masks, and the masks have been adjusted and inspected

Before the exercise, each individual must check that the mask is undamaged and working properly by holding the mask filter’s inhalation opening and breathing in (the mask should stick to the face without air filtering in). Filter cartridges must be checked and any cartridges displaying significant breathing resistance must be replaced.

The OCE must ensure that civilian traffic is prevented from entering a contaminated zone, that drivers of military vehicles are wearing protective masks before passing through the zone, and that the vehicle's speed is reduced sufficiently to ensure safe transit.

Personnel displaying strong signs of discomfort must be helped out of the contaminated zone as quickly as possible and prevented from removing the protective mask until an uncontaminated zone has been reached.

Personnel with severe colds, asthma, bronchial disorders, who are pregnant or who display diminished general health should not be exposed to CS.

Diminished general health as a result of physical fitness tests and other tough physical challenges are generally not sufficient grounds for being exempted from CS exposure.

5.5.2.3 Use of simulants during training and exercises

Simulants must not be used on unprotected personnel.

Before exercises involving simulants, a safety inspection of the protective masks must be carried out.

As a minimum, protective mask and gloves must be worn when using simulants. Contact with exposed skin must be avoided.

Red simulant must not be used in terrain with run-off into rivers, drinking water or other vulnerable aquatic environments.

5.5.3 Radioactivity

During peacetime, the Norwegian Armed Forces are subject to national laws and regulations relating to exposure to ionising radiation. Norwegian Armed Forces personnel are subject to the same regulations as the general public and must not be exposed to more than 1mSv a year above and beyond normal background radiation. This is the case during both exercises and operations.

Personal dosimeters must be used during all training, exercises and handling of radioactive materials. The dose received must be registered and documented in a dose ledger. Follow-up of the received dose and ensuring that it does not exceed the statutory value is the responsibility of the unit.

When managing radioactive sources, materials containing radioactive sources/ substances or materials that may emit radioactive radiation during use, the Norwegian Armed Forces must abide by national provisions and regulations, and by the user guide and safety provisions relating to the materials in question.

For supplementary regulations, see

- ”Regulations on radiation protection and use of radiation (radiation regulations)”
- 1111 – Radiation protection provision
- The Internal Control Regulations
- “Provisions on the protection of personnel against ionising radiation”
- “Provisions on the use of the Norwegian Armed Forces' dose metering system for ionising radiation”

5.5.4 Live agent training

Exercises and training using live chemical weapons, threat agents and radioactive materials involves a risk to life and health and must be restricted to official needs.

Such exercises and training may only take place once the relevant courses have been completed.

Before such exercises and training, personnel must test their protective masks for airtightness.

Protective suits designed for exercises must not be used during live agent exercises and agent exercises and training.

5.6 DISINFECTING DRINKING WATER IN THE FIELD

5.6.1 In general

5.6.1.1 Military personnel must be supplied with drinking water that meets the requirements in the Regulation concerning water supply and water intended for human consumption (Drinking water regulations). This is to ensure that the drinking water does not contain contaminants that are harmful to health.

Drinking water intended for distribution in the field and at water tap points must be approved by a veterinary officer.

5.6.1.2 Chlorine

Drinking water used in the field must be disinfected using a chlorine preparation approved by the Norwegian Armed Forces' Inspector of Veterinary Services. The addition of chlorine kills off pathogenic microbes present in the water and ensures its quality during storage. This also counteracts the formation of harmful biofilm in water containers. The use of chlorine in drinking water has been thoroughly investigated and it does not constitute a threat to health.

If bottled water is used from a manufacturer approved by a veterinary officer, there is no requirement for chlorination. Bottled water can be kept for one day after opening. This period can be extended by adding chlorine.

Drinking water in the field must contain free chlorine at a minimum concentration of 1.0 mg/l 30 minutes after addition.

The correct concentration in field water bottles/camelbacks is achieved by adding one 1-litre chlorine tablet per litre of water. The correct concentration in a 20 litre can is obtained by adding one 20-litre chlorine tablet per 20 litres of water. The water in both cases is ready for drinking 30 minutes after addition of the chlorine tablets.

Chlorinated drinking water stored in 20 litre cans can be kept for 7 days. After 7 days it must be replaced by fresh drinking water and chlorination is repeated as described in the previous section.

For correct chlorination of large volumes (water trailers, water tankers etc.), the chlorine level should be measured after the addition of tablets.

Chlorine tablets for the disinfection of drinking water are available from the supplies system. The tablets contain the active ingredient sodium dichloroisocyanurate. Different tablets are available for disinfecting different volumes. See the table for a list of available tablets:

Volume	Quantity per pack	SAP-nr	NATO-nr	Content NADCC	Concentration in water (ppm)
1 litre	10	30184447	6850-99-238-9729	3,5 mg	1-2
5 litres	50	30211244	6850-99-670-0769	8,5 mg	1,0
20 litres	50	30184512	6850-99-563-6924	33 mg	1,0
1000 litres	200	30184513	6850-99-590-5720	1670 mg	1,0
10000 litres	60	30184514	6850-99-996-9455	8680 mg	0,5

5.6.1.3 Storage materials (bottles, cans, water trailers etc.)

Storage materials (e.g. field water bottles, camelbacks, water cans or water trailers) for use with drinking water must not be used for any other fluids.

Whenever using chlorine for disinfecting drinking water, it is important that the storage material (e.g. field water bottle, camelback, water can or water trailer) is clean and disinfected before adding drinking water and chlorine. If the material is dirty, the chlorine preparation will react with the contamination, resulting in the drinking water having an unpleasant chlorine flavour and odour.

Storage material that is visibly dirty must first be cleaned before disinfection or replaced.

When disinfecting storage materials, a solution is used that gives a total chlorine level of 25.0 mg/l in the can/tank. This is referred to as shock chlorination. The chlorine solution must be left in the can/tank for 24 hours. The disinfection time can be reduced to 8 hours by using a solution that gives a total chlorine level of 50 mg/l in the can/tank. On completion of disinfection: empty the storage equipment and rinse thoroughly using approved drinking water before filling with drinking water that has been chlorinated in accordance with 5.6.1.2.

Shock chlorination is carried out on storage equipment that is used after acquisition, after storage of empty containers for more than 7 days or if there is suspected contamination.

Chlorine solution for disinfecting storage equipment can be produced by using commercially available products containing 4-5% sodium hypochlorite (e.g. Klorin®, Lilleborg, SAP no. 40692435): Chlorine. See the following table for the amount of bleach used to disinfect various volumes:

Volume water	Amount of Klorin (chlorine based bleach and disinfectant)	
	25 mg/l	50 mg/l
1 l	5 drops	10 drops
20 l	10 ml	20 ml
1000 l	0,5 l	1 l

Alternatively, chlorine tablets can be used to disinfect storage materials, in which case 25 or 50 times as many tablets respectively are used as indicated in point 5.6.1.2. For example, for a disinfection solution of 20 litres with a total chlorine level of 25 mg/l, fifty 20 l tablets or half a 1,000 l tablet can be used.

Containers intended to be stored must be dry before being put away. 20 litre cans must be set out on a suitable shelf or stand, upside down and with their stoppers out.

5.6.1.4 Use of non-approved water sources

In situations in which personnel are supplied with water from water sources that have not been inspected and approved by a veterinary officer, additional measures must be taken in order to ensure that the water is safe to drink. For example, SERE situations and combat reconnaissance missions may necessitate such measures.

Water from a water source that has not been approved by a veterinary officer must be boiled for at least 1 minute. At elevations above 2,000 m above sea level, drinking water must be boiled for at least 3 minutes. Boiling is necessary in order to kill off pathogenic organisms.

If this water is not drunk immediately, it must be chlorinated in accordance with the provisions of 5.6.1.2 concerning further processing in the field. If the water is cloudy or discoloured, double the amount of chlorine given in point 5.6.1.2. E.g. for disinfecting water in field water bottles/camelbacks, add two 1 litre chlorine tablets per litre of cloudy or discoloured water.

Units with special needs to use non-approved water sources are asked to contact the chief veterinary officer for their own Armed Forces branch for assessment of alternative disinfection solutions.

5.7 TRAINING IN MILITARY OPERATIONS IN BUILT-UP AREAS/URBAN TERRAIN (OBUA/FIBUA)

Figure: 5.7

Combat training in a built-up areas in urban terrain.

5.7.1 In general

5.7.1.1 When training in FIBUA, the following protective equipment must be used in addition to what is stated in point 3.1, 3.7.5.1 and in chapter 8:

- gloves
- knee protectors
- uniform covering the entire body

Additional requirement in case of fire simulation:

- Clothing must cover to the neck

5.7.1.2 All personnel operating in and around built-up areas during an exercise should use the protective equipment listed in point 5.7.1.1.

Personal protective equipment must not be removed until the OCE has ordered a halt, unload weapon check and a halt in the exercise. Any personnel inside the exercise area may order a halt in the exercise if so required for safety reasons.

Everyone located inside the exercise area or observing the exercise as a safety supervisor, instructor, OCE, etc. must wear a reflective vest.

5.7.1.3 Marking/securing in and around buildings

To prevent unwanted situations, marking should be used at locations where entering or movement is not desirable. This applies to both infantry and vehicles. When using openings (holes in the floor) instructors or others must ensure that it is impossible for personnel to fall down.

During exercises in ascending/descending from the 2nd floor or higher, or at heights above 5 metres, personnel must be secured from above. Fittings for securing ropes during ascent/descent must be approved by the OCE or qualified personnel approved by the OCE.

Improvised ladders or similar aids must be approved by the OCE or by qualified personnel approved by the OCE.

5.7.1.4 When using a practice hand grenade or exercise hand grenade, great care must be taken so that personnel are not injured as a result of being hit by the grenades. When using FlashBang, markers should under no circumstances be left unattended. See section 3.7.9

Improvised ladders or similar aids must be approved by the exercise leader, or qualified safety personnel approved by the OCE.

Stretcher, heat preservation material, medical equipment FC-2 equivalent and a dedicated vehicle to medical service must be present at all exercises.

Scenario villages must have their own safety instructions.

5.8 TRANSITING IN STEEP AND DEMANDING TERRAIN

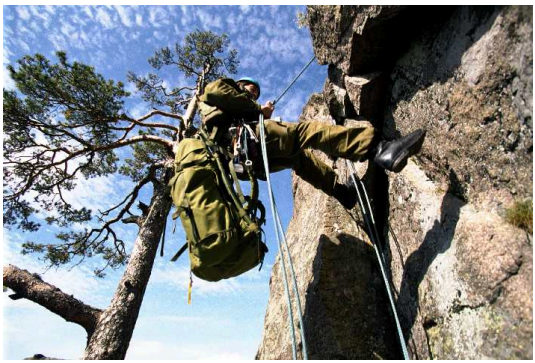


Figure: 5.8
Rappelling down a precipice

5.8.1 In general

5.8.1.1 The provisions are applicable during exercises and activity in steep and demanding terrain, where transit through such terrain involves a risk of falling. The provisions also cover rappelling, roped traversing and traversing glaciers. Exercises in the Norwegian Armed Forces associated with climbing/transit through steep terrain primarily serve two objectives:

- Moving units that have this as part of their operational concept
- As a climbing activity applied as an element of assault courses and other types of training activity.

Activity associated with both objectives is governed by the safety provisions of UD 2-1. The unit commander will determine whether the nature of the unit's exercises are such that the provisions must be applied.

For safety provisions for working at heights, see *Provisions for working at heights*.

5.8.1.2 Qualified personnel

Exercises of this nature must be supervised by qualified personnel. Qualified personnel refers to personnel who have completed in-depth training in outdoor climbing techniques relating to the activity to be conducted, as part of either military or civilian training programmes, and where this can be documented.

The unit commander is responsible for determining whether the individual conducting such exercises is regarded as qualified. The actual skills of the OCE must be submitted to the unit commander in advance of the relevant exercise as a basis for assessment.

5.8.2 The OCE's duties

5.8.2.1 The OCE is responsible for the following safety measures:

- administering personnel and materiel in such a manner as to minimise high-risk situations
- ensuring that securing and protective equipment is available and is used
- checking that ropes and other securing materials are in regulation condition
- ensuring that the equipment being used has been approved for the specific type of use
- ensuring that equipment is serviceable and will not result in unnecessary risk of wear and tear to securing equipment or injury in case of a fall
- ensuring that the required first aid equipment is available
- ensuring that measures are in place for any evacuation of injured personnel
- ensuring that rappels and roped descents are always made using double anchors
    - Exemptions from the double anchor regulation can be made based on the unit commander's assessment for personnel with a high standard of training in climbing.

5.8.2.2 Climbing materiel

Units that possess climbing equipment must have effective routines for storage, maintenance and disposing of materiel. All equipment must satisfy requirements for regular checks in accordance with applicable regulations for climbing equipment.

5.8.3 Roped traversing and roped descent of personnel and stretchers

5.8.3.1 Training and exercises in these areas should only be conducted in units that have a defined need to undertake this type of activity, and should, for safety reasons, be carried out in accordance with specific guidelines for the equipment.

5.9 SAFETY RULES FOR INSERTION AND EXTRACTION BY HELICOPTER USING SPECIAL INSERTION AND EXTRACTION TECHNIQUES

Figure: 5.9
Training with a fast rope

5.9.1 In general

5.9.1.1 The Helocast insertion/extraction, Fastrope, Rapell and Spider Pick-up insertion and extraction techniques must be conducted according to Procedures for special operations by helicopter.

5.10 CLIMATE-RELATED INJURIES

Figure: 5.10
Service in cold regions

5.10.1 In general

A risk management form (ORM) must be available before the exercise is started.

5.10.1.1 Service that is undertaken in areas with high and low temperatures represents a health hazard to Norwegian Armed Forces personnel. The prevention of climate-related injuries is the responsibility of the officer in charge.

Factors such as absolute temperature, exposure time, degree of physical activity, fluid consumption/access, nutritional status, rest, humidity and acclimatisation must be included in the assessment, together with other safety risks.

The division's doctor has overall medical responsibility and must be included in any such assessment. The OCE is responsible for follow-up and inspection of the team and for ensuring that necessary measures have been implemented to prevent injuries from occurring.

5.10.2 Special conditions in high temperatures

5.10.2.1 In order to prevent heat exhaustion and heatstroke, attention must be paid to the temperature in respect of the amount of clothing being worn, as well as the type of physical activity undertaken. When the daytime temperature is expected to exceed 25 degrees, vigorous physical activity must be adapted to the temperature. Such physical activity should be restricted to the time of day when the temperature is at its lowest (e.g. before 10.00 or after 16.00). Personnel must have access to sufficient quantities of electrolyte drinks. It is noted that, historically, sudden heat waves during intake and selection is a risk factor, and when this occurs a responsible doctor and OCE must exercise heightened caution.

Special consideration must be given in respect of deployment to international operations or training/exercises in different climatic zones. In order to reduce the health hazard, physical activity must be restricted in the period immediately following deployment

so that the body may become acclimatised. This must take place in consultation with a responsible doctor. Prior to deployment, a briefing must also be given on heat and cold injuries.

Restrictions to physical activities such as exercises and competitive events are described in point 5.11.6.

5.10.3 Special conditions in low temperatures

Figure: 5.11

Using Telemark technique in steep terrain

5.10.3.1 The officer must ensure that the team is adequately dressed for the conditions. At temperatures below minus 10 degrees Celsius, where there is low temperature combined with wind (the wind chill factor is minus 10 or colder) and/or when there is low temperature combined with high ambient humidity, buddy checks must be carried out. This involves personnel being divided into pairs who systematically check each other for frostbite injuries, such as white spots on the face. Checking procedures are followed up by an experienced officer.

Particular attention should be paid to the prevention of injuries to the extremities. If staying more than one day in a cold and damp environment, daily foot inspections must be carried out to check for signs of trench foot.

In case of frostbite, the measures described in the “Winter service manual – Cold weather injuries” must be taken.

This contains an outline of frostbite symptoms and the immediate measures to taken in order to treat such symptoms.

Competitive events in cold weather are described in point 5.11.6.

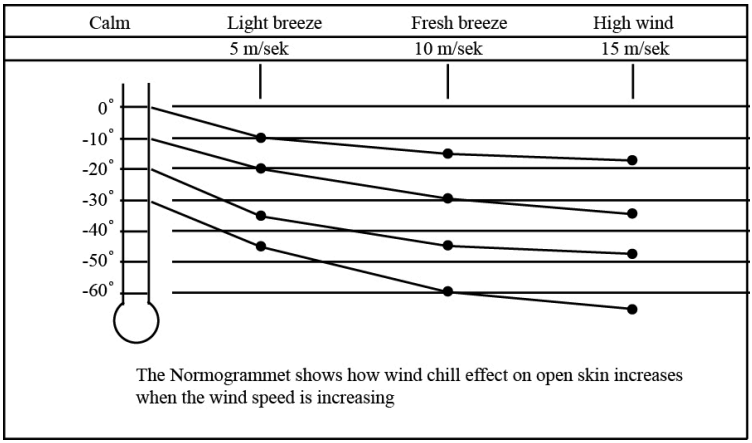


Figure: 5.12
Wind chill factor table

5.10.4 Special conditions in UV radiation (sunlight)

5.10.4.1 Exposure to sunlight results in a risk of damage to the skin (skin burns/skin cancer) and eyes ('snow-blindness'). Such injuries must be prevented. When a soldier is exposed to strong sunlight, all exposed skin should be protected. This means that the skin should be either covered or a sun cream with a high protection factor must be used (> factor 30). When sunlight, light clouds or mist is present and soldiers are assembled over a long period (more than 1 hour) on reflective surfaces such as snow, sand or water, sunglasses must be worn .

5.11 MILITARY TRAINING FACILITIES (MTF) AND SPORTS EVENTS

5.11.1 Indoor and outdoor military training facilities

5.11.1.1 Content and equipment used in indoor and outdoor military training facilities (MTF) must be submitted for approval to the sports inspector at the relevant branch of the military services. Instructions must be prepared for the use and cleaning of all materiel and equipment. Risk assessment for injuries to personnel must be drawn up for the use of facilities by the responsible owner, along with the following risk-reducing measures. Where there is a high risk of injury, necessary training must be provided in use of the materiel and equipment

5.11.2 Ostacle courses and obstacle runs

Figure: 5.13

Obstacle courses

5.11.2.1 Obstacle courses intended for use in competitions in accordance with applicable regulations for a military pentathlon must be constructed in accordance with the regulations of the International Military Sports Council (CISM) and in accordance with approved designs. Adaptation of such obstacle courses is not permitted. Special course instructions are not required.

Competitive obstacle courses must be approved and registered with the competent authority, Military sport and training in the Norwegian Armed Forces/the Norwegian Defence University College.

5.11.2.2 Permanent obstacle course facilities of a different type that have been made available for education/training and internal competitive events outside of the previously mentioned CISM facility must be submitted for approval to the sports inspector at the relevant branch of the military services. Instructions must be prepared for the use of such courses. Obstacles in other field exercises and competitive events require the approval of the relevant division commander/OCE. General safety regulations for assault courses/ obstacle courses must be complied with.

5.11.2.3 The construction leader (the Norwegian Defence Estates Agency/others) is responsible for ensuring that the course is constructed to a satisfactory standard.

5.11.2.4 *Course instructions* for non-CISM assault courses should contain provisions regarding:

- exposed locations on the obstacle course requiring the implementation of special measures. This may include signs or posters warning of the exposed locations .
- placement of medical personnel and medical materiel and any other personnel and materiel regarded as necessary to ensure that the obstacle course may be used with a reasonable degree of safety.
- instructions for using the course. The course instructions should contain detailed instructions explaining the correct way to cross the relevant obstacles.

5.11.2.5 *The OCE's duties*. The OCE must have previously familiarised him/herself with safety regulations regarding obstacle courses, as well as the relevant course instructions. Before the exercise commences, the OCE must check that all materiel used on the assault course (ropes, trestles, etc.) is in good condition and in accordance with regulations, and that landing pits, etc, have been made ready. The OCE must in particular assess whether any special conditions (icing, slippery woodwork, poor visibility, etc) could make it necessary to omit (cordon off) certain obstacles, as well as the possible postponement of course activity. The OCE must ensure that the necessary medical materiel is in place.

5.11.2.6 The OCE must ensure that all participants have been shown how to cross each individual obstacle and have practised doing so with instruction before being ordered to complete the obstacle course. Moreover, the exercises should follow a natural and suitable progression, in addition to considering physical and mental factors. The competitive element should not be introduced until participants have achieved a satisfactory level of proficiency in crossing individual obstacles.

5.11.2.7 *Special provisions*. When shooting, swimming, wading or other risky exercises are included in the obstacle course, the applicable safety regulations for these disciplines must be observed. In the case of multi-divisional obstacle runs, each registered division is responsible for ensuring that participants have been shown how to cross each individual obstacle, have practised doing so with instruction and have also achieved a satisfactory level of proficiency. However, this only applies to standard type obstacles. The commanding officer is responsible for ensuring that participants are briefed and are provided with the opportunity to familiarise themselves with non-standard obstacles (obstacles not included in obstacle courses in accordance with the designs of the International Military Sports Council). In the case of obstacle courses that are open to the general public, the local coordinating authority must ensure that obstacles do not represent any hazard. In particular, rope ladders should be secured to prevent their use as swings. Defective obstacles that cannot be repaired must be demolished immediately if they represent a hazard.

5.11.3 Crossing waterways

5.11.3.1 *Wading* during sporting competitions may be undertaken in various circumstances. Consequently, only general safety regulations can be provided.

5.11.3.2 The OCE must reconnoitre the crossing point before the exercise commences. The width, depth, current and bottom conditions at the crossing point must be investigated. The bottom must be firm enough to ensure that participants do not sink. The depth of the water should not exceed 1 metre and the current velocity must not be so great as to cause personnel to lose their footing. (This should be tested.) The width must be no greater than is required for rescue personnel to reach participants who are in difficulty.

5.11.3.3 The crossing point should be delimited and clearly marked. A guide rope/rescue rope should be suspended across the crossing point. If there is a current in the water, the rope should be suspended downstream. The rope must be clearly visible and easy to grip. Buoyant nylon rope must be used.

5.11.3.4 Rescue personnel must be assigned (see exceptions in point 5.11.3.5) and must have prepared and be capable of using rescue materiel suited to the specific needs. See point 7.2.1.

5.11.3.5 When wading across streams and smaller waterways with minimal water flow in which there is a negligible risk of accidents occurring, the provisions of point 5.11.3.3 and point 5.11.3.4 may be waived.

5.11.4 Using weapons

5.11.4.1 During any military sports event in which live firing is part of the event, the following provisions must be complied with:

a. *Weapon inspection* should be carried out immediately prior to firing by running through the weapon with a cleaning rod. (This does not apply to .22 calibre weapons which have their own muzzle protectors.)

b. *"Affix magazine – load weapon"* should not be performed until the participant is in position at the stand. It is not permitted for weapons to be loaded (chamber/ magazine/belt) during the run.

c. *"Unload weapons – inspect"* should be performed by the individual before firing positions at stands are vacated.

d. Verification that the weapon is unloaded must be carried out as follows:

- when the competition or event is undertaken as a team or patrol event, the team leader or patrol leader must inspect all weapons that have been fired before firing positions at stands are vacated
- automatic weapons such as machine-guns, pistols and sub-machine guns must always be inspected before firing positions at stands are vacated
- during events in which there are score-counters or checkers for each shooter, weapons must always be inspected before stands are vacated.
- during larger championships and biathlon events where there must be compliance with the regulations of the Norwegian Biathlon Association, these are applicable
- in all other cases, weapons must be inspected directly after passing the finishing line, at the latest

e. *Ammunition* that has not been used must be collected during the inspection

See also chapter 3 point 3.2.1 Handling weapons.

See also the applicable Directive Service regulations for the Norwegian Armed Forces (TfT) Group 43 – Physical development in the Norwegian Armed Forces

Ear protection. See point 5.20. In competitions using .22 calibre weapons, or even weapons that are less loud, ear plugs or ear muffs should be used as a minimum. Conscripts with hearing level 2 are not permitted to participate in sports events involving the use of live ammunition.

5.11.5 Physical activity in hot weather

5.11.5.1 The background literature for safety regulations for physical activity in hot weather is the Norwegian Confederation of Sport's subject booklet no. 5. "Sport in hot climates" by Professor Sigmund B Strømme and the text book on "Human Physiology", chapter 12, on temperature regulation, by Sand, Sjaastad and Haug See also UD 12-7-9 "Technical communication from the medical commander, heat and cold", UD 4-1-5, "Text book on medical services", chapter 22. All OCEs in charge of physical activity, including close and dispersed order and competitive events, must familiarise themselves with the above-mentioned literature. This applies regardless of the prevailing climatic conditions

5.11.5.2 When the temperature (measured in the shade) is 25 degrees Celsius or higher, physical activity should be undertaken before 10.00 or after 16.00. When the temperature in the shade is from 25-27 degrees, lighter clothing, such as shorts and a singlet, should be worn. If it is necessary to undertake special exercises in battledress or fatigue dress, the following points should be observed:

- tunics should be unbuttoned and possibly held together by a waist cord
- trousers should be rolled up to knee height
- caps should be removed

5.11.5.3 When the temperature is from 27-28 degrees Celsius in the shade, caution must be exercised in respect of strenuous physical activity. Long distance runs over 1500 m etc. or pack marches/marching competitions of more than 30 minutes' duration must not be organised. Exercises in close and dispersed order must not be of more than 30 minutes' duration Breaks between lessons should be of at least 30 minutes' duration and should offer the possibility for consuming cold drinks and remaining in the shade.

When the temperature is from 28-30 degrees Celsius in the shade or higher, long marching competitions etc, should be avoided. Medical personnel must be present.

When the temperature exceeds 30 degrees Celsius, all physical activity must be suspended. This also applies to close and dispersed order.

5.11.5.4 hen the temperature is 25 degrees Celsius or more, an opportunity must be provided to consume drink before, during and immediately after physical activity. Runs and pack marches of more than 5000 m must be organised to allow for the consumption of fluids every 4-5 km. With closed and dispersed order, it should be possible to consume fluids several times an hour. Fluid consumed should preferably contain between 30 and 70 g

of sugar per litre, 1-2 g of common salt per litre, as well as added flavouring, e.g. orange extract, lemon extract, apple juice, etc. The fluid should be chilled to around 10-15 degrees Celsius. There should also be an opportunity to consume ice-cold drinks.

General recommendations for the consumption of fluids (individuals must ascertain their own needs during training and customise these recommendations according to their own requirements):

- Aim to achieve the correct fluid balance before training
- Train to tolerate frequent consumption of fluids
- Drink at least 5-7 dl per hour during heavy, physical activity
- Drink before you feel thirsty
- Drink frequently (every 10-15 mins) but ideally in small amounts (100-150 ml)
- In activities lasting for more than 1 hour, use sports drinks containing both carbohydrates (4-7%) and salt
- Increase fluid and salt consumption when undertaking strenuous physical activity at more than 1000 metres above sea level
- Increase the water and salt content of the drink

5.11.5.5 When the temperature is 25 degrees Celsius or more, it is incumbent upon the commanding officer to inform other officers and participants about the symptoms of heat exhaustion and heat stroke. (See the Norwegian Confederation of Sport's subject booklet no. 5, pp 40 and 41). Personnel must be informed of the importance of consuming plenty of fluids before, during and after physical activity.*This must also include information about first aid measures.*

5.11.6 Competitive events in cold weather

5.11.6.1 Cold weather restrictions in respect of the organisation of military competitive are in accordance with the regulations of the Norwegian Skiing Association. This means a temperature limit of -15 degrees Celsius for events longer than 15 km and -18 degrees for events of less than 15 km. At temperatures below these limits, the division commander, in consultation with the division's doctor and sports officer, must determine whether a competitive event is to be carried out, and, if so, how.

5.11.6.2 In addition to the temperature and the duration of exposure to cold weather, air humidity and wind speed are vital factors that must be taken into consideration in any assessment of whether the competitive event should be carried out. Thus, there may be situations in which the weather conditions call for a safety assessment before the temperature has reached as low as -15 degrees Celsius.

5.11.6.3 The effective temperature (taking into account the wind chill factor) may be read from table 5.12.

5.12 SAFETY REGULATIONS FOR CARRYING OUT INFUSION, TRANSFUSION, INJECTION AND INTRA-OSSEOUS TRAINING AND APPLICATION IN THE NORWEGIAN ARMED FORCES

Figure: 5.14
Administering an infusion to injured personnel

5.12.1 In general

5.12.1.1 Any service involving contact with blood carries a risk of bacterial/viral transmission (infection). Necessary measures must be taken to restrict direct contact with blood. The purpose is to reduce the risk of infection if such contact should occur, and to clarify any risk of infection if direct contact should have occurred.

5.12.1.2 All personnel participating in the infusion service, including courses, training and practice including injections, have a duty to present themselves to a doctor if they have, or suspect that they may have had needle stick accidents or any other potential exposure to infection.

5.12.2 Precautionary measures

5.12.2.1 Before practical exercises commence, the instructor MUST run through hygienic precautionary measures that apply to exercises in which blood spillage may occur:

- keep blood spillage to a minimum
- all disposable materiel contaminated by blood must be disposed of in dedicated containers and/or bags (the use of approved waste solutions, yellow waste bags and yellow containers for sharp/cutting waste is recommended. Red bags are approved for organic waste and must be treated as infectious waste). Such waste matter must be destroyed at an incineration plant that processes hazardous waste
- Blood-soiled durable materials (equipment and fixtures) that are not destroyed must be decontaminated at the end of the training session.
- In the event of major contamination:

- remove all visible contamination (use cold water and absorbent materials. When using buckets or wash basins (durable materiel), use waste bags to protect the materiel from exposure
- Contaminated cleaning materials must be packaged and treated as hazardous waste, and placed in dedicated waste bags/containers. Durable materials must be decontaminated, disposable materials must be destroyed.
- A suitable decontaminant e.g. CHLORAMINE 5% should be applied to contaminated surfaces/equipment using a cloth or sponge. This will take effect after 60 minutes on soiled surfaces and after 30 minutes on surfaces that have been wiped. After disinfection, infectious material will be rendered harmless and ordinary cleaning may be undertaken. When using some other suitable surface decontaminant, directions for use of the product must be followed.

- Personnel who have wounds/scratches on the hands must cover the skin damage (plaster, etc.) before procedure training begins. Plasters must not be removed until after cleaning/disinfection with CHLORHEXIDINE 0.5mg/ml or 70% alcohol.
- All personnel must use disposable gloves while performing invasive procedures.

5.12.3 Procedure for testing for HIV and hepatitis in case of an infusion course.

5.12.3.1 Procedures for the following up needle stick injuries/blood spillage:

First aid in the event of a needle stick injury:

- Promote bleeding from the wounded area, e.g. by gently pressing the surrounding area, but avoid excessive squeezing or massage
- Wash and rinse the injured area with soap and water
- Disinfect with chlorhexidine 5 mg/ml or 70% alcohol

First aid in case of blood spurts in the mouth:

- Rinse several times with water and hydrogen peroxide 3% for 3-4 mins. (ordinary mouth rinse with hydrogen peroxide)

First aid in case of blood spillage in the eyes:

- Rinse with plenty of physiological saline/water for 3-4 mins.

Additional measures:

The doctor in charge of the course must assess individual incidents and implement measures based on his/her observations. There should be a low threshold for conferring with clinical infection specialists. Ion case of needle stick injuries that could potentially involve infection, the following measures may be appropriate:

- a blood sample is taken on the same day from the person on whom the cannula was used. The blood sample must be tested for HIV antibodies, hepatitis C antibodies, hepatitis B antibodies, (anti-HBc) and hepatitis C antigens (HbsAg) A “0 sample” is taken from the exposed personnel (the person in question who pricked him/herself with the cannula) This person must be tested for HIV

antibodies, hepatitis C antibodies, hepatitis B antibodies, (anti-HBc) and hepatitis C antigens (HbsAg)

- After the needle stick accident, the exposed party should be offered a Hepatitis B vaccine and specific immunoglobulin (HBIG). After 48 hours HBIG is no longer effective and only the vaccine should be administered. The vaccination should be administered as a rapid vaccination, i.e. 1 dose at 0, 1 and 2 months, as well as a booster after one year. The vaccine should be administered before the results of the blood test are available.

  In case of suspected HIV, post-exposure prophylaxis should be implemented within 2 hours in order to achieve the optimal effect. If such a case arises, an infective medicine specialist should be contacted.
- Subsequent follow-up of persons who have been exposed to possible blood infection is dependant upon the results of the serological tests. If the source person proves negative then no other measures are necessary, apart from a check-up test 6 months after the incident. It is up to the individual doctor, in consultation with the patient, to determine whether the vaccination programme should continue. Persons who test positive must be followed up by the division's sick bay/medical office.
- Needle stick injuries must be recorded as occupational injuries (OCE).
- The vaccine and specific immunoglobulin may be ordered from the local ward or casualty clinic, or the nearest hospital. The incident must be registered in HRM-FiF.

5.12.4 Practical exercises

5.12.4.1 A responsible medical doctor must always be assigned to the activities and procedures involving puncture of the skin. The doctor must be contactable during all practical training and exercises. Where instructors are not authorised as healthcare personnel, the doctor is required to delegate and authorise them in writing. All instructors and assistant instructors must have undergone the relevant practice necessary to provide direction and instruction in this type of training.

5.12.4.2 In case of practical exercises, training and instruction involving penetration of the skin, instructors must ensure that the equipment used is sterile, and that aseptic techniques are used. It is also verified that equipment that has been used previously has been cleaned of e.g. bloodstains.

5.12.4.3 The injection and infusion of fluids must be approved by the doctor in charge prior to the activity. Only physiological saline solution (NaCl 0.9%) may be used. Below are the current volume restrictions:

- Subcutaneous injection not exceeding 1ml NaCl, twice per person
- Intramuscular injection not exceeding 5 ml NaCl, three times per person
- Infusion not exceeding 100ml NaCl, three times per person

5.12.4.4 Safety regulations for training in and carrying out blood transfusion in the Norwegian Armed Forces

In the Norwegian Armed Forces, practical exercises are conducted in establishing mobile blood banks and blood transfusion. Practical exercises may involve the use of rapid tests for blood-typing, possibly rapid tests for viruses and drawing a unit of whole blood followed by autologous re-infusion of the drawn unit back to the donor. The following must be complied with in practical training of blood transfusion:

- The person in charge of the exercise and training must be a registered doctor with a basic understanding of blood transfusion, having completed theoretical training. The doctor must be physically present during training and ensure that safety precautions are observed.
- Instructors must be registered healthcare personnel who have completed the Norwegian Armed Forces' instructors' course in whole blood transfusion.
- There must be a minimum of one instructor for every 4 students.
- NSOCM medics may be employed as assistant instructors, though they may not be in charge of the exercise.
- During drawing and autologous re-infusion, the students can be organised into buddy pairs.
- Each pair is allocated a specific zone where drawing and re-infusion of blood is to be performed.
- The drawing of blood must be preceded by a rapid determination of blood type, and intravenous access must be established (preferably on the opposite side to the selected injection site for donation).
- Before the drawing of blood, the donor himself/herself must first mark the bag with name, date of birth, blood type and time/date of drawing.
- When drawing blood, applicable regulations for disinfecting the injection site must be observed.
- Once the blood bag is full, it must not leave the zone.
- Before the donor's blood is re-infused, he/she must state their name, date of birth, blood type and time/date of drawing. The donor must be able to guarantee that the blood to be re-infused belongs to him/her.
- Prior to re-infusion, the bag must be inspected for the presence of clots and it can only be re-infused if the bag contains sufficient volume (450-500 ml), does not contain any clots or displays signs of haemolysis (red-coloured plasma).
- Following drawing and re-infusion, pairs can swap roles and the procedure can be repeated.
- There must be medical resources available in case of unanticipated events. The recommended medicines are adrenalin, atropine, solu-cortef and dexchlorpheniramine.

5.12.4.5 Intraosseous access and infusion

Practical use of an intraosseous cannula in an exercise requires assessment by a responsible doctor of whether it is considered definitely important for this training to be conducted. The level of training for personnel who are to be competent authorities for training in IO is Norwegian registration as a physician. Healthcare personnel who are to provide support in the training must have in-depth expertise in the procedure. Instructors for this training must be registered healthcare personnel with HPR (healthcare personnel registration) numbers. Healthcare personnel for this procedure include ambulance crew, paramedics, doctors and nurses. The procedure must be performed under sterile conditions during training, i.e. no form of field training is carried out in "practical" conditions. The party with practical responsibility and instructors must have the necessary resources for sterile discontinuation. The following must be done prior to carrying out the procedure:

- An application must be sent to the FSAN (the Norwegian Armed Forces' Joint Medical Services) POINT OF CONTACT (PO box)
- The application must include:
  - Who
    - Who is this procedure to be carried out on, and when is it be carried out?
    - Who is in charge of the exercise?
    - Who has practical responsibility for carrying out the procedure (names and HPR numbers of competent authority and instructors)?
    - Have the role-players been informed of the risk involved in carrying out IO training, and also been made aware of the procedure in its entirety and all of the materials?
    - Have the role-players been informed of the activities they may not perform after IO training?
    - Have the role-players given their consent? This is to be documented in writing
  - What
    - What is the purpose and intention of carrying out the procedure?
    - Why is a practical exercise necessary?
  - Where
    - Where is the procedure to be carried out?
  - How
    - How is the procedure to be carried out?
    - What contingency plan has been put in place for sterile discontinuation of IO
  - Completed Bl 1021B Risk assessment

While carrying out the procedure, applicable procedures for IO Pre-hospital procedures in Bliksund must be followed.

On completion of the procedure, the following must be done:

- removal of IO must be witnessed by healthcare personnel in order to document that no there are no foreign bodies remaining in the role-player
- practical training in IO must be documented in SanDok for the role-players
- role-players must be informed of the side effects and complications associated with IO, focusing primarily on infection
- role-players must be informed of activities they may not perform after IO training

5.13 WINTER SERVICE

Figure: 5.15

5.13.1 Preparing and conducting exercises in areas of avalanche-prone terrain

Avalanche-prone terrain is taken to mean initiation areas for avalanches, usually steeper than 30 degrees (zone 1 on the Norwegian Armed Forces' avalanche map), and underlying avalanche run-out areas (zone 2 on the Norwegian Armed Forces' avalanche map).

5.13.1.1 OCE's responsibility

The OCE has responsibility for assessing and ascertaining the avalanche risk, and taking measures to minimise the risk of anyone being caught up in an avalanche. This applies to both the planning and the execution of the activity.

While the activity is being conducted, it is the responsibility of the OCE to keep him/herself informed of the avalanche risk at all times. This is in order to be able to make any required adjustments to the exercise. Technical responsibility for avalanche warning must be assigned to a person or group with approved avalanche warning expertise, see "Instruction in winter service – Snow awareness".

5.13.1.2 Assessing avalanche risk before and during exercises

All units must perform a thorough map study in order to identify avalanche-prone areas.

5.13.1.3 The Norwegian Armed Forces' approved avalanche map must be used. If no avalanche map has been produced, terrain assessment must include through assessment of initiation areas (zone 1) and run-out areas (zone 2).

5.13.1.4 All movement in zone 1 and 2 on the Norwegian Armed Forces' avalanche map must be in accordance with *Supplementary Military Provisions from the Norwegian Armed Forces' avalanche risk scale*. If there is no avalanche warning for the area, zones 1 and 2 must not be used by personnel.

Danger level	Stability of the snow cover	Likelihood of avalanche	Supplementary Military Provisions
5 Very high 	The snowpack is poorly bonded and is extremely unstable.	Numerous very large and often extremely large natural avalanches can be expected, even in moderately steep terrain. Remote triggering highly likely.	Movement in zones 1 and 2 is not permitted. Avalanches may travel further than marked on the avalanche map.
4 High 	The snowpack is poorly bonded on most steep slopes.	Triggering is likely, even from low additional loads, on many steep slopes. In some cases, numerous large and often very large natural avalanches can be expected.	Movement in zones 1 and 2 is not permitted.
3 Considerable 	The snowpack is moderately to poorly bonded on many steep slopes.	Triggering is possible, even from low additional loads, particularly on the indicated steep slopes. In certain situations some large, and in isolated cases very large natural avalanches are possible.	Movement in zone 1 is not permitted. Movement in zone 2 is permitted if it is far out into the zone. Lengthy pauses and bivouacking are not permitted in zone 2.
2 Moderate 	The snowpack is only moderately well bonded on some steep slopes; otherwise well bonded in general.	Triggering is possible, primarily from high additional loads, particularly on the indicated steep slopes. Very large natural avalanches are unlikely.	Movement in zone 1 is not permitted. Movement in zone 2 is permitted, but lengthy pauses or bivouacking should be done further than half-way out in zone 2.
1 Low 	The snowpack is well bonded and stable in general.	Triggering is generally possible only from high additional loads in isolated areas of very steep, extreme terrain. Only small and medium natural avalanches are possible	There should be no movement in zone 1. Zone 2 is expected to be safe.

Figure: 5.16

The Norwegian Armed Forces' avalanche danger scale

5.13.1.5 When conducting field exercises, an avalanche danger warning must be issued before the start of the exercise. There must be daily and routine checks of the snowpack to assess the development of stability in the snow. An avalanche warning must be issued at least once a day.

5.13.1.6 Avalanche team

A dedicated avalanche team must be set up during field duty exercises involving units larger than battalion (or equivalent). The size of the avalanche team is based on the area to be covered, though it should comprise a minimum of 2 people with avalanche warning expertise and for whom this is their primary role during the exercise. The leader of the avalanche team must be approved by the commander of the Norwegian School of Winter Warfare. The commander of the avalanche team is answerable to the OCE.

5.13.2 Actions in special circumstances in avalanche-prone terrain

5.13.2.1 Avalanche warning

Personnel working with avalanche warning must have completed a course in avalanche warning at the Norwegian School of Winter Warfare. Personal must generally remain on safe ground. If conditions allow, avalanche warning personnel may traverse snow-covered terrain steeper than 30 degrees when this is necessary in order to make observations of the snowpack in relevant terrain. A risk assessment must be performed in order to minimise the consequences of a potential avalanche. Personnel who have completed avalanche warning courses are not qualified to traverse avalanche-prone terrain and therefore must not lead individuals or groups in avalanche-prone terrain. Exemptions can be made in training situations in avalanche warning.

5.13.2.2 Search and rescue operations

In the case of search and rescue operations in avalanche-prone terrain, the officer in charge at the location must assess the terrain and choose a marching route which, based on his/her knowledge and experience and on the prevailing conditions, represents the lowest possible risk to his/her unit.

5.13.3 Units that have an operational need to move through avalanche-prone terrain

5.13.3.1 Units that are required to move in snow-covered terrain steeper than 30° must have this defined in the unit's operational requirement. Every patrol or similar that is required to move in snow-covered terrain steeper than 30° must be under the command of a person who has completed the *Course in transiting avalanche-prone terrain*.

5.13.4 Use of a completely buried mock victim during avalanche rescue exercises.

5.13.4.1 In general

The OCE is responsible for ensuring that the exercise is undertaken in terrain in which an avalanche risk is not present and that the pit satisfies the specified requirements, see Instruction in winter service – avalanche rescue.

5.13.4.2 The following requirements for pits must be fulfilled:

- The OCE must nominate a supervisor to be in charge of the mock victims. This person must record burial time, position and communications checks.
- The snow above the pit must be firm, hard-packed snow able to bear the weight of a person.
- The mock victim must be a volunteer
- The mock victim must not be buried for longer than 4 hours
- The mock victim must possess an avalanche probe that has been partly assembled and inserted through the roof.
- The mock victim must possess a radio with an extra battery, and a communications check must be performed BEFORE the mock victim is buried. From then on a communications check must be performed every 15 minutes.

- The mock victim must have two sleeping mats, a sleeping bag/protective bag and must wear warm and waterproof clothing for comfort. One of the sleeping mats must be placed on top of the mock victim to protect against avalanche probes.
- The mock victim must have facial protection from search poles, e.g. a spade.
- It must be possible to locate the pit in at least two different ways, e.g. avalanche transceiver, 10-digit map reference from GPS or cross bearings.
- The height of the pit should be sufficient to allow the mock victim to lie freely – minimum 60 cm.

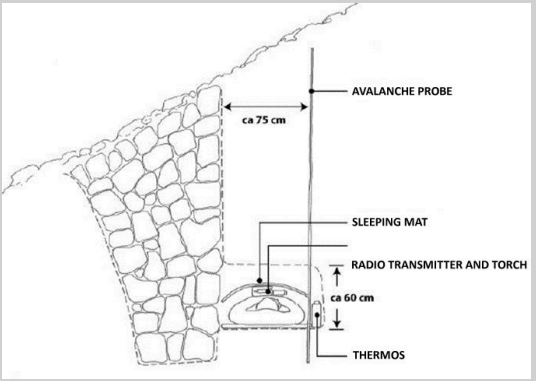


Figure: 5.17

Diagram of a pit from Instruction in winter service – avalanche rescue

5.13.5 Safety regulations for snow bivouacs

5.13.5.1 Definition

A snow bivouac is a bivouac that is fully or partly excavated in snow.

5.13.5.2 Bivouacking on slopes

Bivouacking in snowdrifts and formation steeper than 30 degrees is permitted as long as they are less than 5 metres in height.

5.13.5.3 Design

Roofs in snow caves must be dome-shaped and have a roof thickness of at least 30 cm of firm snow. If the sleeping area is higher than the exit, the bivouac must be ventilated by a hole high up in the space with a minimum diameter of 10 cm. The ventilation hole must be kept open for as long as the bivouac is in use.

For snow bivouacs such as ridge pits, flat pits, snow domes etc. were roofs or walls are thin or constructed from snow blocks, there is no requirement for ventilation. If there is a risk of snow building up and potentially sealing walls and roof, ventilation must be provided as if for 30 cm of firm snow.

A spade must be available inside the snow bivouac.

5.13.5.4 Guard duty

When staying overnight in a snow bivouac, a guard must be assigned in the bivouac to check the following:

- accumulation of snow
- whether the snow cave's roof is subsiding
- that the air hole is open

If a snow bivouac is to be used for a training situation where there are multiple bivouacs in a small area, the guard duty may be performed by a wondering guard with responsibility for several bivouacs.

5.13.5.5 Marking

In connection with training, the entrance must be clearly marked with an avalanche probe/stick/spade or similar. The marking must also be evident during poor visibility and in darkness (lightstick or similar).

If external marking of the bivouac is not suitable due to camouflage, the unit commander may waive the requirement of marking. The bivouac can then be located by means of an avalanche transceiver, GPS etc.

5.13.5.6 Use of cooking apparatus

If using cooking apparatus, this must be done in an area with good ventilation so that warm air or combustion gasses can not enter spaces where personnel are present.

5.14 PROVISIONS FOR USING FIRES, HEATING IN TENTS, LIGHTING COOKING APPARATUS AND LIGHTING EQUIPMENT

5.14.1 Heating in a tent, general information

5.14.1.1 When using a heat source in a tent (cooking apparatus, wood-burning stove, multifuel M94) or stearine candles as a light source, a fire watch must always be assigned.

5.14.1.2 The intention is that the fire watch should continuously check lighting and heating sources in order to avoid the tent catching fire and carbon monoxide poisoning.

When using heating and cooking apparatus with an open flame, the flame must burn with a clear, blue flame. Combustion will then be at its most effective. The fire watch must pay particular attention when a kettle/frying pan has been placed on the burner. In such cases, the tent must be ventilated.

The fire watch may not be combined with other guard duties outside of the tent.

The fire watch must be wearing footwear and have water available for extinguishing minor fires quickly.

Guard duty must not be conducted in a lying position and the guard must not be occupied with duties that distract him/her from monitoring the heat/light source.

5.14.1.3 In tents where heat sources are used, knives or bayonets must be available and placed to allow personnel to cut their way out through the tent fabric in case of fire.

When changing fire watches, it is the retiring guard’s responsibility to wake the next guard. The departing fire watch must not end his/her shift until the next one is definitely awake, has got out of his/her sleeping bag and is in a sitting position.

5.14.1.4 It is strictly forbidden to use petrol, spirit or other highly combustible fluids in camp stoves intended for wood-burning only. When lighting a cold oven, it is permitted, if extreme caution is exercised, soak wood in paraffin which, under no circumstances, should ever be poured directly from a jerry can/bottle etc. directly into the oven.

5.14.1.5 The multifuel camp stove has been developed for liquid and solid fuels. The most important fuel is F 34 fuel, although the camp stove also works well with paraffin, diesel and wood.

5.14.1.6 Before using the stove, jerry cans should be checked to ensure that they contain F 34 fuel, paraffin or diesel. Jerry cans should not contain petrol and should be placed outside the tent. In order to prevent the fuel hose from melting, breaking or becoming blocked, it is important that it is completely unwound and under no circumstances should it be coiled within the stove's protective cage.

The hose must be placed at a distance from the most trafficked areas of the tent so that it will not become damaged by being stepped on.

Fuel cans and hoses must be placed on the side of the tent that is defined as the “dirty” side.

5.14.2 Using portable cooking devices and heat sources

Portable cooking devices and heat sources can only be used with the fuel types recommended by the manufacturer.

When filling up a preheating bag, use a bottle or similar to prevent spillage.

- Before use, check that the cooking apparatus or heat source is fitted with the correct type of nozzle for the fuel in question
- Before equalising the pressure in the fuel cannister, remember to turn off the burner, disconnect the cannister and keep it away from the burner, other open flames and eyes

5.14.2.1 OPTIMUS 111

The Norwegian Defence Forces' OPTIMUS 111 should be operated using only waxy petroleum products.

- Before preheating, fill the priming cup with priming fuel from a cannister designed to prevent spillage
- The fuel containers must not be pressurised at the start of preheating.

5.14.3 Carbon monoxide poisoning

5.14.3.1 See point 5.19.4

5.14.4 VA-M 15, VA-M 25 and VA-M 40 Air heaters

5.14.4.1 Supplementary provisions are provided in:

TM 11-4520-25/206-12 – Technical manual, VA-M 15, VA-M 25 and VA-M 40 Air heaters

When using a VA-M air heater (all types) as a heat source, it must be checked once every hour to ensure that the heater is working properly.

5.14.5 M/94 camp stove, Liquid fuel (Multifuel)

Supplementary provisions are provided in: TM 10-4520-25/207-12 M94 camp stove, LIQUID FUEL Inspection regulations MBK, M/94 camp stove, Liquid fuel (Multifuel)

5.14.5.1 Camp stoves have been developed for liquid and solid fuels. The most important fuel is F 34 fuel, although the camp stove also works well with paraffin, diesel and wood. Petrol may not be used in the stove.

5.14.5.2 Before use and assembly:

- Before using camp stoves, the unit must check that they are not coated in aluminium paint or similar, and that the necessary maintenance has been performed.
- Before using the stove, the jerry can must be checked to ensure that it contains F 34 fuel, paraffin or diesel, and that the jerry can is placed outside the tent
- In order to prevent the fuel hose from melting, breaking or becoming blocked, it is important that it is completely unwound and under no circumstances should it be coiled within or around the stove's protective cage.

- The hose must be placed at a distance from the most trafficked areas of the tent so that it will not become damaged by being stepped on.
- Fuel cans and hoses must be placed on the side of the tent that is defined as the "dirty" side.

5.15 USE OF EARTH-MOVING MACHINERY, CRANES, TRUCKS AND WORK EQUIPMENT

5.15.1 In general

5.15.1.1 General

Operators of earth moving machinery, cranes and trucks must possess the necessary certification for the type of machinery being used. Operators must also have driving licences as in Appendix 25.1.

Operators of earth moving machinery, cranes, trucks and working equipment must have documented equipment-specific training on the materiel.

See the Regulations on work, the use of work equipment and associated technical requirements FOR-2011-12-06-1357. The regulations apply to the use of all types of work equipment. "Work equipment" refers to all technical appliances used in the manufacture of products or the execution of work tasks. "Extreme caution" refers to materiel which, according to a risk assessment, could expose the user to risk.

Personnel not operating earth-moving equipment, cranes, trucks or work equipment must familiarise themselves with the safety distances for equipment.

Personnel assembling by equipment which, as a consequence of drilling or in some other way creates dust/airborne particles, must wear dust masks or similar

Personnel assembling in or by materiel belonging to the Norwegian Armed Forces must use ear protection where it is mandatory to do so. See point 5.20.

5.15.1.2 Safety when establishing positions, slit trenches, trench systems and barriers below ground level

Working below ground level, such as establishing positions, trenches etc. involves a potential risk of backsliding loose material. Such activity is therefore subject to civilian provisions. When military units carry out work below ground level, a person in charge (OCE) must therefore be appointed who is to ensure that the work is carried out with the least possible risk to exposed personnel and equipment. Positions, pits and systems of positions that are not subject to supervision must therefore be filled in or clearly marked. The OCE for the activity has responsibility for familiarising him/herself with the Regulations concerning the performance of work, use of work equipment and related technical requirements (FOR-2011-12-06-1357), and to consult with a competent authority as required.

5.15.1.3 Use of small machines, chain saws, rock drills and earth, ice and frozen soil borers and brush saws

Use of chain saws

- There must be at least two people present when using a chain saw. If several saws are in use at the same time, competent work leadership is required.
- The Sachs Dolmar 115 litre chain saw should not be used for more than 50 minutes a day due to vibration.
- More recent chain saws produce less vibration and can be used according to the vibration count provided in the directions for use.

5.15.1.4 Use of rock drills with equipment

Personnel in the vicinity must use dust masks for as long as there is dust in the air.

Personell som befinner seg i nærheten, skal benytte støvmaske så lenge det er støv i luften.

The Pionjer rick drill must not be used by any one operator for longer than 8 minutes a day due to vibration.

Use of earth, ice and frozen soil borers

Earth, ice and frozen soil borers must not be used by any one operator for longer than 15 minutes a day due to heavy vibration.

Use of brush saws

When using brush saws, the following protective equipment must be used:

- Helmet with visor
- Hearing protection
- Protective footwear
- Do not wear any garments, clothing or equipment that might become caught

There is currently no documented training in the use of brush saws in the Norwegian Armed Forces. Personnel completing or taking courses from civil training providers can use Armed Forces' brush saws. Personnel are obliged to familiarise themselves with the instructions for the relevant brush saw before use.

5.15.1.5 Compressed air plant/compressors

All personnel responsible for the use/supervision of compressors and compressed air plant are obliged to comply with the following provisions:

- lNever play with compressed air. Never point an air hose at anyone. At close range, air pressure can be so powerful that it may result in serious injury.
- Before use, inspect safety valves. A compressed air cylinder has the same blast effect as a bomb.
- Never remove protective caps, screens, etc, and do not adjust the compressor while the motor is running if this has not been specified in the TM.
- Ensure the air supply has been shut down before disconnecting hoses.
- Never tamper with the safety valves' settings or assembly.

- Refuelling must never take place while the motor is running, or close to an open flame. Never use volatile fluids to clean the plant's parts/equipment (petrol/lynol).
- Check that the compressor's control system functions normally following start-up.

The following provisions apply to the use of pneumatically driven work equipment:

- Never point a pneumatically driven percussive tool at anyone. Drills, spades, chisels, etc. may loosen and be hurled out at great force.
- Hoses must be secured prior to purging.

Personnel assembling in or by materiel belonging to the Norwegian Armed Forces must use ear protection where it is mandatory to do so. See point 5.20.

5.15.1.6 Regulations for the use of mechanical equipment on a repair truck

General provisions

The senior workshop commander or repair crew foreman/field mechanic must ensure that machinery and equipment on the repair truck is maintained, inspected and looked after at all times in such a way that personnel operating/using such machinery and equipment are protected from injury.

Fire safety

A fire extinguisher should be placed in an easily accessible location on the vehicle. Maintenance and inspection must be carried out in accordance with applicable regulations, including the Regulations on the Use of Work Equipment of 26 June 1998. The fire extinguisher must be inspected to ensure that it is full at all times.

Use of a generator

The generator must not be operated in an enclosed room without a sealed exhaust line running out into an open area. During operation, the generator must have an adequate earth connection. Ear protection. Ear plugs should be used, as a minimum, see point 5.15.1.1.

Use of a grinding machine

The highest permissible rotational speed for the grinding wheel should be controlled and verified (for spindle velocity) before it is fitted to the machine.

See Regulations on the Use of Work Equipment of 26 June 1998. Ensure that assembly is carried out in accordance with the user guide.

Ear protection. Ear plugs should be used, as a minimum, see point 5.15.1.1.

Gas welding equipment

See the ’Regulations on Welding, Thermal cutting, Thermal spraying, Carbon arc cutting, Soldering and Grinding (hot work)’ of 26th February 1998.

Gas and oxygen cylinders must be securely mounted on the vehicle. The cylinders must not be permitted to strike each other or fall over. During vehicle movement, pressure gauges must be removed and the protective caps screwed on. Cylinders, pressure gauges, hoses and welding handles must be checked for leakage. Gas cylinders must not be exposed to heat. Only personnel who have completed training in welding are permitted

access to the equipment. Protective goggles or a screen should be used during welding operations.

Lathe

See Regulations on the Use of Work Equipment of 26 June 1998. Only competent personnel are permitted to use a lathe The lathe operator must have sufficient space, as well as peace and quiet, so that he/she does not unexpectedly come into contact with moving parts of the machine, or his/her clothes become entangled in such parts.

The lathe operator should wear tight-fitting leather cuffs, etc. on the arms and otherwise not wear loose-fitting garments that could become entangled in the work piece. Long hair should be tied back. The chock key must be removed.

Ear protection. Ear plugs should be used, as a minimum, see point 5.15.1.1.

5.15.1.7 Safety regulations and use of protective equipment during nail gun exercises

a. A nail gun is a firing tool that must be handled with the same care and caution as an ordinary firearm.

b. During storage, nail guns must be kept in a secure box, in which cartridges, bolts and other equipment are placed in separate compartments.

c. Before use, ensure that the gun is functioning properly. During loading, the same safety regulations apply as for small firearms.

d. During use, a helmet, ear protection (combination of ear plugs and ear muffs) and protective goggles must be worn. The appropriate type of splinter protection must be used during use.

e. Prior to use, warning signs (A5 format) with the following text: “Warning. Nail gun in use”, must be put up at appropriate locations close to where the nail gun is being used.

   Be aware of the risk of deflection and through-penetration.

f. Ammunition must not be carried loosely in pockets but stored in rigid containers. These must be marked in such a way that the ammunition is easily identifiable.

g. In the event of a misfire, it will not be possible to open the nail gun until 30 seconds after discharge.

5.15.2 Leguan

5.15.2.1 Mechanical bridge Layer, Leguan

The bridge layer must only be driven and operated by trained personnel. In addition the operator must have a Class C driving licence.

Supplementary regulation for operation of the Leguan can be found in TM 5-5420-25/200-10 part 1 and TM 5-5420-25/200-10 part 2.

5.15.3 Armoured recovery vehicle and armoured bridge layer

5.15.3.1 In general

See point 4.12.

When operating the vehicle and its special equipment must in addition to point 4.12, the vehicle commander and vehicle driver must have attended and passed operator course for the relevant vehicle type.

Supplementary regulations for operating the armoured bridge layer can be found in TM 9-2350-25/228-10.

Additional provisions for operating the armoured recovery vehicle can be found in TM 9-2350-25/227-10.

5.15.4 Semitrailer, Leguan bridge

5.15.4.1 In general

The semitrailer must only be operated by personnel with documented training that has been recorded in the Norwegian Armed Forces' personnel database.

Additional provisions relating to operation of the semitrailer are contained in TM 5-2330-25/219-10.

5.15.4.2 Deploying the bridge pack from or recovering it onto the semitrailer

Deployment or recovery of the bridge pack must only be performed by personnel who have completed the Leguan bridge-laying or NM-190 BroPV course.

The safety distance from the tractor trailer during deployment or recovery of the bridge pack is a minimum of 10 metres.

Personnel must never be present beneath the bridge when the bridge-layer is deploying the bridge pack from the semitrailer or recovering it to the semitrailer.

5.15.4.3 Disassembly or assembly of the bridge pack on the semitrailer

The bridge pack must only be assembled or disassembled by personnel who have completed documented training and in accordance with procedures described in TM 5-2330-25/219-10.

Load-securing must be performed in accordance with procedures in the manual and in LADOK.

5.15.4.4 Towing the Leguan bridge semitrailer with the Norwegian Armed Forces’ towing vehicles, all types

Only personnel with class CE driving licences are qualified to tow Leguan bridge semitrailers with towing vehicles.

Only personnel with type training on the semitrailer can drive towing vehicles with the Leguan bridge semitrailer.

5.16 SAFETY REGULATIONS WHEN ERECTING A FIELD COMMUNICATION LINE

Figure: 5.18
Erecting field communications lines

5.16.1 In general

5.16.1.1 General

When erecting a field communication line, the regulations in 'Field Manual Signals', Part 4, Field communication lines, must be observed. Special attention must be given to the regulations concerning crossing roads, railways and power lines. Climbing power line poles and masts, both low-voltage and high-voltage, is prohibited. When using line sticks, sticks, etc. near power lines, caution must be observed, so that these do not accidentally touch live power lines.

5.16.1.2 Erecting field communication lines along roads

When erecting a field communication line along a road, traffic rules must be observed. Reflective vests must be worn by field line personnel when erecting a line along a road that is carrying traffic, regardless of the light conditions. Similarly, the vehicle must be fitted with and use a rotating yellow warning light.

5.16.1.3 Mounting equipment on field line vehicles

The laying apparatus must be securely mounted on the vehicle, so that it will not be pulled off should the cable get stuck during laying/assembling, i.e. it must be possible for the cable (WD1/1T) to be torn off without the apparatus coming loose. Other equipment

such as cable drums, equipment cases etc. must also be secured so that they cannot move around during driving.

5.16.1.4 Crossing power lines

Power lines must be crossed as described in “Signals Field Manual”. Climbing power line poles and masts, both low-voltage and high-voltage, is prohibited. When using line sticks and field line poles near power lines, caution must be observed to ensure that these do not accidentally touch the live power lines.

5.16.1.5 Pole-climbing

Only qualified and/or certified personnel are able to direct or carry out climbing operations in the Norwegian Armed Forces.

Before climbing commences, it must always be checked whether the poles can withstand the strain.

For safety provisions for military climbing, see point 5.8.

For safety provisions for working at heights, see *“Regulations for working at heights”*.

5.16.1.6 Marking of roadblock guards at military roadblocks. See point 5.22.1.3.

5.17 RADIO/RADIO LINE DUTY

5.17.1 In general

5.17.1.1 *Remaining in vehicles with the engine running and/or a generator set in use.*

See point 4.19.1.1 and following.

5.17.2 Handling accumulators

5.17.2.1 Accumulators must be handled carefully to prevent the electrolyte from leaking. This applies in particular when loading it onto/unloading it from a vehicle and during transport. Special caution must be observed during helicopter transport, etc. The acid is highly corrosive, and may cause great injury to personnel and damage to materiel. Should electrolyte leak out, it has be washed off with water as soon as possible.

Battery covers on vehicles with extra battery sets must be open when stopping or charging a battery, as charging involves the development of flammable gas.

5.17.3 Fastening equipment inside vehicles

5.17.3.1 All K2IS equipment MUST be installed in the vehicle in accordance with approved MTOs. It is not permitted to make any adjustments to the way in which K2IS materiel is installed in the vehicle, as the installation, in accordance with an approved MTO, has been approved in respect of RADHAZ, EMC and TEMPEST.

The vehicle's packing plan must be adhered to.

5.17.4 Earthing of radio/radio line equipment

5.17.4.1 Earthing of K2IS equipment must be carried out in accordance with the descriptions in approved MTOs. This earthing is also essential in order to ensure that radio antennas are capable of achieving the most accurate radiation reading.

Stationary equipment installed in buildings. Should radio/radio line equipment require earthing for reasons of functionality or safety, this equipment must not be installed or used in buildings or parts of buildings (rooms) where the wiring is not earthed, at least not without assessing the danger of contact voltage between the permanent wiring and the radio equipment. If the wiring in the room is firmly installed and in good condition, and there is little danger of simultaneous contact between radio equipment and wiring, the risk is considered to be low.

Radio/radio line equipment of this kind should ideally only be used in buildings or parts of buildings (rooms) where the wiring already is earthed.

Equipment must be earthed by connecting to earth on an electric panel. If the equipment is earthed by use of earth rod, an equalizing bar must still be laid to the earthing system in the building, with connection to the electric panel. Earthing by connecting to water pipes in the building alone is prohibited.

5.17.5 Antennae

5.17.5.1 Antennae must be erected as described in “Field Manual Signals”, parts 2 and 3. Short masts may be fastened in other ways than described (to trees, poles, etc.) if this seems more practical and poses no risk to personnel and/or materiel. For very short masts, the regulations concerning wiring may be deviated from as long as this poses no risk of the antenna mast and/or antenna element being damaged or harming personnel.

5.17.5.2 On radio sets with high maximum output power (100 W and upwards) there will be very voltage levels on the antenna connection. Contact may prove lethal. The radio set must therefore be switched off when connecting and disconnecting the antenna.

5.17.5.3 *Tying down antennae during movement*. During vehicle movement, vehicle-mounted fibreglass antennae must be tied down in such a way that they do not become entangled in power lines, telephone lines and other objects that may result in injury to personnel and/or damage to materiel. It is not necessary for steel whip antennae and other short antennae, such as GPS and UHF antennae, to be tied down. Where power lines cross public roads, the minimum height is 5 metres. On private roads, approach roads and in terrain, the minimum free height of power lines may be reduced to 4 metres. Drivers of radio vehicles must also pay attention to other overhead lines, underpasses, bridges, etc. where the minimum free height may be even less. Vehicle-mounted antennae must never be tied down at an angle of more than 45 degrees. If this is not sufficient, the antenna should be unscrewed from its socket. This may be necessary when driving through low underpasses, driving beneath trees, etc. and particularly when driving into garages or workshops. When reversing with an antenna that has been tied down, the driver must ensure that the antenna does not become entangled in lines, tree branches, etc.

5.17.6 Microwave equipment

5.17.6.1 In general

Strict precautions must be taken when handling the field cables between the base band unit and the control unit, as these may carry a voltage of 148 V.

When using radioline equipment in the Ghz range, no personnel must remain near the reflector when the equipment is operating. Although the power levels are small, these radio beams may cause injury to the eyes of anyone looking directly at the reflector. Safe distance from the antenna is 1 metre.

For more on radiation danger, see point 5.2.5 onwards.

5.17.7 Where to place communications installations, radio/radio lines when close to high-voltage power lines

5.17.7.1 A communications installation, radio/radio line, or a vehicle containing communications equipment must not be placed closer than 20 metres away from a high-voltage power line. This distance also applies to the installation’s additional equipment, such as antennae, stays and generator sets.

5.17.8 Transport and handling of flammable liquids

5.17.8.1 See Appendix 11 A

5.18 SAFETY REGULATIONS FOR TRAINING CONDUCT AFTER CAPTURE (CAC)

Conduct after capture (CAC) training is regulated by the competent authority of the chief of the Air Force and the chief of the Air Operational Inspectorate (LOI). Safety regulations are regulated by the Provisions on conduct after capture, and the Regulation for training in conduct after capture.

Only certified CAC instructors and authorised OCEs of CAC can direct CAC training.

5.19 MEDICAL SERVICE

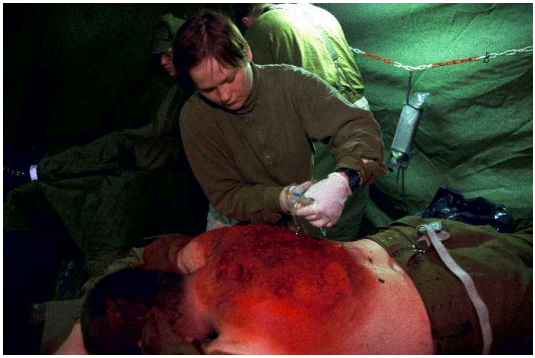


Figure: 5.19
Field hospital

5.19.1 In general

Medical service has top priority. The officer in charge must make provision for ensuring that the medical service is conducted properly and with quality. Sufficient medical equipment of a sufficient quality must be available. Personnel responsible for the unit's sick and wounded must be educated and trained, see guidelines from the competent authority for the medical service.

5.19.2 Qualification requirements

5.19.2.1

- Commissioned and non-commissioned officers, recruits or civilians who direct hazardous operations/exercises/activities must have First responder (FR) medical skills as a minimum. The person in question must also be able to use accident scene management principles before being orderer to direct activities involving a risk of undesired incidents.
- All conscripts must have First Responder (FR) medical skills during basic training.
- All personnel must be able to use issued medical equipment correctly. Medical equipment within the unit must be looked after so as to be operational at all times, particularly with regard to temperature, humidity and shelf life.
- During training, practice or exercises of units of a company size or equivalent, each unit must have personnel with Basic Medic first aid expertise, and at least 1 person with medical service as their primary function.

Medical preparedness during activities, training or exercises is based on residual risk regardless of unit size. The residual risk level is a determining factor when planning the medical service, and it determines the type and scope of medical preparedness required. A distinction is made between "low risk activity", "medium risk activity " and "high risk activity".

During low risk activity

All personnel participating in exercises must be in possession of personal medical equipment (FC 1) cf. in accordance with own level of training.

During medium-risk activity

In addition to individual equipment, a medical equipment team (FC2 or higher) and personnel skilled in using a medical equipment team (FC2) should be available.

During high-risk activity

High risk activity requires the presence of personnel with medical expertise Basic Medic (BM) or higher. The medical personnel must bring with them medical equipment according to their level of expertise. The medical personnel must have as a minimum telephone contact with an appointed responsible doctor. The unit commander assesses the need for the physical presence of a doctor, based on activity and available medical personnel.

5.19.3 First aid, treatment and evacuation plan

5.19.3.1 Prior to activities, training or exercises that involve a risk of incidents, a plan for the medical service must be developed. All personnel must be familiar with the plan.

The medical plan must contain the following points:

- Notifying and reporting procedures
- Medical materiel (unit materiel)
- local accident site management
- Treatment if injured persons
- Light and heat
- Methods of evacuation (Grid for, or pre-defined helicopter landing site)

The plan must contain as a minimum routines for contact using the 110, 112 and 113 emergency numbers. Units serving abroad must have a plan that fulfils the same requirements for treatment and evacuation as in Norway.

5.19.4 Carbon monoxide poisoning

5.19.4.1 Properties:

Carbon monoxide (CO) is a flavourless, odourless and colourless non-irritating gas. It is produced by incomplete combustion (for example from fires, vehicle exhaust, heating apparatus and power supplies). The gas is rapidly absorbed via the lungs, and it can produce internal suffocation even at low concentrations in inhaled air. It bonds very strongly to the haemoglobin in the blood and displaces oxygen (haemoglobin is responsible for the transport of oxygen in the body). Eventually the cells are also directly damaged by CO. This results in oxygen deficiency and a risk of life-threatening injury, in particular to the most oxygen-dependent organs, such as the heart and the brain.

5.19.4.2 Signs of illness/clinical information:

Carbon monoxide poisoning can produce extremely variable and non-specific symptoms. People exposed to carbon monoxide poisoning while sleeping will not be aware of any discomfort. They go from sleeping to unconsciousness.

Mild poisoning: Headache, nausea, vomiting, diarrhoea, dizziness, listlessness/feeling unwell, confusion, irritability.

Moderate poisoning: Reduced consciousness, visual disturbance/photosensitivity, unsteadiness, rapid pulse, breathing difficulty, chest pain.

Severe poisoning: Unconsciousness, focal neurological deficit, seizures, cerebral oedema, respiratory depression, pulmonary oedema, coma, low blood pressure, heart rhythm disorders, myocardial infarction, cardiac arrest and death. With severe CO poisoning, the skin/mucosa may appear pale pink. Pulse oximetry will produce false elevated oxygen measurements. Cognitive late-onset symptoms (memory problems etc.) occur in some severe cases.

Soot around the airways are a potential sign of inhalation injury. Cyanide poisoning may occur at the same time

5.19.5 First aid in case of suspected carbon monoxide (CO) poisoning

5.19.5.1 First aid:

Carbon dioxide is removed almost exclusively by CO being released from the compound with haemoglobin in the lungs – it is exhaled. The haemoglobin molecule can then be used once again to transport oxygen. Detoxification is significantly accelerated by breathing 100% oxygen.

The most important measure in case of carbon monoxide poisoning is to immediately remove the person from the carbon monoxide source and to start giving oxygen via a face mask.

- Ensure the airways are open, and remove any food remains and vomit
- Get the victim out into fresh air
- Find out if any others may have been exposed
- If the patient is not breathing, give artificial respiration using the mouth-to-mouth method
- If the patient is breathing, put them into the recovery position, lying on their side
- Make sure the patient is not cold

Get medical assistance as soon as possible.

Emergency medical treatment (as soon as the equipment is available):

- Give plenty of oxygen (10-15 litres O2/min.) via a mask with a reservoir (equivalent to 100% oxygen) continuously until the person has been assessed by a doctor.

- Anyone who has or has had neurological, cardiac/circulatory or pulmonary symptoms (mild, moderate or severe) should be admitted to a hospital. Hyperbaric treatment or an antidote against cyanide poisoning may be required based on assessment by a doctor.

5.19.6 Use of role-players in the medical service

5.19.6.1 In general

Before starting an exercise using role-players, participating personnel must be informed of the general conditions for conducting the exercise. The aim is to regulate exercises by using live role-players in such a way that their decency, bodies and intimate zones are protected from undesired or unacceptable behaviour. Responsibility rests with the unit commander, the OCE or the chief instructor for the activity.

5.19.6.2 Prohibition in case of medical procedures

No training my be provided in medical procedures in the role-player’s intimate zones, these being within the outside edge of underwear/bra.

5.19.6.3 Requirements of underwear

Role-players must wear sports underwear, or some other covering underwear on their lower bodies. Women must wear sports bras or similar covering their upper bodies. If the role-player's underwear is not in accordance with these requirements, that person may only be used to simulate injuries to extremities.

5.19.6.4 Use of casualty make-up or injury mock-ups

Neither casualty make-up nor injury mock-ups may be placed within the edge of the role-player's underpants or in the front of the role-player's bra.

5.19.6.5 Cutting clothing

Examination of role-players may involve cutting their clothing. It is not permitted to cut the role-player’s underwear (underpants and bra) during examination drill.

5.19.6.6 Covering up role-players

Exercising personnel must ensure that any accidentally exposed role-players are covered up. Personnel must therefore have access to resources allowing rapid covering up.

5.19.6.7 Reporting in case of undesired incidents

In case of violation of the above, the role-player, or others who have observed the violation, must immediately report to the OCE or their immediate superior officer. The immediate superior officer assesses the severity of the case and takes the necessary measures. The provisions of the Working Environment Act on whistleblowing are in any case applicable where the reporting conditions are met. Undesired events must be reported electronically via the Norwegian Armed Forces' whistleblowing channel (FIF HMS).

5.19.7 Use of wet make-up in the medical service

5.19.7.1 General information about wet make-up and use of wet make-up

Wet make-up is used as an injury simulant and is applied to the role-player's skin in the course of medical instruction, training and exercises. Use of wet make-up represents a real risk of cooling down for the role-player.

Wet make-up contains various chemical compounds that are used to indicate injury or symptoms. Some casualty make-up uses solutions that contain latex (natural rubber). Use of wet make-up involves a risk of hypersensitivity reaction/allergy for the role-player and the person applying the make-up. This is particularly the case for personnel with known allergies, e.g. contact eczema or food allergies.

5.19.7.2 Restrictions

Wet make-up must not be used when the outdoor temperature is 15 degrees Celsius or colder. Injury mock-ups or injury illustrations are used for indicating injuries. Cooling is extremely complicated and is dependent on individual factors (UD 2-1 points 5.23.1/ 5.23.1.5). The cooling down of casualty role-players must be prevented by reducing the effect of heat loss: conduction, wind-cooling/convection, evaporation, radiation.

5.19.7.3 Responsibility of the OCE or chief instructor with respect to the use of wet make-up

When conducting medical exercises or instruction, the OCE or chief instructor must assess the risk of role-players cooling down and take preventive measures (UD 2-1 point 1.1.4.1).

5.19.7.4 First aid – action in case of deviation

Treatment of identified/suspected cooling-down is based on cooling stage (Bliksund.no/ Tiltaksbok Advanced First Responder/Basic Medic/ 6 Spesielle tiltak).

5.19.7.5 Reporting in case of undesired incidents/accidents

A doctor must register an incident in SANDOK in accordance with applicable provisions

An OCE must report the incident as an "undesired incident" in FIF, see applicable provisions

5.19.8 Using tourniquets

5.19.8.1 General information about tourniquet use

Tourniquets must be used on life-threatening haemorrhages, and must only be used on arms or legs. Tourniquets must only be used by trained personnel.

Training in the use of tourniquets is an important element of the medical service and Care under Fire (CUF) combat drill.

5.19.8.2 Using tourniquets during training/exercises/teaching

Training in the use of tourniquets must only be given under the supervision of an instructor. During training, tourniquets must be tightened hard on the role-player. Neither the person conducting the exercise nor the role-player may loosen the tourniquet

themselves. This should preferably be done by an instructor after a short while. This is intended to prevent the learning of incorrect patterns of behaviour.

On completion of the subject lesson, the tourniquet is **loosened so that it does not provide compression**, but just sits in place as a marker. On padded extremities where a tourniquet does not compress blood vessels or nerves, the tourniquet can be kept tightened.

5.19.8.3 Chief instructor's/OCE's responsibility prior to training with tourniquet

The chief instructor must ensure that tourniquets that are to be used *are approved for use by the Norwegian Armed Forces*, are intact and without any damage to straps or locking mechanisms.

5.19.8.4 When using tourniquets the chief instructor/OCE must verify that:

- tourniquets on arms and legs are tied tight and loosened as soon as possible. A tourniquet must not be tightened for longer than the maximum one minute
- the need for repeated tightening of a tourniquet at the same place and on the same day is assessed and kept to a minimum
- personnel with tourniquets do not perform hard physical activity when the tourniquet is tightened
- scissors or clothing cutters are physically available for removing tourniquets that cannot be loosened
- tourniquets are left loose in complex exercises and when evacuating role-players

5.19.8.5 Action in case of deviations/undesired incidents

Remove the tourniquet.

Document the sequence of events.

Symptoms may occur acutely or some time after the use of a tourniquet. Most symptoms will abate in the course of a few minutes to hours, and are entirely common when training using tourniquets.

A doctor must be sought if the following symptoms occur:

- persistent discomfort or pain in the arm, foot, fingers or toes after the tourniquet has been loosened
- reduced sensitivity in the arm, foot, fingers or toes.
- prickling or tingling sensation in the arm, foot, fingers or toes
- reduced mobility in the arm or foot.

5.19.8.6 Reporting in case of an incident/accident

A doctor must record the event in SANDOK in accordance with applicable provisions.

The OCE must report the event as an "incident" in FIF (the Armed Forces' jointly integrated management system), see applicable provisions.

5.20 HEARING AND NOISE INJURIES, AND PERSONAL PROTECTIVE EQUIPMENT

5.20.1 Noise injuries

5.20.1.1 All loud noises can potentially damage hearing. Even short-term noise impact can permanently damage hearing, though damage can also be caused by exposure to prolonged lower noise levels.

Hearing damage is dependent on acoustic pressure. Acoustic pressure is measured in decibels (dB is logarithmic, which means that an increase in acoustic pressure of 3 dB, e.g. from 85 dB to 88 dB means that the noise is **twice** as loud.

Noise can permanently damage the hearing cells in the ears if they are exposed to a mean acoustic pressure of 85 dB(A) or more over a period of 8 hours a day (this is even, continuous noise).

However, if the noise is in the form of impulses, i.e. sudden noises such as bangs or shots, there is a potential for damage to hearing if these sudden noises are more than 130 dB(C). If the acoustic pressure is doubled, the permitted length of exposure to noise is halved (in which case e.g. only 4 hours a day).

The first hearing cells to die off are those that perceive consonants. The brain will no longer be able to perceive these letters and, even with a hearing aid, it will result in difficulty communicating with others.

It is therefore important to look after your hearing and protect yourself from noise.

5.20.2 Hearing protection in the Armed Forces

5.20.2.1 **Type of hearing protection**

Earplugs E-A-R™ - earplugs or similar approved plugs

Earplugs made of expanding foam plastic. Must be shaped into a thin cylinder and placed firmly in the auditory canal.

Specially adapted type ER-15 moulded earplugs can also be used.

Ear defenders

Light (Norwegian armed forces standard) or heavy, with or without electronic communication equipment or Active Noise Reduction (ANR).

Ear defenders have to sit around the ears properly in order to dampen noise effectively. The rings around the ear defenders must be replaced if damaged.

5.20.2.2 **Selecting hearing protection**

Approved foam plugs must be used:

- in case of acoustic impulses at levels higher than 85 dB(C)
- in case of continuous noise at levels up to 110 dB(A)
- inside headsets when used
- in the marker’s pit

Approved foam plugs and ear defenders must be used:

- in case of acoustic impulses at levels higher than 130 dB(C)
- in case of continuous noise at levels higher than 110 dB(A)
- in case of all forms of firing using live or blank ammunition

5.20.2.3 Firing and blasting service

Personnel participating in service involving firing or blasting, or present within 100 metres from such noise sources, must be informed of the danger of hearing damage and ordered to wear hearing protection.

Double hearing protection (ear plugs and ear defenders) must be used for all forms of firing:

- Personnel inside buildings or personnel who are adequately shielded from noise may disregard the above rule.
- The rule may also be disregarded in situations where the hearing protection makes it difficult to maintain safety in an adequate manner. An officer/NCO may order or allow changes to this regulation. Should this happen, the personnel involved must be sent for a hearing test as soon as possible after the incident.

The officer/NCO is responsible for ensuring that personnel use correct hearing protection. Documented training must be given in when it is necessary to use hearing protection and how it should be used. Training must be provided before participation, and otherwise as required, e.g. if there is a change in equipment or method.

In the list of noise sources and recommended hearing protection, the minimum time for exposure to sound that will result in hearing injury is shown for some of the sources.

Source of noise	**Sound level, dB(C)**	**Hearing protection**
Weapon (see 5.20.2.2 and 5.20.2.3)		
Kjøretøy		
Tracked vehicle	91	earplugs (if driving for more than 15 min)
AFV Leopard in terrain 40 km/h	108	earplugs
AFV Leopard 2 at a halt	80	earplugs + AFV helmet
AFV Leopard on gravel tracks (dirt roads), 40 km/h	108	earplugs + earmuffs
AFV Leopard 2 on roads, 50 km/ hour	108,5	earplugs + AFV helmet
AFV Leopard on gravel tracks (dirt roads), 66 km/h	115	earplugs + earmuffs

CV9030N/F1 on roads 50 km/h	102	earplugs + AFV helmet/ earmuffs
CV9030N/F1 in terrain 30 km/h	99	earplugs + AFV helmet/ earmuffs
M 109 G	110	earplugs
M 113 A 1 30 km/h	109	earplugs
M 113 A 1 30 km/h Diehl	112	earplugs + earmuffs
M113 on roads 30 km/h	104	earplugs + AFV helmet
M113 in terrain 30 km/h	95	earplugs + AFV helmet
M 548	115	earplugs + earmuffs
UNIMOG 416	90	earplugs + earmuffs (2 hours)
UNIMOG 421	88	earplugs + earmuffs (2 hours)
Aircraft		
Helicopter	106-112	earplugs + earmuffs(1-4 min)
C-130 Taxiing, 20 m distance	105	earplugs (4 min)
C-130 In flight, Cargo compartment	93	earplugs + earmuffs (1 hour)
Engine rooms		
Power plant room	105	earplugs
Compressors	104-109	earplugs
Compressor with pneumatic drill	109	earplugs + earmuffs (2 min)

5.20.2.4 Guidelines in case of suspected noise injury or if remaining in a noisy environment without hearing protection

When personnel who have been exposed to high noise levels without hearing protection display the following symptoms:

- reduced hearing
- ringing in the ears
- buzzing in the ears
- pain in the ears

The person must be sent for medical examination and a hearing test as soon as possible.

5.21 HYPOTHERMIA

5.21.1 In general

The Norwegian Labour Inspection Authority defines hypothermia as a serious injury. Activity that is carried out is covered by the Working Environment Act. Activity involving a risk of hypothermia must therefore be thoroughly assessed by a commanding officer. Hypothermia is extremely complex and is dependent on multiple individual factors. It is experienced as reduced core temperature, and the response in the individual may vary widely and be difficult to detect. This is particularly the case during assault courses, when personnel are exhausted and symptoms of hypothermia are identical to those of exhaustion or sleep deprivation.

Hypothermia increases the risk of other injuries (fall traumas, cuts etc.) because hypothermia reduces motor and cognitive capabilities. For an injured person, hypothermia may represent a greater danger than the injury itself, and in the case of severe trauma, a patient is already considered to be hypothermic at a core temperature of 36 degrees Celsius. This is because a drop in the core temperature of just 1 degree affects a number of the body's important defence functions and therefore the ability to survive an acute injury situation.

5.21.3 Symptoms and treatment

Hypothermia refers to general cooling down of the internal body temperature. Shivering produces heat. When the body is cooled down further, shivering stops and consciousness and respiration is reduced, finally resulting in cardiac arrest. Hypothermia exacerbates other injuries, fractures or bleeds. In case of drowning, on the other hand, hypothermia can improve survival, as the brain and heart survive for longer when cooled down.

The following table shows the various stages of hypothermia.

1. If a patient is conscious and shivering (mild hypothermia, stage 1), remove wet clothing and replace with insulating materials. If this is not possible, create an airtight vapour barrier outside the wet clothing. Apply insulation to the back and a wind barrier. If the patient is shivering (passive heating) their temperature will normalise as long as further cooling is avoided. Apply heat (active heating) if possible. Can be dealt with in the field.
2. If shivering reduces/stops and the patient becomes listless/unconscious, the patient is probably experiencing moderate to deep cooling (stages 2-4). The patient must then be actively heated up in order for the core temperature to increase. Begin active heating-up in the field if possible in order to prevent a further fall in temperature. In case of moderate to deep hypothermia, stages 2-4, handle the patient carefully and preferably in a lying position.
3. With deep hypothermia, stage 4, there is no detectable respiration. Begin CPR. Maintain CPR for a long time, as hypothermic patients are able to survive prolonged cardiac arrest.

5.21.3.1 Hypothermia: stages, symptoms and measures

Level of cooling and measures considered if conscious, shivering and breathing. Temp. is assumed core temperature.

Stage	Consciousness	Shivering	Breathing	Temp.	Measures
1 - Mild	Conscious	Yes	Yes	35-32 °C	Dry, insulate, active heating-up
2 - Moderat	Listless	No	Yes	32-28 °C	Careful handling
3 – Severe	Unconscious	No	Yes	28-24 °C	Recovery position ABC
4 – Deep	Unconscious	No	No	< 24 °C	HLR

For further information, see "Winter service manual – Cold weather injuries"

5.22 ROADBLOCKS – SENTRY DUTY AND MARKINGS

5.22.1 General

5.22.1.1 Roadblocks on public roads must only be set up during exercises in which the area has been requisitioned. The roadblock must be set up as a marked barrier. Concertina wire fences are used for marking (alternatively Spanish riders). It is forbidden to use vehicles, stones, etc., that may result in accidents or damage to materiel. Roadblocks must not be set up in hazardous locations (road bends, hill crests, etc.), which may represent a danger to traffic.

5.22.1.2 The responsible exercise leaders would normally contact the local police or road authority prior to the exercise (for agreement and consultation regarding traffic density, the road’s condition, assistance/loan of materiel, etc.).

5.22.1.3 Roadblocks with sentries and warning signs must be positioned as indicated in fig. 5.19. In addition to sentries and obstacles, a roadblock comprises a roadblock set.

During hours of darkness, the sentry must additionally be equipped with a red flashlight.

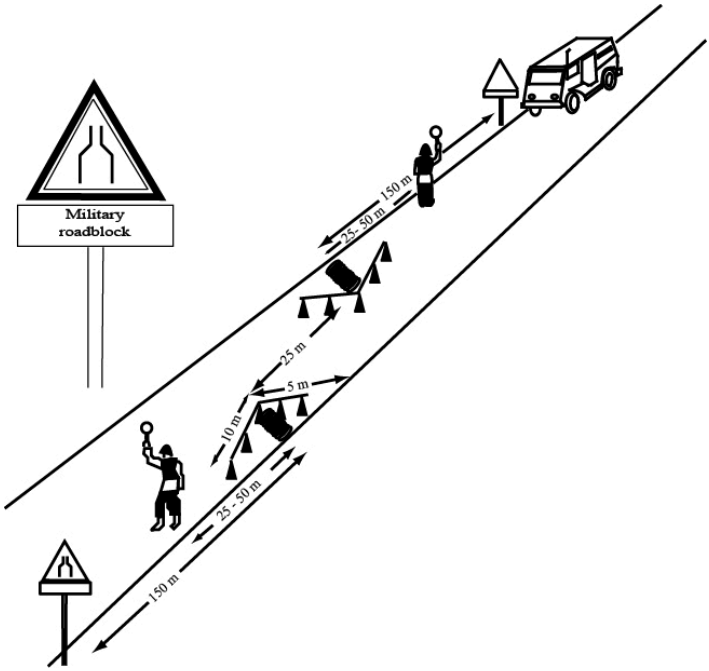


Figure: 5.20
Roadblock

5.22.1.4 The commanding officer of the division that has received an order to carry out a designated roadblock (troops, or similar) is responsible for appointing sentries and ensuring that these sentries have received sufficient instruction to enable them to perform their duties safely and effectively.

There must be an unobstructed line of sight from the warning sign to the roadblock. The traffic cones closest to the edge of the road must be placed 50 cm into the roadway. A concertina wire fence or a Spanish rider should be used as a barrier. No one barrier may cover more than 1/3 of the roadway. The outermost cone at each concertina wire fence should be placed centrally to the obstacle and at least 0.5 metres outside of the obstacle itself, leaving at least half of the roadway on the opposite side clear.

On heavily trafficked roads, sentries must be MP-trained personnel. Sentries must be functionally connected directly to the tactical watch at the location, but must be completely independent of this in terms of traffic safety. Tactical watch and checking of vehicles at the roadblock must take place outside the roadway, where practicable.

5.22.1.5 Civilian traffic must not normally be stopped except when required for reason of traffic safety. Such traffic must be directed and signalled to reduce speed. Civilian vehicles/ road users must not be checked. The sentries must ensure that there is no loitering at or near the roadblock.

5.23 ASSAULT COURSES

Figure: 5.21

5.23.1 In general

Assault courses, including planning and risk management, require the approval of a commanding officer at battalion level or higher.

5.23.1.1 The term "Assault course"

Assault course is a term that describes activities and exercises with the purpose of selecting or training participants to maintain their combat capability and self-efficacy in physically and mentally demanding conditions. A characteristic of assault courses might be that participants are deprived of their basic physiological needs, such as nutrition, rest and restitution, often combined with minimal information, short deadlines and stress. Participating personnel are given little control over which types of stress they are exposed to and are thus dependent on the officer in charge of the exercise to assume responsibility for aspects of safety.

5.23.1.2 Objectives and tools

General objectives and tools for assault courses:

- Reducing cognitive skills in order to identify the need for over-learning and drill.
- Creating challenging physical environments to enforce correct combat technique in order to maintain combat capability.
- Engendering stress through deprivation of information in order to create an arena with a high degree of uncertainty.
- Create challenging situations in order to practice cooperation skills, and also enhance self-efficacy and self-insight.

5.23.1.3 Qualification requirements

Qualification basis for the OCE:

- Must be company commander or have permanent rank code OF2, OR8 or higher.
- The OCE must accompany the entire exercise in the field.

Qualification basis for accompanying officers/instructors:

- Must have completed the same lessons as the participants.
- Must be familiar with the organisation of safety.
- Must have completed equivalent exercises as a participant.
- Must have a minimum of 2 years' service in the Norwegian Armed Forces.

Skills basis for participants:

Prior to commencement of the exercise, the participants must have completed the following:

- Lesson on cold injuries.
- Clothing lesson.
- Review of the body's reactions to the type of stress it will be exposed to.

Instructors giving lessons must have attained platoon leader, platoon sergeant or equivalent with permanent level OF1, OR6 or higher.

Qualification requirements – medical service:

- Medical service level 3 present at all times.
- Heated evacuation vehicle.
- Heated tent.
- Access to doctors (on standby).

A thermometer must be available in order to measure rectal temperature. It should be noted that general thermometers are often unable to measure temperatures under 34 degrees Celsius. Use of skin temperature and measurements taken with an ear thermometer are not validated methods and cannot replace rectal temperature measurement in order to determine a reduced core temperature.

5.23.1.4 Particularly high-risk activities

It is a requirement for the Norwegian Armed Forces to be able to perform exercises that result in personnel being exposed to exhaustion in combination with cold/cold water, including different types of water hazards. A water hazard is defined as a situation in which large parts of the body are immersed in water. The following requirements apply to negotiating water hazards:

- Immersion in a water hazard (above 12 degrees Celsius) must not exceed 15 minutes.
- Immersion in a water hazard (9-12 degrees Celsius) must not exceed 10 minutes.
- Immersion in a cold water hazard (5-8 degrees Celsius) must not exceed 5 minutes.

- Immersion in icy water (0-4 degrees Celsius) is not permitted (does not apply when entering the water through a hole in the ice, when this is undertaken as an individual lesson, with rested personnel).

These times are to be regarded as absolute maximum limits and must not be exceeded. In addition, the OCE will have a significant responsibility for reducing the amount of time involving extreme exposure to cold if climatic conditions, other exercise factors, or the health situation of the individual suggest a shorter exposure time.

During both planning and implementation, the OCE must evaluate the time spent in the water hazard in light of activities associated with this, as well as activities both before and after. The OCE must ensure that combat capability is maintained and that personnel are not exposed to hypothermia.

5.23.1.5 Hypothermia

See point 5.21 Hypothermia.

5.23.1.6 Inspection and follow-up

Particular attention must be paid to the prevention of injuries to the extremities. Inspections of the extremities, such as the feet, hands and exposed skin (Siberia) must be performed twice a day.

5.23.1.7 Risk management

Risk assessments and management carried out in connection with assault courses must include the increased risk of sequential injuries being sustained by personnel suffering from hypothermia, exhaustion and lack of sleep.

5.24 PERSONNEL WALKING ON ROADS

When moving along trafficked roads without a footpath or cycle lane, all personnel must walk on the left shoulder of the road and in the direction facing oncoming traffic. If there is a footpath or cycle lane, it must be used.

When marching along trafficked roads at dusk, during darkness or in dawn light, personnel in groups of a minimum size of a squad must ensure that the following minimum measures are implemented:

- All personnel must have reflective tape attached to their right ankles.
- During administrative movements, the persons at the front and rear must also wear reflective vests and carry light-sticks

Individual personnel in the same circumstances must carry reflectors. Personnel associated with vehicles in the same circumstances must also wear reflective vests when on or by the road.

5.25 MUAS/NUAS

5.25.1 General

Supplementary provisions are provided in: BML, 140-10 and 140-20

6 MILITARY WORKING DOGS

6.1 USE OF MILITARY WORKING DOGS

Figure: 6.1
Canine on duty

6.1.1 General

6.1.1.1 The safety regulation apply to all use of military working dogs and regulate all training and use of military working dogs in the Norwegian Armed Forces. The competent authority for all use of military working dogs is delegated to the the Commander of the Norwegian Armed Forces' military working dog school (FHSK), who exercises competent authority on behalf of the Commander of the Norwegian Army Land Warfare Centre (LWC), who has delegated competent authority for dog service in the Norwegian Armed Forces.

The competent authority for the dog service in the Norwegian Armed Forces is the chief of the Norwegian Army.

6.1.2 Personnel

6.1.2.1 The recruiting of personnel for canine units is based on voluntary participation.

6.1.2.2 Military and civilian personnel in the Norwegian Armed Forces that are to handle or use military working dogs must have completed training that qualifies them for the category of service dog that person is to operate with or handle as part of the service. Teams that are to conduct operations must be certified and have operational status, see Regulations for the dog service and the framework plan for joint individual training in the dog service.

6.1.2.3 To ensure safe operation of the kennel service in the Norwegian Armed Forces, at least two people must be present in the kennel guard at all times. The kennel guard must be available whenever service dogs are taken out of or returned to a kennel, so they they are able to intervene in case of an incident, without being caught up in other duties that do not entail kennel operation.

6.1.2.4 Personnel who participate in the training of military working dogs are obligated to familiarise themselves with the Safety provisions for the use of military working dogs, as well as the locally prepared instructions that apply to the individual service location. The dog handler must have the necessary expertise confirmed by the competent authority to be able to train, exercise perform duties with a service dog in the category of active patrol dog.

6.1.3 Materiel and equipment

6.1.3.1 All materiel that is defined as safety materiel in the Norwegian Armed Forces' dog service and that is used in operations, in training, during transport and in the kennelling of dogs, must be approved by the competent authority.

6.1.3.2 The materiel must be in such condition as to ensure that it cannot cause injury to personnel or dogs. Safety materiel must be checked before use.

6.1.3.3 Muzzles used during transportation must be perforated and not obstruct normal air flow around the dog's nose.

6.1.3.4 Transportation boxes for dogs must be approved by the veterinary inspector (VETINSP) and must be inspected prior to use. Dog handlers must ensure that the boxes are intact and without cracks, that they have no sharp edges, that the locking mechanism on the doors works and that the box has been assembled correctly.

6.1.4 Protective equipment

6.1.4.1 In situations in which protective equipment such as flak jackets, bullet-proof vests, helmets, hearing protection etc. are used by dog handlers, the dog must also use protective equipment if this is deemed appropriate. Whether or not the dog uses a protective vest must be assessed by the officer responsible for military working dogs at the unit.

6.1.5 Transportation

6.1.5.1 Dogs must be transported in accordance with applicable civil and military regulations in such a way that the dogs are not subject to unnecessary suffering. Military working dogs must be provided with a proper level of supervision and care.

6.1.5.2 When moving around, the dog must, as a rule, be led on a leash. The exception to this rule is when the officer in charge gives the order that the dog is to move around unrestrained, due to reasons of training and/or the nature of the mission.

6.1.5.3 Transportation of dogs shall generally be carried out in vehicles with fixed cages that have been approved by VETINSP. Where cages have not been installed, an approved transportation box or muzzle must be used. When transporting more than two dogs in a vehicle with no fixed cage or transportation box, the dog handlers shall accompany the dogs and keep them separated, and also use muzzles.

All vehicles used for the transportation of dogs should have an air-cooling system and the possibility of providing heating during cold weather.

During operations abroad, efforts must be made to find solutions that are as close to this as possible, depending on which vehicle and vehicle properties are used for transporting dogs.

6.1.5.4 The transportation of dog teams in trucks must be carried out in accordance with point 4.1. Dog handlers must sit with their backs facing each other and holding the dogs between their legs with a tight neck leash. The dogs must be muzzled. The vehicle commander must ensure that personnel being transported and the driver comply with the Safety regulations. If required, communication must be established between the vehicle commander and the dog handlers. In the case of transportation in vehicles in which benches have been installed, resulting in dog handlers sitting facing each other, extra caution must be exercised.

6.1.5.5 If the dogs are transported in trailers, these must be approved in accordance with civilian laws and regulations for the transportation of animals and any provisions issued by VETINSP.

6.1.5.6 When transporting dogs and dog handlers in helicopters, the dogs must be muzzled. Dog handlers must sit next to each other and hold the dogs between their legs, properly holding the collar and muzzle, as well as keeping a tight neck leash. A transport leader not accompanying a dog must monitor the transport. He or she must ensure that the dog handlers do not fall asleep, and also provide assistance where required. There must be a possibility for communication between the transport leader and the helicopter pilot. Since the dogs and dog handlers sit very closely together, extra care must be taken and the handler leash must be threaded through the "cargo loop" on the floor. If there is sufficient space, transportation boxes should be used.

6.1.5.7 During all movement in marine vessels such as rubber dinghies or equivalent, military working dogs shall wear approved life jackets marked "*Forsvaret*" (Norwegian Armed Forces).

6.1.5.8 If Light Terrain Vehicles (LTV) Summer/Winter are used to transport dogs and dog handlers, the dogs must generally be transported in fixed, secured cages. If fixed cages are not used, the dog handler must hold the dog between his/her legs on a tight neck leash. In the event of severe cold, the dog must wear a warm cover.

6.1.5.9 If using a tracked vehicle to transport dogs and dog handlers, dog handlers must hold their dogs between their legs on a tight neck leash. The dogs must be muzzled. If there is sufficient space in the tracked vehicle, dogs should be transported in transportation boxes.

6.1.5.10 In addition, the Norwegian Armed Forces must at all times observe the applicable civilian laws and regulations for transporting dogs in transport boxes and in trailers.

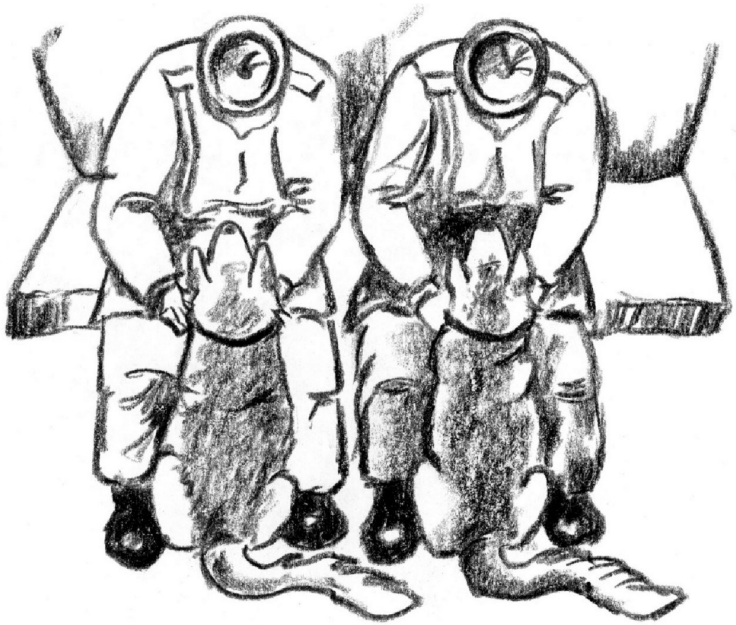


Figure: 6.2
Canine transport, helicopter

6.1.6 Field kennelling

6.1.6.1 During field kennelling, approved safety materiel must always be used.

6.1.6.2 Kennelling must be carried out in such a way as to prevent anyone unexpectedly coming into contact with the dogs. If necessary, a safety sentry/sentries must be deployed. Kennelling must be constructed in such a way that the dogs are no closer than 4 metres to any paths.

6.1.6.3 The kennelling site must be checked with a view to preventing any circumstances that could cause injury to the dogs. Any faults or defects must be repaired before the dogs enter the kennelling site.

6.1.6.4 During field kennelling, the dog must be able to move freely along a length of chain (about 1.5 m). The dog's chain collar must be kept on a tight neck leash.

6.1.6.5 It is the responsibility of the user to ensure that the chosen solution takes into account the animal's welfare.

6.1.7 Exercises

6.1.7.1 When using military working dogs on exercises, personnel who may come into contact with the dog, or be detained by a MWD team, must be familiar with how they must behave towards the dog and in response to the dog handler's commands. Under no circumstances may anyone lunge at a dog, dog handler and/or other personnel

accompanying the team, unless this is a specific exercise or goal of the exercise. If the dog is used in an active attack, the approved protection arm, full suit or muzzle must be used Dog handlers undertake to have control of the dog during the exercise so that it does inflict bite injuries on exercising personnel or others.

In two-sided exercises where the opposite side will not be adequately aware of the dogs' capabilities, dog handlers in the active patrol dog category must ensure that the dogs will not come into close contact with the exercising opposite side in order to avoid bite injuries.

6.1.8 Injuries

6.1.8.1 Injuries to personnel caused by working dogs must, without exception, be reported and the necessary measures initiated to look after the personnel involved.

6.1.8.2 If a working dog becomes ill or is injured, a veterinary surgeon must be contacted and the dog presented for examination and, if necessary, treatment by the veterinary surgeon as soon as possible. In the event of an acute, life-threatening condition, the working dog must be taken to a veterinary surgeon without delay.

6.1.8.3 Injuries to working dogs or dog handlers must be reported in FIF HMS, the Norwegian Armed Forces RAPP or through official channels.

6.1.9 Use of military working dogs as a means of power

6.1.9.1 Military service dog may be used as a means of power (on order), in self-defence or necessity, see Sections 17 and 18 of the penal code, as self protection or in arrest situations. The general rule for soldiers' use of instruments of force is that they must not use more force than is necessary. The degree of force must be assessed based on the injury that will or may be caused. Before a working dog can be used as an instrument of force, less forceful means must have been used without success, unless such means are regarded as obviously inadequate or inappropriate. It must be assessed at all times whether the use of military working dogs as an instrument of force is strictly necessary. When using or threatening to use a military working dog as an instrument of force, the dog handler must, as soon as possible, report to his/her immediate superior, who must then report this to the appropriate party at the service location. In the event of personal injury resulting from a dog bite, see point 6.1.8 and the following.

6.1.10 Military police

6.1.10.1 Military officers/NCOs, military police and military guards may use working dogs trained in live exercises as an instrument of force if this is necessary in the exercise of police authority in accordance with Sections 1 and 3 of the Act on Military Police Authority, see Section 4 of the Police Act.

6.1.11 Allocation of authority when using live dogs

6.1.11.1 If military dog handlers are conducting independent operations and not directly subject to a superior's command, they have sole responsibility for assessing whether the dog may be used as an instrument of force. If he/she is accompanied by or under the command of a superior and/or superior personnel are present, the decision must be made by the superior.

Responsibility for use of the dog rests with the party who has issued the order to use the dog.

6.1.12 Marking of military working dogs during training and exercises

6.1.12.1 Military working dogs

During training in which a dog is running freely outdoors, the dog must always be equipped with an approved marking with the following text: "Forsvaret" (Norwegian Armed Forces). During exercises and live operations, use of the marking must be assessed in each case by the duty officer. Approved markings can be requisitioned from the Norwegian Armed Forces' military working dog school.

6.1.13 Use of sniffer dogs for explosives

6.1.13.1 Use of ammunition and explosives in dog training

Personnel who are required to use ammunition and explosives independently in dog training must have undergone training and received instructions. All use of explosives in dog training must adhere to procedures as determined by the competent authority. Personnel in training may only use explosives and ammunition in dog training under the supervision of qualified personnel and in accordance with established procedures. Only classified explosives acquired from the Norwegian Armed Forces may be used in dog training.

6.1.13.2 Use of sniffer dogs for explosives

Using dogs to search for ammunition, explosives and IEDs must be seen in the context of applicable tactical and technical procedures employed in the Norwegian Armed Forces. In a defensive context, an explosives sniffer dog team (all categories) is used primarily to mitigate EO threat in order to achieve protection for friendly forces and to protect planned activities and critical infrastructure. In an offensive context, an explosives sniffer dog team (all categories) is used primarily to detect the enemy’s resources, identify information about the enemy and the secure legal evidence. The team provides back-up for teams searching for ammunition, explosives and IEDs that would otherwise have been difficult using manual search techniques and search procedures.

6.1.14 Personal protective equipment (PPE)

6.1.14.1 Dog handlers and search personnel taking part in mine detection or searches for ammunition, explosives and IEDs must use appropriate personal protective equipment stipulated by the authorities.

7 ACTIVITIES IN COASTAL ENVIRONMENTS, RIVERS AND LAKES

7.1 IN GENERAL

Figure: 7.1
Ferry 2000 with Leopard 2

7.1.1 Introduction

7.1.1.1 This chapter discusses and presents regulations for all activities in a coastal environment, or on lakes and rivers.

For definitions, see point 0.2 Definitions

7.1.2 Leadership and responsibilities

7.1.2.1 In general

Regulations in chapter 1.1 apply to these types of activities.

7.1.2.2 Special regulations applicable to boats and ferries

In all units where boats or ferries are used, a maritime safety commander (MSC) must be appointed. The maritime safety commander must authorise all boat and/or ferry operations. MSC, requirements/qualifications:

- commissioned or non-commissioned officer with training and experience in the ferrying service
- authorised as a Maritime safety officer – boat operations
- authorised as a Maritime safety officer – ferrying operations

Authorisation is issued following application to the Commander of engineering and CBRN. The Commander of engineering and CBRN issue authorisation based on an assessment of actual competence.

Certification is issued for boat or ferrying operations, or for both. If the unit is conducting both boat and ferrying operations, but does not have any personnel members

who can be certified as MSC for both boat and ferrying operations, two MSCs must be appointed – one for boat operations and one for ferrying operations.

MSC, responsibility/authority:

- authorising boat and/or ferrying operations
- defining how safety is to be ensured for the operation/training
- authorising assistant instructors in connection with courses
- following up and checking that the activity is conducted safely
- The commanding officer can authorise the MSC to deviate from SHOULD requirements in chapter 7 in UD 2-1

If an MSC is not able to be present during the boat and/or ferrying activity, or makes the assessment that it is not necessary to be present, a Maritime Safety Officer (MSO) must be appointed.

MSO, requirements/qualifications:

- Military personnel with at least one year's specialised service
- Must have Boat Course level 3 – Advanced navigation, for boat operations
- Should have Boat Course level 5 – Boat instructor, for boat operations
- Must have at least Ferry Engineer 1 – Construction supervisor/ferry commander course, for ferrying operations
- Additional requirements are issued by the Maritime Safety Commander

MSO, responsibility/authority:

- Following up on safety in accordance with guidance from the MSC
- Checking compliance with applicable safety regulations
- Checking that there is no change in conditions for authorised boat and/or ferrying operations
- Able to halt training/exercising for safety reasons

7.1.3 Duty on and near lakes and rivers

7.1.3.1 In general

All duty that include crossing of, work by and activity at water surfaces.

Required safety equipment:

Approved flotation devices, if:

- personnel near/on water move alone*****
- in boats when advancing
- if the distance to safe ground is over 20 metres
- if personnel near/on water are wearing heavier clothing (combat equipment etc.) and water depths are over one metre.

Alternatively, ropes can be attached to the body in such a way that it will not come loose. Partners at the other end of the ropes must be on safe ground. Units that operate primarily on water, such as boat and ferry units, should have wetsuits/drysuits for their personnel

*****The definition of movement on/near water alone is when the person under movement is neither visible nor within reasonable reach of other personnel.

7.1.4 Climate conditions

7.1.4.1 Water temperature

All water in Norway is by definition cold. In other words, precautions must be taken and adjusted to the water temperature rather than the air temperature, see point 5.10 in UD 2-1.

The following table can be used as a starting point for calculating how long a person can stay in the water at various temperatures. The rule is based on a person in normal physical condition and gives information about the time it takes before a person will be unable to take care of himself/herself. The rule does not take local frost injuries into account.

Regardless of clothing:	Time:
Icy water (0-5 degrees)	5 min.
Cold water (5-10 degrees)	15 min.

Note that the ability to survive in cold water is **highly individual.** *Physical exhaustion decreases the ability to survive. The rule must therefore be used only as a starting point.*

7.1.5 Set-up and equipment

7.1.5.1 Rescue boat:

This should be motor-driven unless the conditions indicate that it will suffice without. If a motorboat is used, the boatman must hold appropriate certification. The boat must have a capacity and stability that makes it suitable for recovering personnel from the water. The vessel must be manned by at least 1 boatman and 1-2 assistants who are good swimmers. The rescue boat must be equipped with:

- heaving line, alternatively a lifebuoy
- searchlight (or strong torch)
- scoop
- 2 paddles, boat without engine: 4 paddles
- boat hook
- rope
- appropriate medical kit for the mission
- communication with the person(s) being recovered and those who are ashore

7.1.5.2 Safety boat

Safety boats must be motor-driven and manned by at least 1 experienced boatman and 1-2 assistants who are good swimmers. Safety boats must have at least the same capabilities as the vessel(s) for which they are intended to provide safety, including speed, seagoing properties and for loads/personnel on board. Safety boats for ferries must have sufficient capacity to recover personnel from water and carry them to land. Safety boats must not be loaded in a way that disrupts their use as safety boats. Boats must have sufficient capacity to recover personnel from the water without this causing a significant risk of capsizing. Safety boats can also function as working boats, as long as this does not disrupt their function as safety boats.

Safety boats must be equipped with:

- heaving line
- search light, can be hand-held
- scoop
- paddles
- boat-hook
- tow rope
- medical equipment
- grapnel/anchor with chain and rope
- during operations on the coast/near large bodies of water there must be a maritime VHF radio (access to channel 16 + work channels)
- fire extinguisher
- 5 emergency flares
- lanterns
- during operations at sea in the dark when visibility is poor, the safety boat should be equipped with radar and a navigation system

7.1.6 Flotation devices/Rescue Equipment

7.1.6.1 In general

Approved floatation devices are required when crossing or conducting work and activities on bodies of water, if circumstances indicate that falling in the water may result in drowning. Flotation devices used on boats or ferries must have automatic activation mechanisms on contact with water.

7.1.6.2 Testing floatation devices/rescue equipment

Everyone with use of such equipment must be familiar with how it works on contact with water.

Implementation:

- pre-defined area
- no possibility for drifting caused by current/wind

- when testing inflatable floatation devices, lines are to be attached to the body in a manner that makes it impossible for them to fall off
- a rescue boat is to be present
- a warm room/heating tent must be available
- medical equipment

7.2 SPECIAL REGULATIONS FOR VARIOUS ACTIVITIES

7.2.1 Wading across rivers

7.2.1.1 Using vehicles in wading operations

Vehicles may only be used in wading operations at established wading sites or sites that have been reconnoitred by engineer divers. If the route and its bottom conditions can be verified by means of wading by foot (see 0.2) by suitable personnel appointed by the commanding officer, it will not be necessary to deploy engineer divers.

Category 2 (see 0.2) floatation devices must be available.

7.2.1.2 Wading personnel

The points below only apply to personnel on foot.

The crossing point must be reconnoitred in order to assess width, depth, variations in water level, current, ground conditions and water temperature.

Reconnoitring must be conducted by the OCE.

The crossing site must be tested by the OCE before wading by the unit commences.

See also point 7.1.3 Duty on and near lakes and rivers.

7.2.1.3 Command and control

The OCE must have control/overview over the crossing site.

The OCE must be able to communicate with the rescue boat.

7.2.1.4 Execution/safety measures

- A rescue boat must be available where necessary and possible.
- The safety rope must be tightened so that it cannot be pulled down into the water when the weight of the people being secured is added. The safety rope is to be tested and checked. The safety rope must be set up downstream and secured by means of floats or piles.
- During crossing, a guide line must be set up as an aid to balance. When required by ground conditions (definition provided), safety personnel without equipment must be established on both sides of the crossing point in order to be able to provide rapid support for any personnel who lose their balance.
- The number of people in the water must not exceed the number that the rescue personnel and boat has the capacity to rescue.
- When wading in darkness and in poor visibility, those who are wading must be marked with a watertight light source and equipped with category 1 floatation devices. The safety rope must be marked with a watertight light source.
- A lightstick is considered to be a watertight light source.
- Protective masks must not be worn during wading.

7.2.2 Swimming across rivers

7.2.2.1 Swimming vehicles

Vehicle swimming may only take place in swimming areas that have been reconnoitred.

A military diver is to be present and ready to provide assistance before, during and after vehicle swimming. A military diver must to be commanded by a military diving commander.

Militær dykker skal dykkeledes av militær dykkeleder.

Category 2 floatation devices must be available.

Special regulations for the individual type of vehicle can be found under the relevant vehicle type in UD 2-1 or in technical manuals.

7.2.2.2 Swimming personnel

Definition

Crossing rivers where the water depth exceeds 1 metre or where personnel do not have adequate foothold and balance.

See 0.2 definitions

7.2.2.3 Preparations for crossing rivers

The crossing point must be reconnoitred in order to assess width, depth, variations in water level, current, ground conditions and water temperature.

- Current increases difficulty in respect of safety operations.
- Currents in excess of 0.5 m/s must be assessed with respect to available crossing resources.

Reconnoitring must be conducted by the OCE.

The crossing site must be tested by the OCE before the exercise involving the unit commences.

7.2.2.4 Command and control

The OCE must have control/overview over the crossing site.

The OCE must be able to communicate with the rescue boat.

7.2.2.5 Execution/safety measures

A rescue boat, see 7.1.5.1, must be present.

Guide lines must not be used as safety ropes.

Category 1 floatation devices must be used.

The number of people in the water must not exceed the number that the OCE can keep control of, or that the rescue personnel/boat has the capacity to rescue.

When swimming in darkness and in poor visibility, the personnel swimming must be marked with a watertight lighting device. A military diver must be present and ready

to assist personnel before, during and after swimming. The safety rope must be marked with a watertight light source.

When swimming, no items or equipment aside from personal floatation devices must be attached to the body.

7.2.3 Swimming

7.2.3.1 General

Swimming/being in water under the command of a military unit must always be under the control of an OCE and comply with the regulations in point 7.1.2. Swimming when not in service is on the personnel's own responsibility.

7.2.3.2 Command and control

Swimming requires the approval of the officer in charge. The OCE must ensure the following prior to swimming:

- Unit swimming is not permitted when the water temperature is less than 15 degrees Celsius.
- Swimming must take place at a safe swimming place with a current of less than 1.5 m/sec and firm bottom conditions.
- Non-swimmers must be guided to a defined area in shallow water and a good swimmer must be set to watch them. An officer/NCO must be present.

Swimming must be done in pairs. Unaccompanied swimming is prohibited.

Two lifeguards must be posted. These lifeguards must have passed life-saving tests.

There must be no more than 40 swimmers per OCE.

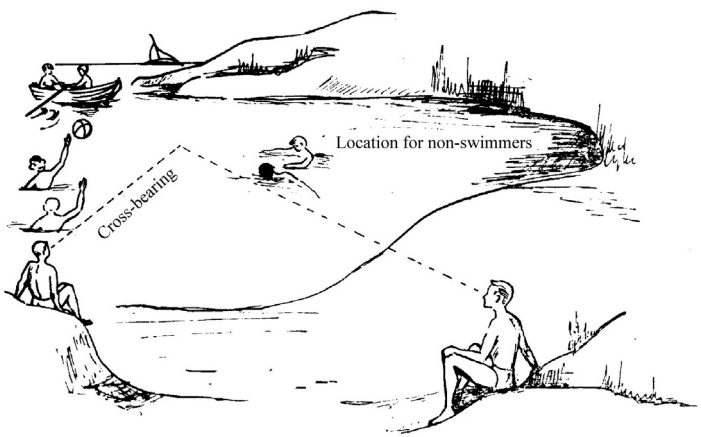


Figure: 7.2
Where to place lifeguards during unit swimming in a lake

7.2.3.3 Cold water acclimation swimming

Units can conduct unit swimming in service for the purpose of acclimating personnel to cold water. The following safety measures are required prior to execution:

- The swimming area must be screened off to prevent the action of current and waves
- The maximum time spent in water must be in accordance with point 7.1.3
- The number of people in the water must not exceed the number that the safety personnel are able to cope with
- Safety personnel with heaving lines must be ready to provide assistance
- Less than 10 metres to safe ground
- Heating tent or similar present
- Medical equipment and an evacuation vehicle present

7.2.3.4 Diving is not permitted unless it has previously been ascertained that the bottom conditions (depth) pose no risk.

- Diving from heights exceeding one - 1- metre is not permitted.
- Dispensation from these regulations can be given when special conditions demand it, for instance when training for competitions, giving instructions, etc.

For diving into swimming pools, see Pool requirements.

7.2.4 Ferry, including possible use of pontoons

7.2.4.1 Definitions

A floating construction that can be used to transport materiel and vehicles across rivers, lakes and sea.

- UNIFLOTE
- Ferry 2000

A tug is defined as a boat as long as it is not attached to the ferry.

7.2.4.2 Command and control

The ferry commander is in charge of the construction and is responsible for safety. The ferry commander is the officer in command on board and is responsible for navigation, manoeuvring and safety.

Before embarking on the ferry, the unit being supported is to be informed about:

- The ferry’s properties.
- Responsibilities and the chain of command on board.
- Safety equipment and how to use it (including flotation devices).
- Placing and conduct.
- Drill in case of a fire or man overboard.

7.2.4.3 Certification and requirements of personnel

The ferry team must have passed *"Army Seamanship Basic Course"*.

The ferry operator/engine man must have passed *"Army Seamanship Basic Course"* and the operator's course for that specific ferry.

The ferry commander must have completed *Ferry engineer 1 – Construction supervisor/ ferry commander*.

7.2.4.4 Execution/safety measures

The following safety material is used in construction of a ferry:

- helmets
- work gloves
- approved flotation devices
- protective footwear

Only vehicle drivers may be on board ferries when driving on or off. Vehicles must be directed by personnel under the command of the ferry commander.

All personnel on board the ferry must use flotation devices. Personnel in vehicles must not use seatbelts, and life jackets must not be worn but easily accessible.

Vehicles' windows and hatches must be open during the ferrying operation.

A safety boat must be present for as long as the ferry is in the water. The safety boat can also function as a working boat, as long as this does not disrupt its function as a safety boat.

The ferry lanterns must be lit in the dark and in poor visibility. The maritime safety commander is regarded as the vessel's commander and can authorise crossing with lanterns off during tactical movement, if:

- the safety boat is lit up and in the immediate proximity
- the safety boat is also equipped with an Automatic Identification System (AIS), radar and maritime VHF radio for reporting other shipping traffic in the area
- a separate risk assessment has been completed for this activity and the principle of vigilance and responsibility has been pointed out to all crew members
- the maritime safety commander is on board and following the exercise on the safety boat
- the ferry has lanterns that can be displayed immediately
- the ferry must always give way to other shipping traffic

The ferry must be equipped with the following safety equipment:

- Heaving line
- Searchlight (can be hand-held)
- Extra rope
- 4 anchors with chains and rope

- Boat hook
- Fire extinguisher
- Appropriate medical kit for the mission
- 5 emergency flares
- During operations on the coast/near large bodies of water there must be a maritime VHF radio with access to channel 16 and work channels
- Lanterns
- Compass
- There should be a sea chart for the area

Crew members must carry the following:

- 2 lightsticks
- 1 whistle
- Approved flotation devices

7.2.4.5 Uniflote pontoons

In general

Only certified personnel may operate a Uniflote.

Additional provisions relating to operation of the Uniflote are contained in UD 9-2-7.

7.2.4.6 Uniflote as a ferry

The ferry's capacity must be assessed based on prevailing conditions, but as a starting point, it should only serve as a ferry in stable and calm weather conditions.

Max. wave height: 1 m

- This must be considered in relation to the ratio of wave height to wave length.
- Be aware of back wash from other vessels.

When using a winch as a form of propulsion, the following safety measures also apply:

- Two safety boats should be used, one on either side of the ferry.
- If the activity is being carried out in an area where there is a presence of civilian leisure boats, the steel cable must be marked when the ferry is not in operation.
- The ferry shall not operate in water flows in rivers above 2 m/s.

7.2.4.7 Uniflote as a floating bridge

A safety boat should be available where necessary and possible.

Safety equipment on a floating bridge:

- heaving line with life buoy
- searchlight (can be hand held)
- extra rope
- Appropriate medical kit for the mission

Ferry personnel must at all times regulate passage over the bridge and continuously check the alignment of the bridge and its moorings.

7.2.4.8 Uniflote as a floating working platform

When the pontoons are used for this purpose, the safety measures listed under "Uniflote as a floating bridge" must be observed.

7.2.4.9 Ferge 2000

The ferry's capacity must be assessed based on prevailing conditions, but as a starting point, it should only serve as a ferry in stable and calm weather conditions.

Max. wave height: 1 m

- This must be considered in relation to the ratio of wave height to wave length.
- Be aware of back wash from other vessels.

Max. current: 2.5 m/s

7.2.4.10 Ferge 2000 as a floating bridge

A floating bridge has max. MLC 30

A safety boat should be available where necessary and possible.

Safety equipment on a floating bridge:

- heaving line with life buoy
- searchlight (can be hand held)
- extra rope
- Appropriate medical kit for the mission

Crew present on the bridge shall be in possession of the following:

- 2 lightsticks
- 1 whistle
- approved flotation devices

Ferry personnel must at all times regulate passage over the bridge and continuously check the alignment of the bridge and its moorings.

7.2.4.11 Drop-off ferry 2000 pontoons with special bridge section

There must be no personnel or materiel in the drop-off zone.

There must be a safety boat with two extra ferry personnel on the water, though they must remain close to shore or upstream from the drop-off zone. Safety distances to the container when it is dropped off are:

- 40 m on both sides of the bridge section above the water
- 200 m behind the bridge section
- 15 m all the way around the vehicle on land.

Only the operator is permitted to move within this safety distances. Release lines must always be used when dropping off pontoons.

7.2.5 The boat

7.2.5.1 Command and control

The helmsman is in command and holds responsibility on board.

Before embarking on the vessel, the personnel being supported must be given a safety briefing, including:

- responsibility and chain of command on board
- the properties of the vessel
- safety equipment and how to use it
- placing of packs and personnel
- conduct on board in the case of:
  - fire
  - man overboard
  - capsizing
  - taking in water
  - engine breakdown

7.2.5.2 Certification and requirements of personnel

All use of boats requires certification, see technical plans

7.2.5.3 Requirements of boats

Boats that are used must be CE approved at a minimum, and suited for their intended use.

7.2.5.4 Execution/safety measures

All personnel on board must wear personal flotation devices when in marching order (see point 7.1.3.1). Personnel on a boat or a ferry should have clothing that will protect them from cooling should an accident occur.

Boat and ferry personnel should wear wetsuits/drysuits. All equipment must be fastened to the boat or to the body, if necessary with floatation devices appropriate to their weight.

A safety boat must always be available. A safety boat can operate independently or be tied up to a jetty if conditions are considered good enough by the maritime safety commander and there is a communication link with safety personnel.

The response time for the safety boat to arrive and be ready to provide assistance must be within 45 minutes, if personnel in the boat are equipped with wetsuits/drysuits. If personnel do not have wetsuits/drysuits, the response boat's response time must be within point 7.1.4 climate conditions.

Boats that are operating jointly and of the same capacity can provide safety support for each other during activity at sea. In such situations, the boats must be equipped and loaded so that they can operate as safety boats.

Lanterns must be lit in the dark and in poor visibility. The maritime safety commander is regarded as the vessel's commander and can authorise crossing with lanterns off during tactical movement, if:

- the safety boat is lit up and in the immediate proximity
- the safety boat is also equipped with an Automatic Identification System (AIS), radar and maritime VHF radio for reporting other shipping traffic in the area
- a separate risk assessment has been completed for this activity and the principle of vigilance and the helmsman's responsibility has been pointed out to all crew members
- the maritime safety commander is on board and following the exercise on the safety boat
- blacked-out boats have lanterns that can be displayed immediately
- blacked-out boats must always give way to other shipping traffic

If several boats operate together, internal communication must be available between them. Boats equipped with rescue floats and AIS-SART are exempted from point 7.2.5.4. A maritime safety commander can approve some operations without safety boats if:

- there has been special assessment of the operation and the maritime safety commander has consulted with the competent authority
- the boat is equipped in accordance with point 7.1.5.2
- there is a watertight-packed mobile phone for issuing notifications

Boats be equipped with the following safety equipment:

- heaving line
- Searchlight (can be hand-held)
- tow rope
- grapnel/anchor with chain and rope
- boat hook
- paddles
- fire extinguisher
- Appropriate medical kit for the mission
- 5 emergency flares
- knife
- communication with a safety boat
- should have a maritime VHF radio
- compass

- should have a sea chart for the area

Helmsmen must carry the following:

- 2 lightsticks, possibly strobe lights
- 1 whistle
- approved flotation devices
- a dead man’s button where available
- should have a wetsuit/drysuit
- should have a knife

7.2.5.5 Use of small boats without motors

Small boats without motors can be used for transportation and/or crossing bodies of water, including rivers and lakes, in calm weather conditions. The current must be less than 0.5 m/s and personnel must have completed training in accordance with relevant technical plans.

Rescue boats must be present.

If several boats are used for transportation or for crossing water, these can act as safety boats for each other if they have capacity and are loaded in such a way as to be able to recover personnel from water. There must be communications between the boats. If crossing stretches of water of less than 30 metres, the safety boat can be replaced by a safety rope that is set up 20 metres downstream.

The safety rope must be marked using lightsticks and it must withstand the number of personnel on board the boat crossing. The crossing point must be in a straight stretch of water, with a good view at least 50 metres downstream.

For crossing stretches of water of less than 15 metres, the safety boat can be replaced by safety personnel with heaving lines securing a point 20 metres downstream from the crossing point. The personnel must have a good field of observation in the direction of the crossing point. The crossing point must be in a straight stretch of water, with a good view at least 50 metres downstream.

7.2.5.6 Dogs (animals) in boats

See point 6.1 USE OF MILITARY WORKING DOGS

7.2.6 Bridge design and bridge-laying

7.2.6.1 In general

A bridge construction designed solely for military use must be guarded by a bridge sentry for the duration of its effective life, or until the bridge has been classified and signposted for general traffic. The bridge sentry must ensure that only military traffic is permitted to use the bridge, as well as being responsible for continuous maintenance and follow-up.

All bridges, including Leguan combat support bridges, which have been established to support general traffic (civilian traffic), must be approved by the Directorate of Public Roads.

Bridge class tables, as specified in UD 9-2-6, are not valid from 01.08.2011.

7.2.6.2 Duties and responsibilities

The specified duties must be fulfilled for each bridge-laying operation, with the exception of combat support bridges, where the bridge construction is to be used as a crossing:

Designer: must be qualified as a Bridge Engineer 1 – Heavy

Construction supervisor: must be qualified as a Bridge Engineer 1 – Light

The designer and the construction supervisor can be the same person, as long as this person meets the requirements for both roles.

Bridges must be designed in accordance with The Manual for Bridge Design in the Norwegian Army.

7.2.6.3 Protective equipment

Personnel connected to the construction site must wear the following safety equipment:

- helmets
- protective footwear (steel-tipped boots with CE marking)
- gloves
- protective goggles when using sledgehammer
- ear protection when using sledgehammer
- anti-falling device when working at heights

7.2.7 Military use of floating ice sheets

7.2.7.1 General

Crossing frozen water is associated with risk, primarily because falling through ice represents hazardous conditions for personnel, and secondarily because it is difficult to predict the bearing capacity of ice.

The Manual for Military ice classification must be followed in the planning, reconnaissance and use of floating ice sheets as load-bearing surfaces for military use.

A unit that is to use floating ice sheets must have access to personnel who have completed *Military Ice Classification Basic Course*. The personnel must be available to the unit making use of floating ice, and they must be physically present if necessary.

Military ice classification applies only to fresh water and not to sea ice or brackish water (mixed fresh/salt water).

The procedures and regulations described in the Manual for military ice classification are applicable to military forces reconnoitring ice and adapting ice sheets for military use. The Norwegian Armed Forces must not plan, reconnoitre or make preparations for

civil use of ice. In certain scenarios it will be necessary to offer support when assistance is requested. It must then be clearly emphasised by active personnel that a likelihood of incorrect classification exists.

7.2.7.2 Transit across frozen water by personnel on foot or in light terrain vehicles with or without sledges

Transit across frozen water by personnel on foot or in light terrain vehicles with or without sledges must be planned, reconnoitred and conducted as described in the Manual for military ice classification.

All personnel in the Norwegian Armed Forces can carry out military ice classification in accordance with chapter 3 of the Manual for military ice classification subject to the following conditions:

- The personnel must have received training from personnel who have completed the *Military Ice Classification Basic Course*.
- There is no or little current in the water
- They must keep to the table under point 7.2.7.6

In case of flowing water and phenomena not mentioned in table 7.2.7.6 personnel must have completed the the *Military Ice Classification Basic Course*.

7.2.7.3 Work sites on ice and vehicle crossing places

Work sites on ice must be planned, reconnoitred and set up in accordance with the Manual for military ice classification.

In order to be able to classify work sites on ice and vehicle crossing places, personnel must have completed the the *Military Ice Classification Basic Course*.

This requirement may be waived for work sites on ice where this is for acclimation exercises in case of going through ice as described in point 7.2.7.4.

7.2.7.4 Acclimation exercise in case of going through ice

In general

An exercise in which the objective is to become familiar with how the body reacts to cold water, as well as the technique of climbing onto safe ice.

The exercise may be conducted with or without equipment. "Equipment" here refer uniform, skis, poles, backpack or combat pack. Basic equipment and weapons should not be used as these will create a strong negative buoyancy. If the exercise is conducted with combat equipment, this must be assessed in light of operational requirements as it creates strong negative buoyancy and will make the exercise complicated. Going through ice with body armour must not take place.

The ambition level for the exercise must be considered in the context of the unit's level of training and the weather conditions.

The exercise must be demonstrated before being carried out.

Personnel tasked with planning and reconnoitring for going through the ice should have completed the *Military Ice Classification Basic Course*. As a minimum, the personnel must have been given training by personnel who have completed the course.

Planning and preparations

The quality of the ice around the hole must satisfy or exceed the requirement for being able to use the ice according to the table in point 7.2.7.6, Acclimation exercise in case of going through ice, with no more than four (4) people on the ice at any time. Note that it is the smallest measured bearing thickness that must satisfy the requirement given in the table.

The quality of the ice out to the hole where the acclimation exercise is to take place must be as good as or better than the requirement in order to be able to use the ice in accordance with the table in point 7.2.7.6, *Acclimation exercise in case of going through ice. In addition, there may be no more than four (4) people on the ice at any time, and foot soldiers on skis/snowshoes must weigh no more than 140kg*

The OCE must continuously assess whether the ice in question should be used for the activity based on which of the listed phenomena are present. If the conditions change in response to a change in temperature or surface water on the ice, it must be verified that the ice is sufficiently thick according to the table.

The thickness and quality of the ice is measured as described for work sites on ice in chapter 4 of the Manual for military ice classification.

The OCE must assess the impact of the weather on going through a hole in the ice and on activities conducted beforehand and afterwards. This is because it is extremely important that personnel are not cold before going through the ice and that subsequent activity ensures good heat generation.

Execution

There must be no more than three people at the hole where the acclimation exercise is taking place. These are personnel who are conducting and ensuring acclimation. All other personnel, materiel, equipment, vehicles and tents must be on land. There must be only one person conducting the acclimation exercise at any one time.

A heated room/tent/vehicle must be available.

A person with at least Basic Medic (BM) must be present.

A stretcher, heat conservation materiel with an active heater, medical equipment equivalent to FC-2 and a medical vehicle must be available.

The person taking part in the exercise must be secured with a rope passing under the arms. The rope must be secured to prevent it falling off. If a bag is used, the rope must be tied in such a way that the bag can be taken off the body without body being unsecured. The safety person must at all times be in a location where he or she can quickly help the person conducting the exercise out of the water.

Clothing must be normal winter clothing. Minimum clothing throughout the exercise is boots, full uniform and gloves/mittens.

7.2.7.5 Reconnoitring, assessing and measuring ice

The procedure and method for reconnoitring, measuring and assessing ice is described in the Manual for military ice classification. When reconnoitring ice, at least two (2) people must work together. Once must remain on land or firm ice and act as a safety watch for the one taking the measurements. The following materiel is an absolute requirement:

- The safety rope must be at least 10 in diameter
- Icepicks, alternatively ski poles

Other materiel for measuring and assessing the ice is described in the Manual for military ice classification.

The rope is firmly secured around the body of the person who is to perform measurement of unmeasured ice. The other end of the rope is secured to the other soldier who stands on land or on firm ice. When measuring ice over flowing water, the rope must be kept taught. The person on unmeasured ice must not carry a pack, equipment, a helmet or a weapon, but only the necessary winter clothing and reconnoitring materiel

7.2.7.6 Classification table

The table is based on the average temperature during the stated period.

Phenomenon	**A**	**B**	**C**		**D**	
	Temperature between -20 and 0 °C over the last 96 hours (4 days)	Colder than -20 °C, warmer than 0 ºC or surface water for longer than 6 hours in the last 24 hours	Colder than -20 °C for longer than 48 hours		Warmer than 0 °C or surface water for longer than 48 hours	
Soldiers on foot, on skis/ snowshoes, max. 140 kg.	8 cm	10 cm	15 cm	Safety must be re-assessed, requires thorough assessment of TERRAIN and ICE.	15 cm	Safety must be re-assessed, requires thorough assessment of TERRAIN and ICE. If the ice feels soft on loading, crossing
Personnel with sledge, max. 240 kg.	10 cm	15 cm	23cm		23cm	
Snow scooter without sled, max. 650 kg	17 cm	20 cm	30 cm		30 cm	
Snow scooter with sled,	22 cm	25 cm	38 cm		38 cm	

max. 1,200 kg						must be stopped.
Acclimation exercise in case of going through ice, max. 4 people on the ice at any time	18 cm	20 cm	30 cm		30 cm	

7.2.8 Crossing marshy terrain in winter with a tracked vehicle

7.2.8.1 When crossing areas of marshy terrain and less evident water in winter with a tracked vehicle, the following preparations are required:

Battle tanks and self-propelled artillery:

- Vehicles must be driven with open hatches. The driver's hatch must be closed, with the driver observing through the periscopes
- The turret must be locked in a position that ensures that the driver can escape immediately through the escape hatch and the commander's hatch. Furthermore the driver's escape hatch must be free of all equipment (loose equipment, section equipment, etc.) to allow the driver to escape easily.
- Tanks, armoured combat vehicles and armoured recovery vehicles must be prepared for wading. (See drill book/technical manual).
- The crew on self-propelled artillery must dismount from the vehicle and cross on foot.

Other armoured vehicles:

- Vehicles must have open hatches when crossing.
- Type M113 vehicles must be prepared for swimming.
- Vehicle evacuation must be practised prior to crossing.
- For details see drill book/technical manual.

Tracked vehicles:

- All floor plugs must be inserted and tightened
- If there are personnel in the rear cabin, the side hatches must be opened and fastened at the top edge.
- The personnel must be drilled in the emergency procedures/drill.
- A roughly 30 m-long rope must be attached to the towing hook. The rope must be arranged in an open coil with a float, empty fuel can or similar attached to the end.
- Loosen seat belts, if used.

8 CLOSE QUARTER COMBAT

8.1 CLOSE COMBAT

8.1.1 General

8.1.1.1 All training, practice, exercises and instruction in military close combat must be conducted in accordance with applicable documentation, including technical plans, lesson instructions, the close combat manual and safety regulations. An instructor's course in close combat completed before 2001 does not provide authorisation to give instruction in military close combat. Instructor approval is gained on courses where the content and requirements have been approved by the competent authority (the Norwegian Army Land Warfare Centre (LWC)).

8.1.1.2 For all close combat training, instructors have a particular responsibility to adapt challenges, intensity and complexity to the soldiers' skills, size, strength and weight. There are no requirements in terms of recertification as an instructor if the instructor course was taken after 2019. Having passed an instructor course, the individual has sole responsibility for quality-assuring that their own expertise in the specialised field is updated at all times, see 1.1.3.2 and 1.1.3.3 in this Directive.

8.1.1.3 In order to provide instruction in two-sided close combat training, an instructor must be assessed as qualified by their immediate superior, and the instructor must be certified as a close combat instructor at level 1 or 2. Two-sided training refers to sparring, close combat courses, hooded detainment scenarios, combat trials against multiple opponents and floor technique sparring. In other words, training with an opponent in movements with kinetic energy and a substantial potential for injury.

8.1.1.4 In order to instruct in one-sided close combat training, an instructor must be assessed to be qualified by their immediate superior, and instruction must be in the context of training led by an approved level 1 close combat instructor, where a level 1 instructor has the opportunity to monitor the quality of the training. Instructors in one-sided close combat training must have completed a close combat user's course as a minimum.

8.1.1.5 One-sided training refers to technique training without an opponent, e.g. training in technique in the air, on a punch-bag or on a close-combat body opponent bag. Technique training against an opponent can be done in order to create awareness of distance and technique, if performed without contact and at a relaxed tempo/intensity. Floor technique training against an opponent can be conducted as two-sided training if performed at a low intensity and focussing on technique.

8.1.1.6 The student-instructor ratio must be in accordance with the type of activity in order to ensure safety. The following are applicable, as a minimum:

- With one-sided training, 1:50 (e.g. technique training in the air, techniques practised on a close-combat body opponent bag/punch-bag)
- With low-intensity, low-complexity two-sided training, 1:24 (12 pairs of partners) (e.g. technique-sparring or gentle sparring)
- With medium/low-intensity and complexity two-sided training, 1:10 (5 pairs of partners) (e.g. fast technique sparring or combat sparring)

- With high-intensity and complexity scenario training 1:1 (e.g. stress/scenario cases or close combat courses)

8.1.1.7 On instructor courses, the ratio must be 1:5 in order to allow for follow-up and evaluation of the individual student, and also to allow the course to be carried out safely and with progression.

8.1.2 Armed combat

8.1.2.1 It is not permitted to train in blocking and striking techniques with weapons, as this may result in injury to personnel or damage to weapons. Dummy weapons must be used when training in blocking and striking techniques with weapons.

8.1.2.2 Real weapons may be used in sparring and combined FIBUA and close combat situations in which the opponent has a striking weapon that does not damage the real weapon or the soldier using it.

8.1.2.3 Safety provisions for FIBUA/Simunition must be seen in the context of the safety provisions for close combat where relevant.

8.1.2.4 In all training with weapons of all kinds, it is a requirement to look at the target area being attacked in order to avoid unnecessary injury in two-sided training, and especially during sparring.

8.1.2.5 Training in techniques targeting the head and neck can be done without protective equipment as long as weapons do not come into contact with the opponent. Techniques may then be practised with full force and speed, though with the distance adjusted in order to avoid contact.

8.1.2.6 Sparring and two-sided technique training using dummy weapons has to be adjusted to skills level and available protective equipment.

8.1.2.7 It is not permitted to use dummy bayonets (bayonets without sheaths) in two-sided close combat training. Dummy bayonets can be used in one-sided close combat training.

8.1.2.8 When training in attack and defence techniques against thrust weapons such as bayonets, knives, sharp objects etc. dummy rubber knives or similar must be used. These must be checked by the instructor to ensure that they cannot penetrate the skin, even if used with force. Protective goggles (combat goggles or similar), collars and mouth guards must be worn.

8.1.2.9 When training in offensive bayonet and knife techniques, the upper body, arms and legs must be used as primary targets. Offensive bayonet/knife techniques must not be used against the head, throat or neck during training. The only exception is if the knife does not come into direct contact with the opponent, as with other weapons.

8.1.2.10 All requirements that apply to training with knives also apply to training with alternative weapons (e.g. sticks, entrenching tools, helmets etc).

8.1.2.11 When training in close combat in the dark, using night vision, the same rules apply as when using weapons regarding all attacks to the head, both with and without weapons. This is in order to avoid damage to materiel.

8.1.3 Unarmed combat

8.1.3.1 Falling, throwing and take-down techniques must be practised without a helmet, with a thorough warm-up, and at an appropriate progression due to the risk of neck injury. Helmets may be used in accordance with the instructor's assessment of the level of proficiency.

In sparring training, protective equipment, intensity and complexity should be adapted to the soldier's level of proficiency. Mouth guards must be used as a minimum. All techniques practised to the head and throat must be controlled. In sparring involving punching and kicking techniques, gum shields must always be used, and boxing gloves and groin guards should also be used. In case of sparring involving only wrestling/floor techniques, mouth guards must be used as a minimum.

8.1.3.2 During the recruitment period, it is permitted to practice two-sided close combat training, including sparring and scenario training. The instructor has a special responsibility to regulate challenges, intensity and complexity in relation to the soldiers' proficient, size, strength and weight.

8.1.3.3 During the division period and for permanent military employees, challenges, intensity and complexity can be increased to keep pace with the soldiers' proficiency and experience in close combat.

8.1.3.4 When using role-players in two-sided training, it must be ensured wherever possible that these have at least the same physical capacity and close combat skills as the exercising forces with a view to reducing the risk of injury.

8.1.4 Duties of the training officer/officer charge of the exercise (instructor)

8.1.4.1 The planning of general instruction, training, exercises and two-sided Close Combat exercises must be directed by an experienced level 1 or 2 close combat instructor.

If this general responsibility is given to a level 1 close combat instructor, his/her plan must be approved by a commanding officer. The training officer/OCE has responsibility for planning, execution, direction and risk assessment of two-sided close combat exercises.

There must be written risk assessment product for all close combat training.

A sufficient area for the number of students is an important factor in two-sided training. There should be a minimum of 9 m2 per pair for training of this kind, depending on the intensity and complexity of the training, and the soldiers' level.

8.1.4.2 The OCE must ensure that all soldiers have received detailed instruction and training in individual techniques before these are performed vigorously and at high pace. This must involve the OCE pointing out what must be done with caution. In exercises requiring interaction with an opponent, similar provisions apply to the opponent's conduct. During such exercises, collaboration must be emphasised. A separate plan for role playing with Risk assessment must be prepared for all two-sided close quarter combat courses.

8.1.4.3 The OCE must select locations for these exercises with a view to achieving good control so that injuries from falling can be avoided. The safety supervisor for the individual

student must be in close proximity without getting in the way of the exercise in order to be able to intervene quickly to prevent hazardous situations. This is usually about 2 steps back.

8.1.4.4 Close combat training must teach the soldier how to control their own aggression in encounters with opponents, including gaining experience in summoning and using aggression as an instrument for their own advantage. Soldiers who are unable to control their aggression must be removed from the exercise and given a break until the instructor considers them to be psychologically suited to resume participation.

8.1.4.5 The OCE must ensure that suitable protective gear is available and in a approved condition before all training and practice commences. Mouth guards must always be used during close combat activity, regardless of the degree of intensity and proficiency level. Suitable protective gear must be used during high-intensity training and practice, and it must be inspected regularly by the safety supervisors during use. In the case of two-sided exercises, role-players must wear full protective gear plus a full helmet with visor at all stations at which weapon/dummy weapon combat is being practised.

All techniques directed at the head/neck/throat must be carried out with controlled force. Boxing helmets must only be used at stations at which controlled sparring is being practised without weapons/dummy weapons.

If there is a need to train in techniques with full force, this must be done against a close-combat body opponent bag, pad, punch-bag or similar.

8.1.4.6 Close quarter combat is permitted during two-sided field duty exercises if this is part of the exercise programme and is directed by a qualified close quarter combat instructor.

In the case of physically demanding positions, the aim must be for role-players to double up and rotate at frequent intervals.

During two-sided close quarter combat training, the soldier considered to be the best combatant must complete the exercise first. This will provide the instructor with a starting point from which to modify technical content, progression and level of intensity.

During two-sided close quarter combat training, hair must either be cut short and follow the shape of the head or made into a crown, or 1 or 2 plaits. Plaited hair must have a maximum length of 30 cm measured from the edge of the collar.

8.1.4.7 Stretchers, heat-conserving materiel, medical equipment FC-2 or equivalent, ice packs and tape, as well as a vehicle for the specific use of the medical service must be present at all times during close quarter combat training.

The instructor must ensure that there is follow-up of sufficient hygienic aspects. As a minimum, this means that those involved in training must have trimmed nails, uniforms and training equipment is cleaned/dried and that open wounds are dressed so as to prevent contagion/disease.

8.2 SAFETY REGULATIONS FOR RIOT CONTROL

8.2.1 General

8.2.1.1 Training. Training and exercises

Instruction, training and exercises in Riot Control must be led by a certified instructor who has completed and passed the Riot Control instructor's course – Level 1, Level 2 or Level 3 – under the direction of a competent authority.

Riot Control Instructor – Level 1 (Instructor):

- The instructor may independently provide instruction, training and exercises within his/her own division.
- Level 1 certification is issued once the Riot control instructor's course – Level 1 – has been completed and passed under the direction of a competent authority.
- The instructor must demonstrate satisfactory knowledge, proficiency and conduct in order to independently provide instruction, training and exercises within his/her own division.

Riot Control Instructor – Level 2 (Senior instructor):

- The instructor may independently provide instruction, training and exercises within his/her own unit, as well as approve new instructors for Level 1 under the direction of a competent authority.
- Level 2 certification is issued after the Riot control instructor's course – Level 1 and Level 2 – has been completed and passed under the direction of a competent authority and after a minimum of two years' experience as a Level 1 instructor within the instructor's own division.
- The instructor must demonstrate satisfactory knowledge, proficiency and conduct in order to independently provide instruction, training and exercises within his/her own unit and to certify new instructors at Level 1.

Riot Control Instructor – Level 3 (Master instructor):

- Level 3 certification is issued after the Riot Control Instructor course – Level 1 and Level 2 – has been completed and passed and after a minimum of 5 years' experience as an instructor at Levels 1 and 2. Level 3 certification is issued by the competent authority upon specific application and according to needs.
- The instructor must demonstrate satisfactory knowledge, proficiency and conduct in order to independently take charge of and provide instruction and to certify new instructors at Levels 1 and 2.

8.2.2 Officer in charge of the exercise and safety supervisors

8.2.2.1 Two-sided exercises

Two-sided exercises in Riot Control can quickly escalate out of control. The OCE must plan the exercise so as to minimise the risk of personnel being injured in the course of the exercise.

There must be three safety supervisors for the foremost platoon (OCE, safety supervisor 1 and 2). All safety supervisors must wear reflective vests and carry whistles. No persons other than the safety supervisors must use whistles. When a safety supervisor blows the whistle, the situation must be frozen immediately.

With smaller exercises, the same person can function both as OCE and safety controller 1.

The OCE must have passed the riot control instructor course, levels 1, 2 or 3, authorised by the professional authority.

The OCE can be the platoon commander during **one-sided** platoon training and must have overall responsibility for implementation of training.

The OCE is responsible for assigning the necessary number of safety supervisors based on the goal of the training exercise being conducted.

- Safety supervisor 1:Supervisor for the unit in training
- Safety supervisor 2: Supervisor for the opposing force
- Safety supervisor 3: Supervisor for the vehicle unit
- Safety supervisor 4: Supervisor for LLWs
- Safety supervisor 5: Supervisor for dogs
- Safety supervisor X: Supervisor for X

The OCE must familiarise him/herself with the provisions for taking charge of activities.

8.2.3 Effectors

8.2.3.1 Markørstyrken

The role-playing force The role-playing force must have an understanding of and insight into the subject, in order to avoid unnecessary injuries, and for the training to proceed and escalate in the intended manner. The role-playing force must have been trained for the mission before the two-sided exercise begins.

The role-playing force must follow the guidelines for role-playing forces. See "Lesehefte Massetjeneste" ver. 1.0 page 42.

8.2.3.2 Exercising troops

During two-sided exercises, the exercising troops must wear suitable personal protective equipment while the exercise is in progress.

8.2.3.3 Vehicle use

All involved parties must be aware of the applicable safety provisions for the relevant vehicle. On vehicles with a vehicle commander, this person is responsible for safety in and around the vehicle. On vehicles without a vehicle commander, the driver must assume this responsibility.

Personnel on the ground may stand close to a vehicle that is stationary, providing that the personnel involved are coordinated.

When moving vehicles, the vehicle commander/driver is responsible for ensuring that personnel keep a distance of at least 2 metres from the vehicle before it is set in motion. The vehicle must signal with its horn before it starts moving as follows: "3 short blasts – forwards, 2 short blasts – backwards" During instruction, training and exercises, the vehicle commander/driver must maintain eye contact and must receive permission from the safety supervisor before the vehicle can be set in motion. The safety supervisor responsible for the vehicle unit must use a radio to communicate with the vehicle commanders.

Large objects must not be thrown at the shield wall while the vehicle and shield wall are in motion. This is to prevent people from falling against and under the vehicle. The vehicle must not be moved if the vehicle commander's/driver's field of vision is restricted.

8.2.3.4 Use of dogs

See point. 6.1.7.1, Use of military working dogs.

All participating personnel must be briefed by the dog handler before an exercise or training begins, so that they all understand how the dog will behave.

Medical personnel must be alerted and be prepared to treat bite injuries, fractures and crush injuries.

Role-players not wearing protective suits when training with dogs without muzzles must be briefed by the dog handler before the exercise begins. These persons must be instructed to remain at least 2 metres in front of the dog at all times.

When the dog is to pass through the shield wall, the gap must be at least 2 metres when personnel are not wearing personal protective equipment, and one metre when they are. When the dog is to pass through the shield wall, the personnel making up the shield wall through which the dog is to pass must take one step back and to the side so that they stand face-to-face, ready to close the gap as soon as the dog has passed through.

The dog handler must keep the dog "AT HEEL" and on a short leash in all situations where friendly forces are closer than 5 metres until the dog and handler have passed through the gap in the shield wall.

If the role-players are permitted to throw objects, the shield wall, the cleaning team and reserves must be familiar with their duty to protect the dog and handler. Do not physically approach the dog except on orders.

Do not strike or kick the dog. Do not throw objects at the dog. Do not get between the dog and the handler or go behind the dog.

8.2.3.5 Use of open flames

The use of fire is permitted during instruction, training and exercises in Riot Control.

Great caution must be exercised when using open flames, e.g. when burning tyres, practising heat tolerance, or using other forms of flammable liquid. At least two persons must each carry one 6 kg fire extinguisher (minimum) ready for use. At least 2 fire extinguishers must be kept as back-up during two-sided exercises.

When using open flame during two-sided exercises, heat tolerance must be conducted for both training and opposing forces before the exercise. During two-sided exercises using open flame, at least two persons must have a minimum of at least one fire extinguisher each that is ready to use. At least 2 fire extinguishers must be kept as back-up during two-sided exercises.

Such personnel must wear flame-retardant clothing.

8.2.3.6 Use of Molotov cocktails

The use of Molotov cocktails is permitted during instruction, training and exercises in Riot Control. Molotov cocktails must not be thrown directly at personnel during bilateral exercises, only against a specially designated target or area free from flammable materials. Molotov cocktails must primarily be used to demonstrate their effect and risks and for training selected fire fighters.

8.2.3.7 Use of thrown objects

The use of thrown objects is permitted during instruction, training and exercises in Riot Control. The thrown objects must be checked by a safety supervisor before being used.

Only objects that are not large, heavy or sharp may be used. Examples of acceptable thrown objects include half-full plastic bottles, blocks of wood, sand and grit, vegetation, food waste, etc.

8.2.3.8 Use of less lethal weapons (LLWs)

The use of LLWs is permitted during instruction, training and exercises in riot control, if forming part of a course or two-sided exercise.

Shotguns and 40 mm grenade launchers

Only LLW ammunition may be used when firing LLW shotguns or 40 mm grenade launchers. Firing directly at personnel is not permitted – only firing into the air or at target discs in designated areas is permitted.

The Simunition conversion kit for shotguns and 40 mm grenade launchers can be used for firing directly at personnel. The provisions for the use of the Simunition training system must be observed.

Use of pepper spray

Pepper spray must not be used in two-sided exercises. There are specific exercise sprays that may be used in two-sided exercises, if the aim is to practise the use of spray. Personnel who could be exposed to pepper spray must wear protective goggles.

Using batons

The use of batons is permitted during instruction, training and exercises in Riot Control.

Only practice batons must be used during two-sided exercises. Batons **must not** be aimed at an individual's head – only at the main muscle groups in the arms and legs.

8.2.3.9 Use of water cannons

The use of water cannons is permitted during instruction, training and exercises in Riot Control. Only personnel with certified training may man water cannons or high-pressure

water hoses during two-sided exercises. If the water cannon is mounted on a vehicle, the water must not be aimed at personnel closer than 50 metres. If the water cannon is aimed towards the ground for the purpose of whipping up stones and dust, any role players must be equipped with full protective clothing and protective goggles. The exercising troops must be familiar with the applicable safety provisions for the vehicle in question.

8.2.3.10 Use of CS gas

The use of CS gas is permitted during instruction, training and exercises in Riot Control. The provisions for the use of CS gas must be observed.

8.2.4 Medical service

When conducting Riot Control training, stretchers, heat-conserving materiel, medical equipment FC-2 or equivalent and a vehicle for the specific use of the medical service must be present. Medical personnel level 3 or higher must be present during two-sided exercises at company level or higher. The medical personnel must be briefed in advance on which injuries are most likely to occur and whether dogs, open flames, vehicles or simulated firing will be used.

8.2.5 Equipment requirements

8.2.5.1 In accordance with the OCE's provisions.

During two-sided exercises, the exercising troops must wear the following minimum protective equipment while the exercise is in progress:

- Helmet
- Eye protection
- Mouth guard
- Basic hearing protection (earplugs may be used if required)
- Vest (PCE combat vest or riot control vest)
- Elbow protectors
- Gloves (PCE gloves or riot control gloves)
- Jockstraps
- Leg protectors
- Gore-Tex uniform, quilted jacket or other uniform items that easily melt or burn must NOT be used in Riot Control

8.3 SAFETY PROVISIONS FOR THE USE AND HANDLING OF LESS LETHAL WEAPONS (LLWS), AMMUNITION AND METHODS

8.3.1 General

8.3.1.1 Technical responsibility

The HTTS, as represented by the Commander for Manoeuvres, has overall responsibility for instruction in and operational use of less lethal weapons (LLWs) in the Norwegian Armed Forces The Norwegian Defence Materiel Agency (NDMA) is the competent authority for the technical administration of weapons, ammunition and materiel supplied as LLW. This responsibility has been delegated to the NDMA Division for Joint Capacities.

8.3.2 Instruction, training and exercises

Instruction, training and exercises in LLWs must be led by a certified instructor who has completed and passed the LLW instructor's course – Level 1, Level 2 or Level 3 – under the direction of a competent authority. Civilian instructors who have completed civilian courses and who possess civilian grades or certifications do not have the authority to provide instruction in military use of LLWs.

8.3.2.1 LLW Instructor – Level 1 (Instructor):

The instructor may independently provide instruction, training and exercises within his/her own division.

Level 1 certification is issued once the LLW instructor course – Level 1 – has been completed and passed under the direction of a competent authority.

The instructor must demonstrate satisfactory knowledge, proficiency and conduct in order to independently provide instruction, training and exercises within his/her own division.

8.3.2.2 LLW Instructor Level 2 – (Senior instructor):

The instructor may independently provide instruction, training and exercises within his/her own unit, as well as approve new instructors for Level 1 under the direction of a competent authority.

Level 2 certification is issued after the LLW instructor's course – Level 1 and Level 2 – has been completed and passed under the direction of a competent authority and after a minimum of two years' experience as a Level 1 instructor within the instructor's own division.

The instructor must demonstrate satisfactory knowledge, proficiency and conduct in order to independently provide instruction, training and exercises within his/her own unit and to certify new instructors at Level 1.

8.3.2.3 LLW Instructor Level 3 – (Master instructor):

Level 3 certification is issued after the LLW Instructor course – Level 1 and Level 2 – has been completed and passed and after a minimum of 5 years' experience as an instructor at Levels 1 and 2.

Level 3 certification is issued by the competent authority upon specific application and according to needs.

The instructor must demonstrate satisfactory knowledge, proficiency and conduct in order to be an adviser for the LWC/Commander for Manoeuvres, and is able to independently undertake training, certification and approval of new instructors to Level 1 and 2.

8.3.3 Separate, partial LLW training

Instructors who have only completed and passed certain subjects of a weapons or combat course certified by a competent authority may provide instruction in the subjects covered by the certification, e.g. shotgun courses under the supervision of a competent authority.

8.3.4 Definitions and areas of application

8.3.4.1 Less lethal weapons (LLWs)

The term LLWs is not restricted to the weapon itself, but also applies to ammunition and methods.

Examples of LLWs include but are not limited to impact weapons, gas weapons, electroshock weapons, water cannons, dazzlers, floodlights, sonic weapons and arresting nets, drones, kinetic and area impact weapons systems.

8.3.4.2 Impact weapons

This refers to short batons (rubber batons), telescopic batons and long batons.

Batons must be aimed at the large muscle groups in the arms, legs and buttocks.

Batons must not be aimed at the head, throat, neck, solar plexus or spine.

During two-sided exercises, approved and full protective gear must be worn.

Conducting a baton approval test

An instructor must evaluate the exercise and a trained role player wearing a suit must be the opponent of the party being tested. A test description can be found in the curricula for LLWs.

Training in the use of baton pads/impact pads for batons

Participants being trained in the use of batons must be given instruction in the use of baton pads, with defined requirements for the target area.

8.3.4.3 Handcuffs

This refers to inter-connected metal links with a locking mechanism, used for controlling or pacifying persons under arrest, usually by locking the hands or feet together. Handcuffs for use in the Norwegian Armed Forces must be of the chained type, self-

locking, made from metal and equipped with a transport lock. It is NOT permitted to use linked type handcuffs in the Norwegian Armed Forces.

8.3.4.4 Gas weapons

This refers to CS gas, pepper spray and similar less lethal gases, including hand-held, weapon-mounted and vehicle-mounted gas weapons. Pepper spray must only be used by personnel who have received approved training under the direction of a competent authority.

NB! Personnel responsible for instructor training must have completed Level 1 contamination to be a certified instructor.

Pepper spray is defined as ammunition and must be stored in a frost-free case. Only approved types of pepper spray that can be requisitioned through the Norwegian Armed Forces supply system may be used. During training, hand-held pepper spray must be used.

Training must be undertaken in accordance with the relevant curriculum and training programme stipulated by the competent authority. Pepper spray training must be completed in conjunction with training in restraint techniques and the use of handcuffs and batons.

Personnel can be exposed to pepper spray in three ways:

- Level 1 contamination – Person directly exposed to live pepper spray. This involves the person having live pepper spray sprayed directly over his/her eyes.
- Level 2 contamination – Person indirectly exposed to live pepper spray. This involves the person having a helmet placed on his/her head, and where the inside of the helmet, immediately before exposure, is sprayed with live pepper spray.
- Level 3 contamination – Person indirectly exposed to live pepper spray. This involves the surroundings in which the person is to be present, immediately before exposure, being sprayed with live pepper spray, and then positioning the person in these surroundings.

Direct exposure to pepper spray (level 1 contamination) can be conducted on conscripts undergoing basic training, if stipulated in a basic training programme/curriculum for the unit in question.

Level 1 contamination can be conducted on a voluntary basis for other categories of personnel.

Level 1 and 2 contamination must only be conducted by level 2 or 3 AT or LLW instructors. Level 3 contamination can be conducted by level 1 AT or LLW instructors.

Cleaning procedures:

The instructor must ensure that the correct cleaning procedure is followed for all types of contamination.

- After completion of the training run for Level 1 and Level 2 contamination, the test candidate must immediately rinse his/her eyes and face with running water. If necessary, the same procedure shall be followed after Level 3 contamination.

- The instructor must advise the test candidate of the importance of not rubbing his/her eyes or scratching irritated skin, but that blinking in rapid succession will reduce the effect of the spray
- The instructor must advise the test candidate of the importance of not swallowing the pepper spray, but that the mouth, throat and nose must be rinsed with water which should then be spat out
- Contact lenses and make-up must be removed before the test is carried out
- The test should be carried out in a secluded area out of sight of unauthorised parties
- Medical personnel qualified to Basic Medic (level 3) or higher must be present. Such personnel must monitor the test candidates for at least 2 hours following completion of the test
- There has to be a strecher, FC-2 equivalent medical equipment and a vehicle solely for the use of the medical service must be present.

8.3.4.5 Electroshock weapons

This refers to weapons systems that administer electricity locally or fire directly impacting ammunition resulting in total or partial muscle contraction to the person exposed to the weapon.

Electroshock weapons are currently only used for testing and trials under the supervision of a competent authority.

Exposure levels

Exposure to electroshock weapons is divided into two categories:

- Level 1 exposure directly affects the central nervous system.
- Level 2 exposure directly inflicts local pain (stun gun effect).

Instruction and operational use

Electroshock weapons must not be used during instruction on personnel with heart conditions or pacemakers. A doctor must be present during instruction in Level 1 exposure.

8.3.4.6 Laser weapons and dazzlers

This refers to weapons systems firing directly impacting and intensely bright laser beams towards personnel or vehicles in order to warn or halt personnel from a distance, or to isolate personnel or vehicles within an area.

8.3.4.7 Floodlights

This refers to weapons systems that illuminate with a high-intensity, long-range light containing a blinding function in order to warn or halt personnel from a distance, or to isolate personnel or vehicles within an area. Floodlights are currently only used for testing and trials under the supervision of a competent authority. During two-sided exercises, the minimum safety distance for the flooldlight in question must be observed.

8.3.4.8 Sonic weapons

This refers to weapons systems that target personnel with loud and/or unpleasant sounds in order to warn or halt personnel from a distance and to force personnel back and to a desired distance, including communication tools and sound waves.

Sonic weapons may be harmful to a person's hearing when within the hazardous zone. All personnel within the hazardous zone must wear hearing protection, earmuffs and earplugs in combination, or other approved devices providing equivalent protection. Exposure time within the hazardous zone must be kept to a minimum.

8.3.4.9 Arresting nets

This refers to weapons systems that may be direct-fired or temporarily assembled in order to control, reduce movement or halt personnel, vehicles or materiel.

Arresting nets are currently only used for testing and trials under the supervision of a competent authority. Arresting nets for vehicles must only be used in locations with a sufficient safety zone in relation to the vehicle's speed in order that the vehicle can be halted in a controlled fashion.

8.3.4.10 Drones

When using the Norwegian Armed Forces weapon systems as defence against drones, the safety provisions for the use and handling of the individual weapon and type of ammunition apply. Extreme caution must be exercised when using LLWs against drones during instruction, training and exercises on civilian land and property.

8.3.4.11 Kinetic and area impact weapons systems

Weapons of this kind must not be used on personnel during training.

8.3.4.12 Water cannons

These are currently only used for testing and trials under the supervision of a competent authority.

Water cannons must not be used directly on personnel during training.

Appendix 1.
1 CONSTRUCTION OF SAFETY TEMPLATES FOR DIRECT FIRING WEAPONS

Definitions

Flareback area

A triangular zone to the rear of the weapon with depth and greatest width.

Maximum ricochet range (MRR)

The maximum range, measured from the firing stand that a ricochet can reach after one or several impacts on the ground.

First possible point of impact (D_{min})

The distance to the point of impact when the weapon is elevated at nominal elevation minus maximum downward deviation (α_{down}).

Longest possible point of impact (D_{max})

The distance to the point of impact when the weapon is elevated at nominal elevation plus maximum upward deviation (α_{up}).

Maximum range (A_{max})

The longest range physically possible, i.e. range at optimum elevation. This value has been tabulated in Appendices 15 to 21.

Minimum permitted range (A_{min})

Minimum permitted range to *first possible point of impact*. The target distance must be great enough that the first possible point of impact is longer than A_{min}.

Impact area

The area where the ammunition may hit the ground first.

Ricochet area

The area where a ricochet may land after making one or several impacts to the ground.

Ricochet dispersion(W_R)

The maximum deviation (in metres) to the each side of the original trajectory that a ricochet may reach after one or several impacts to the ground.

Ricochet angle (ß)

The maximum angle that a ricochet may reach when deviating from its original trajectory after one or several impacts to the ground, measured from the first impact it makes.

Lateral dispersion (α_{side})

Maximum anticipated error in the lateral point of impact (in the form of an angle on each side of the direction of fire) due to sighting error, weapon failure or meteorological effect.

Safety distance (l_{sa}) Safety angle ($ß_{sa}$)

Safety zone in front of weapon described by radius l_{sa} and angle $ß_{sa}$ of either side of the direction of fire. May be due to sabot, particles, obturator, etc.

Firing line

The straight line between the firing stand and where the shot makes its first impact.

Line of fire

The straight line between firing stand and target.

Splinter distance (s)

Dangerous distance for splinter impacts metered from the detonation point to the ammunition.

Critical point of impact angle (IA_{crit})

The greatest point of impact angle at which ricochets may occur. This is normally set to 30° (533 lines) for spin stabilised projectiles and 16.9° (300 lines) for fin stabilised projectiles.

Total angle of dispersion of splinter shower (δ)

Total angle width (measured from side to side) of the splinter shower from a sector charge. This angle does not include inaccuracy in aiming.

Constructing safety templates for direct-firing weapons

For non-fragmentation forming ammunition, observe points 1 through 11.

For fragmentation forming ammunition, observe points 1 through 14.

1. Draw up the firing line.
2. Mark the maximum lateral dispersion in the angle (α_{side}) of either side of the direction of fire
3. Determine and mark the distance to the first possible point of impact (D_{min}). Left and right limits for this distance are points A and B
4. Determine and mark the distance to the longest possible point of impact (D_{max}). Left and right limits for this distance are points L and M
5. The area demarcated by the letters ABML is the impact zone (see figures V1.1, V1.2 and V1.3).
6. Mark MRR as a line across the direction of fire or as an arc with its centre in the stand. Left and right limits for this distance are points C and D. If MRR is shorter than the distance to the first possible point of impact, items 7-11 (ricochet zone) may be ignored.

7. Draw up the ricochet angles, starting at points A and B. These lines form an angle equal to the ricochet angle ß, left and right side dispersion respectively. These lines are to be marked a and b.

8. Draw lines backward from C and D forming 45^{o} with left and right side dispersion respectively. These lines are to be marked c and d. The intersection between points a and c is to be marked E. The intersection between points b and d is to be marked F.

9. Draw lines marking maximum ricochet dispersion parallel to left and right side dispersion in a distance of W_R on the outside of these. These lines are to be marked e and f.

10. If the lines e and f lie within points E and F respectively, the following intersections are to be marked:
    - G – the intersection between a and e
    - H – the intersection between b and f
    - J – the intersection between c and e
    - K – the intersection between d and f

11. The ricochet zone is now defined as the area demarcated by the letters ABHKDCJGA (see figure V1.1) or, if the requirement described in item 10 has not been met, by the letters ABFDCEA (see figure V1.2).

12. If fragmentation-forming ammunition is being used, a belt has to be drawn around the entire impact area, its width equal to danger area for fragmentation s.

13. If fragmentation-forming ammunition is being used and there is a danger of explosion of the warhead after a ricochet, the danger area for fragmentation must also be drawn as a belt, its width equal to s, around the entire ricochet area.

14. If fragmentation-forming ammunition is being used and there is a danger of premature explosion of the fuze, the fragmentation area must be extended to a width of s to the left and right hand side of the area between the firing stand and the impact area.

15. Any hazardous zones in front of the muzzle are represented as a sector with an angle equal to the safety angle $ß_{sa}$ on either side of the angle of lateral dispersion and with radius l_{sa}

16. Possible danger area behind the weapon is to be presented as an isocleles triangle with height u and baseline y, and with its tip being the weapon.

17. In the following drawing, only the thick lines and the direction of fire (dotted line) constitute the template. The thin solid lines may be removed.

Examples

The following examples have been made to assist the construction of safety templates:

Template for non-fragmentation-forming ammunition

Template for ammunition that does not cause fragmentation. No danger area(s) around the ammunition.

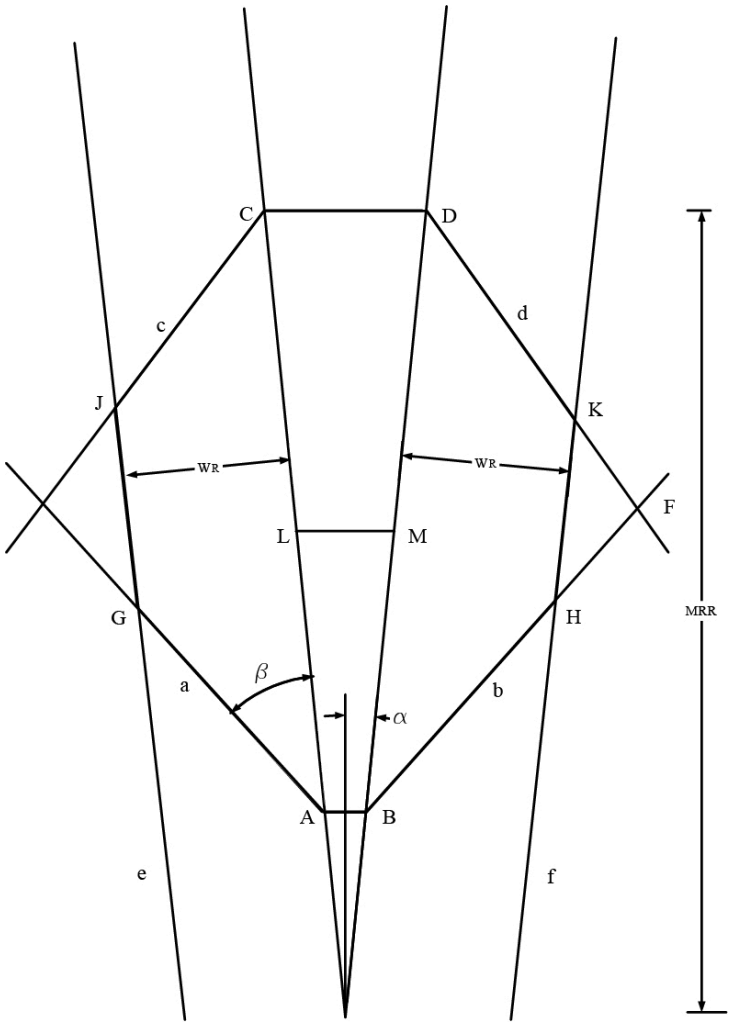


Figure: V1.1
Template for ammunition without splinters.

Template for fragmentation-forming ammunition with wide ricochet dispersion

Template for fragmentation-forming ammunition with wide ricochet dispersion. Danger area in front of the muzzle and behind the weapon.

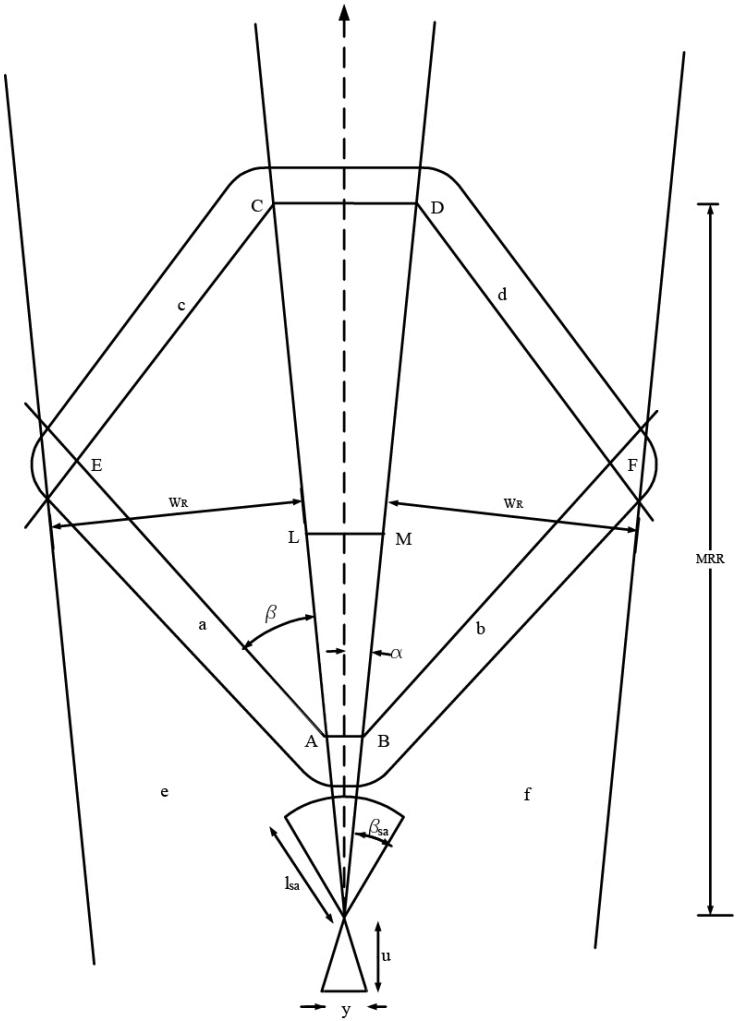


Figure: V1.2
Template for ammunition with splinters.

Template for splinter forming ammunition in which the longest possible point of impact is longer than MRR

Template for splinter forming ammunition in which the distance to the longest possible point of impact is longer than MRR. Hazardous zone in front of the muzzle.

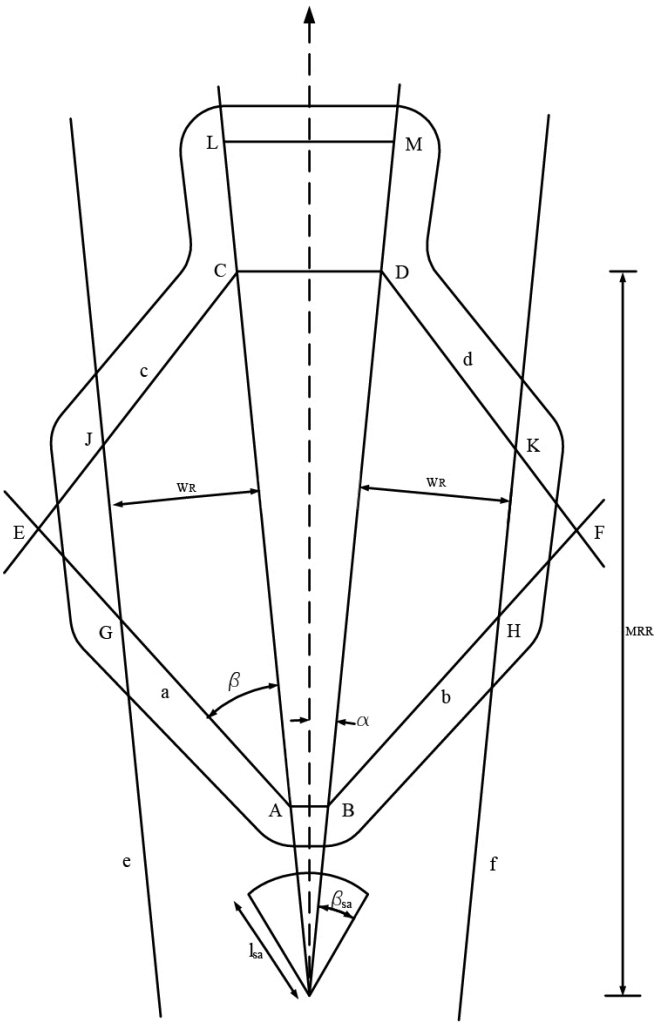


Figure: V1.3

Template for ammunition with splinters at a target distance of above MRR with hazardous zones in front of the muzzle

Appendix 2.
2 CONSTRUCTION OF TEMPLATES FOR SECTOR CHARGES

IN GENERAL

These types of charges release splinters in the form of steel balls in a given sector. Also, splinters from containers, stands and igniters may be hurled in random directions. The width of the hazardous sector equals the total angle of divergence of the splinter shower, plus a setting accuracy of 200 lines to each side, plus the width of the ricochet zone.

A schematic template is shown below.

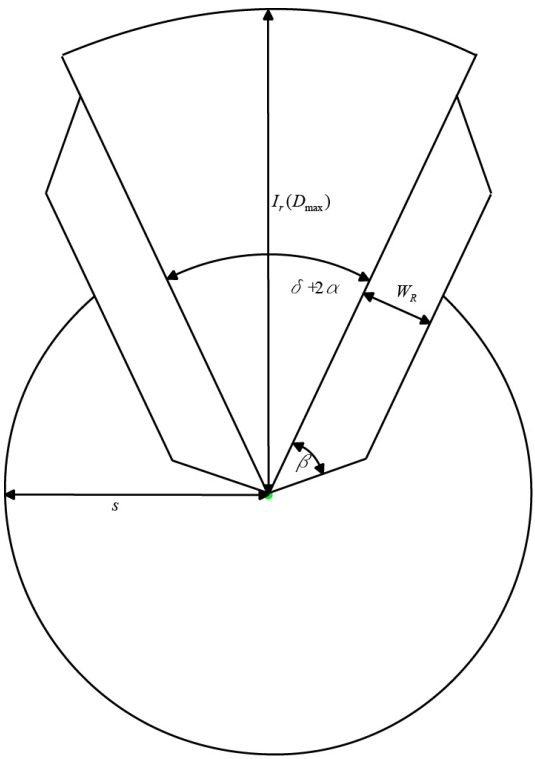


Figure: V2.1

Appendix 6B.
FORM 750 - REPORT AFTER THE USE OF AMMUNITION AND EXPLOSIVES

6B

Report on use of ammunition/explosives

Instruction for filling in this form:

- This report must be filled in after use of any ammunition (regardless of calibre), explosives, hand grenades, bombs and rockets/missiles.
- When firing fixed ammunition only one catalogue number and one lot number is to be reported. When firing separate-loading ammunition, the fuze- grenade- propellant and ignition cartridge are to be reported on the same form.
- Some weaponsystems has special forms that shall be filled in addition to this report.
- This report is to be delivered to the range officer.

Always fill in this section:

Unit	Area	Date	Range officer
US MARINES	RØ	10.06.07	Capt Nilsen

Firing line	Target area (Map reference)
A1	1234

Ammunition data

NATO Catalogue number	Designation	Lot number	Condition	Rounds fired	Number of UXOs	Number of misfires	Other irregularities (Y/N)
1340-25-149-9873	ROCKET NM72	01-RA03		10	1		NO

Fill in this section when UXO, misfires or other irregularities:

Weapon system and weapon number	Delivered from depot	Probable cause of UXO, misfire or other irregularities:
	Løten	Impact area condition

Seals broken?	Visual condition
☐ Yes ☑ No	Good

Impact area condition: Rock/gravel

Weather condition	Wind	Temprature
Rain	Weak wind	8

If uxos, are they demolished?	If No, give map referanses
☑ Yes ☐ No	

Appendix	Range officer

Appendix 6C.
6C REGISTRATION FORM – MISSILES

REGISTRERINGSSKJEMA

SKARPSKYTING JAVELIN (Et skjema per missil)

Avdeling	Grad/Navn på skyteleder	Telefon	Dato

Skytefelt/Bane/Høyde over havet	Målmateriale/-arrangement

LOT-nummer	Rakettnr	Skarp ☐ Øving ☐	Visuelt inntrykk av ammunisjonens tilstand: Ok ☐ Ikke ok ☐

Måltype	Avstand
Stillestående ☐ Bevegelig ☐ Fart: ..... km/h	..... meter

Sikte	Treff	Treffbilde (tegn på figur)
Optisk ☐ Termisk ☐	Ja ☐ Nei ☐	

Ved bom: hva er den sannsynlige årsak .....

.....

.....

.....

Visuelt inntrykk av rakettens flukt .....

.....

.....

.....

Værforhold	Vindforhold (ca. m/s)	Temp(C)

Lysforhold	Kunstig lys Ja ☐ Nei ☐	Hvis ja: hvilken type

Skytestilling/Underlag	Serienr. på utskytningsenhet	Vind/solretning
		skyteretning

Merknader .....

.....

.....

.....

Dette skjemaet skal fylles ut i tillegg til DBL 0750. Skjemaet skal fylles ut og sendes så fort som mulig etter skyting.

Skjemaet skal sendes til:

FMA FELLESKAP AMM AMMSIKK (postboks)

HÆREN HVS MANØVERSKOLEN (postboks)

Appendix 7.
7 REGULATIONS FOR SECURING AIR TRAFFIC DURING FIRING AND MORTAR EXERCISES, TEST FIRING, ETC.

1 Area of application

These regulations apply within Norwegian territory and those parts of international waters that come under the Norwegian Flight Information Regions (FIR). The regulations in the following listed points concerning firing are to apply for all firing when the trajectories of projectiles, mortar shells or missiles/rockets at any point will exceed 100 metres (300 feet) above the ground/water. Firing with direct laying when the trajectory will reach no higher than 100 metres (300 feet) above ground/water, and the OCE/officer conducting firing has visual control of the firing stand and the impact area, as well as hand grenade throwing and demolition exercises will not come under the following regulations on firing, except those conditions presented in 5.

2 Danger area and controlled airspace

a. A danger area is an airspace of certain dimensions where, during certain times, activity (firing/training) may occur which may present danger to aircraft/ helicopters/etc. in the air:

- *A continuously active danger zone* is a precisely defined area associated with a firing range in which firing exercises may be undertaken at all hours of the day without the issuance of a NOTAM (with the exceptions specified in the comments field for the individual zone cf. AIP Norway ENR 5-1, item 3.5). Continuously active danger zones should be restricted to a minimum. It is the responsibility of the Ministry of Defence to ensure that such danger zones are approved and made known. Continuously active danger zones may not be established in international waters. Approved continuously active danger zones are specified in AIP Norge, ENR 5-1, item 3.5. and identified on relevant maps in ENR 6.
- *a danger area only active after publicised in NOTAM* is a certain designated area linked to a firing area where firing may take place after having been notified as described in section 4. If such notice has not been announced by the responsible authorities and made known to the air traffic through NOTAM, the area is to be regarded as not dangerous for aircraft. To simplify the announcement on activity in the most used preliminary danger areas these will be published in AIP Norway, page ENR 5-1, paragraph 3.6.

b. *A controlled airspace* is an airspace of specified dimensions in which air traffic control is undertaken for monitored air traffic (refer to definitions of control area and control zone).

For all firing in controlled airspace, special regulations apply, see § 5.

3 Firing in danger area active only after having been announced through NOTAM.

a. Firing in the said danger areas must in advance have been coordinated with flight activity in the relevant area, preferably by a timetable for a short or long period.

b. Co-ordination shall take place at NAOC in consultation with the respective control centre. Any questions as to whether a firing programme should proceed shall be settled by the commander-in-chief, possibly in consultation with the chief air traffic controller at the respective control centre.

c. The air traffic control centre may, when conditions make it necessary, order a temporary fire break while firing is going on in these danger areas.

4 Notification of firing exercise in danger zone active following NOTAM notification..

When a firing exercise is to be undertaken in an active hazardous zone following a NOTAM notification, a NOTAM application should be submitted to NAOC or NORTG no later than 14 days prior to commencement of the firing exercise. Applications to use Royal Norwegian Navy firing ranges should be directed to NORTG, while other applications should be directed to NAOC. NAOC and NORTG will co-ordinate the activities internally and with the respective control centre before issuing a notice of firing to AVINOR's NOTAM office. A copy of the notice should be sent to the respective control centre. (FIR and sector borders are described in AIP-Norway, ENR 6.2-23 and ENR 6.2-25). The notice must reach AVINOR's NOTAM office no later than 1 week before the firing exercise is scheduled to commence. AVINOR will issue the necessary information regarding the firing exercise to the Civil Aviation Authority in the form of a NOTAM.

NORTG	Phone:55504982
NAOC	Phone: 75536962
	AVINOR's address is:
The NOTAM office	Phone: 64 81 90 65
PO Box 150	
2061 Gardermoen	E-mail: nof@avinor.no

The addresses of the area control centres are:

Oslo area control centre	Stavanger area control centre
Luftveien 16	Pb 506
3440 Røyken	4055 Stavanger Lufthavn
Telefon: 31 26 04 00	Telefon: 51 65 81 42
E-mail: osopsup@avinor.no	

Bodø area control centre

Bodø Lufthavn

8041 BODØ

Telf: 75 54 29 00

The report on firing is to include:

a. Date and time of firing, preferably in UTC or specify if local time is being used.

b. Type of activity (firing).

c. The danger zone's *horizontal* boundary is stipulated either in the form of a straight line between points specified in geographic longitude and latitude (Greenwich), or in the form of a geographic position (Greenwich) plus hazardous sector specified in degrees (true bearing) and sector length. If the danger zone is not an area defined in AIP Norway, the central point and radius of the zone should be included in manuscript that is forwarded to the NOTAM office.

d. *The danger area's upper limit is presented in feet above ocean level.* For danger areas that only are active after the announcement in NOTAM which is listed in AIP Norway, ENR 5-1, para 3.6, the announcement about firing is to contain information on dates and time for the firing and also possible deviations from previous registered information. If the safe height exceeds the height given in ENR 5-1 this is to be stated clearly and to be cleared with the control centre in question which will then be confirmed in the same paper.

5 Firing in danger areas within controlled airspace

a. Training which will lead to restrictions within controlled airspace should be avoided.

b. If firing has to take place within controlled airspace, direct communication is to have been set up through telephone, radiotelephone or radio between the OCE/ officer conducting firing and the relevant area control centre tower, normally at the responsibility of the unit in training. In questions of doubt, e.g. when establishing new controlled air space above already existing firing stands, the question of responsibility for setting up communications is, if necessary, to be presented to the Ministry of Defence through the chain of command. The air traffic control centre decides, based on the reported upper limit of the danger area and the controlled airspace's lower limit whether direct communication might not be required.

c. In control zones all firing, hand grenade throwing and demolition is to be reported to the closest control tower and direct communication is to be set up as described in § 5b when the control tower requests it.

d. Air traffic control service may, when air traffic control conditions make it necessary, order a temporary fire break when firing is going on in controlled airspace.

6 Responsibilities of the OCE/the officer conducting firing

a. Prior to any firing exercise in a danger zone that affects a controlled airspace, the officer in charge of the exercise/firing commander, must have ascertained that air traffic control is aware of the activity.

b. During all exercises/training, the OCE/officer conducting firing is responsible for calling off the exercise immediately should aircraft get dangerously close to the training area.

c. The officer in charge of the exercise/firing commander must submit notification via telephone as soon as possible to air traffic control regarding aircraft that have entered a known danger zone. The notification must be confirmed in a written report to the chief pilot at the relevant control centre with a transcript to FOH J3 Luft.

d. If announced firing is called off, or finishes early, before the announced time, the message is to be given over the phone or telegraph immediately, even if the cancellation happens at the time firing was supposed to have commenced.

7 Staff responsibility

HST/SST/LST are responsible for distributing up-to-date versions of AIP, Norway, ENR 5-1 to defence branches' units and stations. HST is to distribute ENR 5-1 to those Armed Forces' institutions outside the branches that may find it necessary to keep at hand.

8 Definitions used in air traffic

AIP Norge (Aeronautical Information Publication, Norway). A manual issued by Avinor, containing lasting information of significance to undertaking a flight.

Flygeinformasjonsregion (flight information region) FIR. An airspace of set dimensions where flight information service and alarm service are being offered. Note: information concerning flight information regions' location and extent is provided in AIP Norway, part ENR.

Innflygingskontrollenhet (approach control unit) APP. A unit that performs air traffic control for monitored air traffic arriving at or departing from several airports.

Terminalområde (terminal control area) TMA. A control area, usually established where several ATS-routes join near one or several major airports.

Note: Information about the location of terminal areas and their extent is provided by AIP Norway, part ENR. ATS-route is a common term for airway, controlled and uncontrolled route, approach route and departure route, etc.

Kontrollert luftrom (controlled airspace). An airspace of certain dimensions where air traffic control service is being offered for controlled flights.

Kontrollområde (control area) CTA. A controlled airspace which stretches vertically upwards from a given height above ground level.

Kontrollsentral (Air trafic control centre) ACC. A unit that performs air traffic control for monitored air traffic in control areas that fall under its authority.

Kontrollsone (control zone) CTR. A controlled airspace which stretches vertically upwards from a given height above ground level.

Kontrolltårn (aerodrome control tower) TWR. A unit which provides air traffic control service for local traffic.

Lavflygingsområde (low flying area). An area where low flying may be conducted after having received special authorization, using a military aircraft flying in a height of 200-500 feet above ground/water.

Comment: The area of the low fly zones appear on Low Flying Charts (LFC) Norway (2 map sheets to the scale of 1:500000). Within approved firing ranges, low flying may be authorised down to 50 feet above ground/water.

Luftled (airway). A control area or part of a control area in the shape of a corridor.

Comments: Information on overhead transmission lines is specified in AIP Norway, part ENR.

NOTAM (notice to airmen). A notification distributed via telecommunication containing information on set up, condition or modification to navigational aids, service, regulation or risk factors that personnel associated with planning or implementation of air traffic need to become acquainted with within an optimum time frame.

AIP SUP: Contains information regarding temporary modifications of long duration, or modifications of short duration with a significant amount of text/graphics in the specifications.

Appendix 8B.
8B ARTILLERY HUNTING RADAR (ARTHUR), PROHIBITED AREA AND DANGER AREA

Figure: V8 Ba

1 Radars emit strong high-frequent energy which may cause injuries to humans. The following regulations and limitations concerning use and maintenance of ALR must therefore be observed. Individuals who have had metal parts operated into their bodies (e.g. pacemakers) should avoid electromagnetic fields.

The following figures apply to the average value of the electromagnetic field at frequencies between 300 MHz and 300 GHz:

- During 1 second: 300V/m (250W/m2)
- During any given time of 6 minutes: 60 V/m (10 W/m2). Radiation of this density may take place during 8 hours per day, maximum.

Based on these figures, two areas which must be taken into consideration during radar emission may be defined:

- Prohibited area and
- Allowed area

The radiation is in the C-band area, and is described as a static antenna lobe as described below:

WARNING

It is mortally dangerous and hence prohibited to stay in the prohibited area while the radar is emitting radio waves.

In ALR one can never be certain whether or not the antenna lobe is standing still. Safe distance is then calculated for a still-standing lobe.

Horizontal distances refer to the antenna's rotation axis or centre line **C** $_{L}$. Vertical distances refer to the antenna's basis line (fixed point) **B** $_{L}$. The arrow indicates the lobe's direction. **R** is the radius for the prohibited area. The total lobe height **H** is the sum of **H** $_{1}$, **H** $_{2}$ and **H** $_{3}$ indicating height above, respectively under, **B** $_{L}$. Direction and range of the prohibited area is referred to to **C** $_{L}$, **B** $_{L}$ and ground level **G** $_{L}$.

H $_{1}$ indicates the height above **B** $_{L}$ if the antenna elevation is 84 degrees.

H $_{2}$ indicates the height for **B** $_{L}$ over **G** $_{L}$.

H $_{3}$ indicates the height below **G** $_{L}$ if the elevation of the antenna is 97 degrees and the radar is placed on a hill.

It is important to note that sideways the radiation diagram is centred in the antenna's central line **C** $_{L}$ and then follows the antenna's turning angle in relation to the rear wagon. '**Hot Spots**', spots where radiation intensity is stronger, may occur if the radiation is reflected from flat surfaces and then interferes with the direct radiation. In nature, for instance, still or ice-covered lakes and vehicles or other flat metal parts in the prohibited area may cause reflection. When there is a danger of so-called 'Hot Spots', the prohibited area may be extended to **R**=320 m for parts of the angle of the semi-circle.

Prohibited area (shaded) directly behind the tracked vehicle, as in the picture below, is to be considered as the normal scenario. Rotating the antenna within - 45° to + 90° is allowed, so that the shaded prohibited half-cylindric area fills the marked area, without the radiation level outside the door of the rear compartment getting above the allowed level,

When rotating the antenna to ³ + 90° it is prohibited to stay in the front compartment for the following reasons: In a worst case scenario the lobe will end up 3,8° below the base line BL at antenna elevation = 97°. The lobe will then be 0.5 m above the front left corner of the front compartment where the radiation level will be about 10 times higher than what is normally allowed. The front compartment's plastic chassis is not shielded. Conditions inside the rear compartment will not be affected, since the rear compartment is shielded. The possibility of rotating the antenna 150° must be considered abnormal in peacetime since the prohibited half-cylindrical area then may rule out the possibility of staying in the front compartment and/ or moving to or from the operators' seats in the rear compartment.

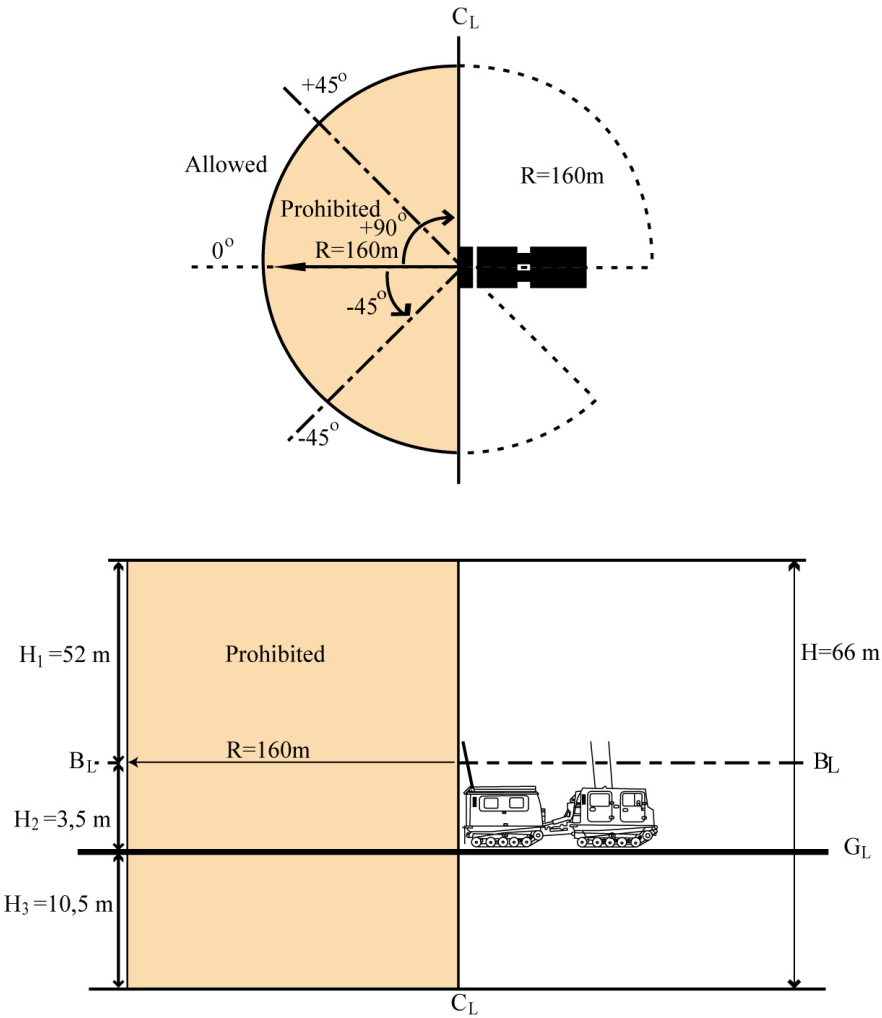


Figure: V8 Bb
Prohibited area and danger area ARTHUR

Appendix

Appendix 8C.
8C RADARSETT SQUIRE

PROHIBITED AREA AND DANGER AREA

1 Personnel are to act as if the radar is emitting radio waves as long as it has been mounted completely on the tripod.

Figure: 8C.1

Danger area and prohibited area Radarsett Squire

2 Danger area and prohibited area are one and the same, with limitations to the side and in height equal to the width and height of the antenna. Forward limitation is 1 metre from the front of the antenna.

3 In addition to the restrictions mentioned here, the safety regulations presented in the technical manuals for the materiel apply.

Appendix 8D.
8D BLIGHTER 2 RADAR SET

Prohibited and hazardous zones

1 Personnel must act as if the radar unit is emitting radio waves if the unit is ready-mounted. This does not apply for the CV90 OPV if the mast is in the lowered position.

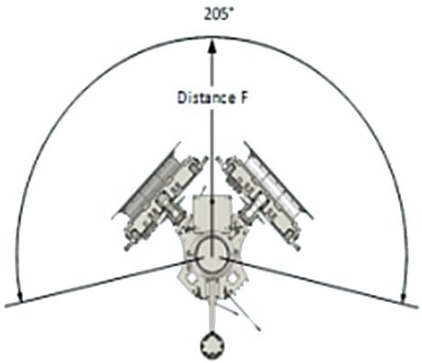


Figure: V8D-1

Surface danger area horizontal plane

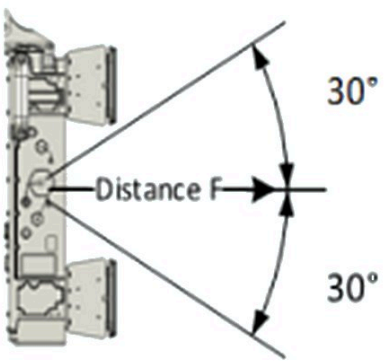


Figure: V8D-2

Surface danger area vertical plane

2 Surface danger and prohibited zones are identical, with a lateral restriction of 115° for a single panel and a vertical restriction of -30° for two panels. +-30 degrees vertically from the centre of the radar plate. Note that the elevation angle of the radar plates can be adjusted. It is therefore the angle of the radar plate and not the horizontal plane that

should be used to assess the surface danger zone. The safe distance (F) is 3 m in front of the antenna, the surface danger zone is 1,9 m in front of the antenna, the angles in the horizontal and vertical planes are given in the figure above. This is indicated on the radar. The reverse side of the radar unit can be touched.

3 In addition to the restrictions stated here, safety regulations as set out in the user manual for the materiel also apply.

Appendix 8E.
8E NASAMS AIR DEFENCE RADAR MPQ-64M2

General

1 As it is not possible to determine whether the radar is transmitting radio waves by simply looking at it, personnel should always behave as if radiation is present when the antenna is erected.

Figure: V8 Ea
NASAMS AIR DEFENCE RADAR MPQ-64-M2

Non-rotating antennas

2 Personnel should not assemble closer than 85 metres in front of an antenna that is transmitting radio waves. Assembly at ground level, beneath the level of the antenna's pedestal, will not expose personnel to any risk.

Rotating antenna

3 Personnel must not be present within a distance of 1 m of the antenna when it is rotating. This distance is based on the danger of being struck by the antenna. Being present at ground level, beneath the level of the antenna's pedestal, will not expose personnel to any risk.

Appendix 8F.
8F TOR ELECTRONIC COUNTER-MEASURE SYSTEM, PROHIBITED AREA AND DANGER AREA

IN GENERAL

1

1. Since it is impossible to determine whether the system is emitting radio waves or not simply by looking at the vehicle, personnel must always act as if radiation is being emitted when the antenna is in an upright position. The exception is personnel who man the vehicle, and hence know whether or not radiation is being emitted.
2. Danger area is 10 metres around the outer edges of the vehicle in all directions. Personnel can only stay for a limited period of time within this area.
3. Prohibited area is on the vehicle roof, no personnel must stay here when radio waves are being emitted.
4. The only way one is allowed to enter the vehicle roof is by use of the ladder on the rear wagon, this ladder has a safety switch which will be released as soon as anyone sets foot on the bottom step of the ladder.

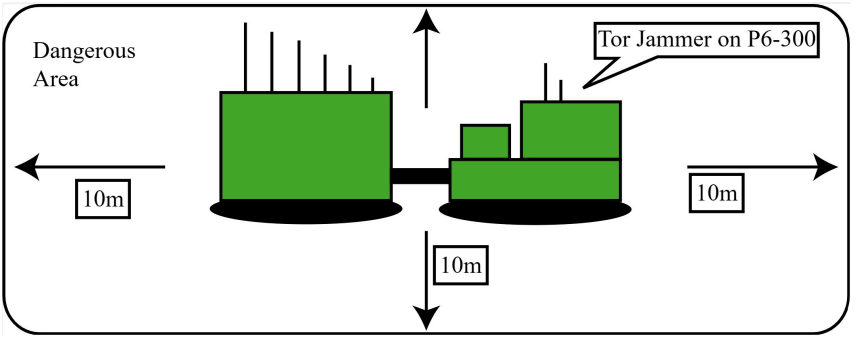


Figure: 8F.1

Danger area TOR electronic counter-measure system

Appendix 8G.
8G SATELLITE EQUIPMENT

IN GENERAL

1 General for satellite communication equipment is that there is a disc which is directed towards a satellite. This disc (the parabole) may have a sub-reflector mounted in front with sender and receiver head, also called the horn. Personnel MUST NOT stay in front of the disk for any long period of time

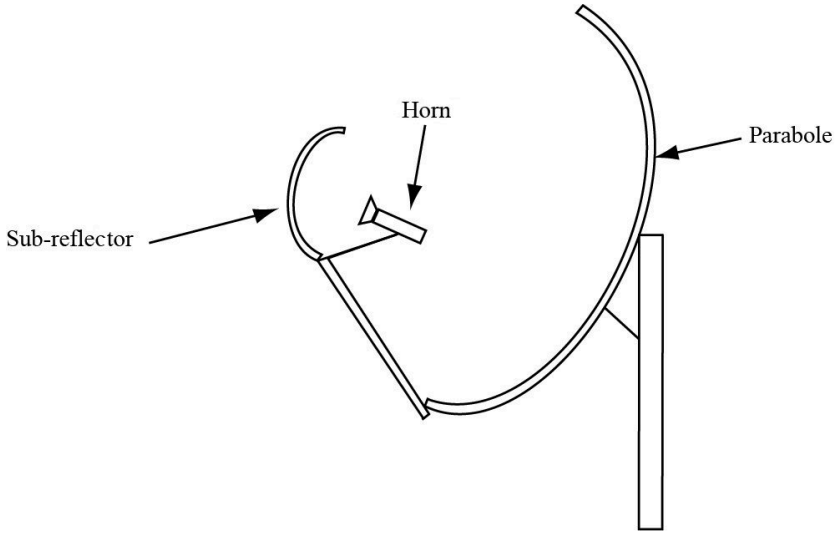


Figure: V8 Ga

Usual components DVB-RCS and VSAT

If a safety distance is given for the antenna, this must be considered a minimum distance.

The safety distance is usually given for various angles of elevation. At low angles of elevation, a larger proportion of the signal power will propagate along the ground, which affects the safety distance. See the materiell operating plan for the terminal for detailed safety considerations.

Figure: V8 Gb

a. High elevation (e.g. in southern Norway)

b. Low elevation (e.g. North Norway)

Appendix 8H.
8H RC-IED JAMMER
PROHIBITED AND HAZARDOUS ZONES

General

1 The RC-IED jammer is installed on various types of vehicle.

The system is identifiable from its comparatively high number of transmission aerials (4 or more), typically mounted on the roof, bonnet, bumper, or similar.

The following warning sign is located by the driver's seat:

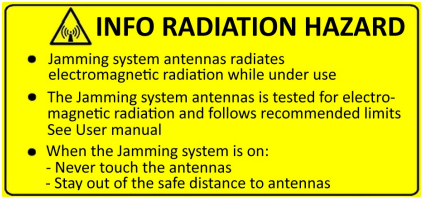


Figure: 8H.1

2 As it is not possible to determine whether a vehicle is transmitting radio waves or not by simply looking at it, personnel should always behave as if radiation is present. The exception to this are authorised personnel operating the vehicle, who will be aware of whether radiation is present or not.

Each aerial is marked as follows:

Figure: 8H.2

3 A hazardous zone is deemed as being a distance of up to 1.5 metres from all of the system's aerials, in every direction. Personnel may only remain within this zone for a limited period of time. The exception to this are personnel being trained in individual configurations, who will possess the required knowledge of the location of individual aerials, as well as the safety distance.

4 Prohibited zones are the roof, bonnet, etc, on individual vehicles, upon which it is forbidden to be situated when radio waves are being transmitted. The exception to this are personnel being trained in individual vehicle configurations, who will possess the required knowledge of the location of individual aerials, as well as the safety distance in respect of weapon racks, driver's hatches, etc.

5 Installation of, or modification to, an RC-IED jammer should be undertaken solely by authorised personnel in accordance with approved assembly instructions.

Only a technically competent authority Norwegian Defence Materiel Agency(NDMA) is permitted to certify new platforms.

Unauthorised modification of the system is NOT permitted and may result in danger to life and limb.

6 In addition to these restrictions, safety regulations specified in technical handbooks for the materiel also apply.

Appendix 8I.
8I RADIO LINK STATION NO/VRC-532

General

1 RF radiation: Measurements have been carried out with the AS-532N antenna and the results/guidelines are only applicable to the RT-532N transmitter/receiver and the AS-532N antenna.

2 Personnel should assume that the antenna is transmitting radio waves and should observe the minimum safety distances as long as there is any uncertainty regarding whether the antenna is disconnected from the transmitter, or that the antenna is not elevated on a mast.

Prohibited and hazardous zones

3 Based on the results of measurements carried out by the Nemko Group in relation to EU-recommended limits[1] "Guidelines of the Chief of Defence in respect of protection from exposure to electromagnetic fields under 300GHz in the Norwegian Armed Forces' military organisation"[2] , the following guidelines have been introduced:

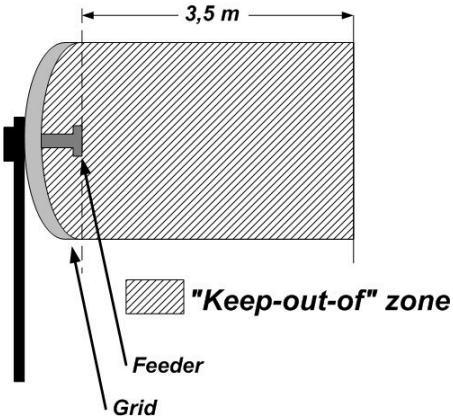


Figure: V8 Ia

Dangerous and prohibited area for RADIO LINK STATION NO/VRC-532

4 Personnel should not assemble closer than 3.5 metres in front of an antenna during transmission (refer to the figure above)

1) EU-recommended limits are published in the COUNCIL RECOMMENDATION of 12th July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) (1999/519/EC).
2) For permitted levels of exposure, refer to ICNIRP Guidelines 7/99. Recommended by the Norwegian Radiation Protection Authority.

Assembling outside of the ”keep-out-of zone” during transmission does not pose any risk

The antenna (grid or feeder) should not be touched during transmission

A double screened antenna cable should be used

Appendix 9.
9 THICKNESS OF COVER

1 Single shots – direct hits by cold projectiles

Thickness of cover measured in cm:

Type of cover	**7,62 m**	**9 mm**	**12,7 mm**	**40 mm[1]**	**75 mm**	**Note**
Steel plate (230 HB)	4	1	6	10	27	
Solid walls:						
– brick	60	30	90	150	–	
– concrete	45	20	60	110	150	
– reinforced concrete	30	–	45	90	120	
– timber	150	–	–	–		
Walls made of loose materials supported by floorboards or timber:						
– mud	120	–	–	–	–	+ 100% if mud is wet
– dirt	100	–	130	–	–	+50% if dirt is wet
– sand	60	30	75	150	–	+ 100% if sand is wet
– shingel	60	30	75	150	–	
Sandbags filled with:						
– mud	150	–	–	–	–	+ 100% if mud is wet
– dirt	130	–	150	–	–	+50% if dirt is wet
– and and gravel	75	–	100	150	–	
Loose bank made of:						
– mud	150	–	–	–	–	+ 100% if mud is wet
– dirt	120	–	–	–	–	+50% if dirt is wet

1) Same thickness of cover apply for 20 mm MP (NM75) as for 40mm.

– sand	90	30	–	–	–	+100% if sand is wet

2 Splinter detonation distance 20 metres from cover.

Thickness of cover measured in cm:

	Splinters from shells and missiles			
Type of cover	**Kal 75 mm and smaller**	**Kal 105 mm**	**Kal 155 mm**	**Note**
Steel plate	1,5	2	2,5	
Solid walls:				
– brick	10	15	20	
– concrete	10	13	15	
– reinforced concrete	7,5	10	13	
– timber	20	25	35	
Walls made of loose materials supported by floorboards:				
– mud	20	25	30	
– dirt	40	45	60	
Sandbags filled with:				
– dirt	50	60	75	
– sand and gravel	25	30	50	
Loose bank made of:				
– dirt	60	90	120	
– sand	30	45	60	

	7,62 mm	**12,7 mm**	**40 mm^2**	**F75 mm**	**Note**
Type of cover	**pbr**	**pbr**			
sand and gravel	75	100	150	–	
Loose bank made of:					

2) Same thickness of cover apply for 20 mm MP (NM75) as for 40mm.

– mud	150	–	–	–	+ 100% if mud is wet
– dirt	120	–	–	–	+50% if dirt is wet
– sand	90	–	–	–	+100% if sand is wet

3 Impact plus detonation of one hit.

Thickness of cover measured in cm:

	HE shell		
Type of cover	**Kal 75 mm**	**Kal 105 mm**	**Kal 155 mm**
reinforced concrete (280 kg/ cm 2)	30	75	110
brick or concrete	50	110	160
Timber logs: (20 cm in diametre anchored)	60	160	220
Shingel or crushed rocks	110	270	350
Hard trodden dirt	220	550	750

4 Shaped charges

Thickness of cover measured in cm:

	Recoilless gun	
	Kal	Kal
Type of cover	66 mm	84 mm
Steel plate	25	55
reinforced concrete	100	200

UD 2-1 Armed Forces Safety Rules and Regulations.

Appendix 10.

10 SAFETY TEMPLATE 81MM MORTAR, NM 123, HE, CONFIRMED AND UNCONFIRMED FIRE CONTROL DATA

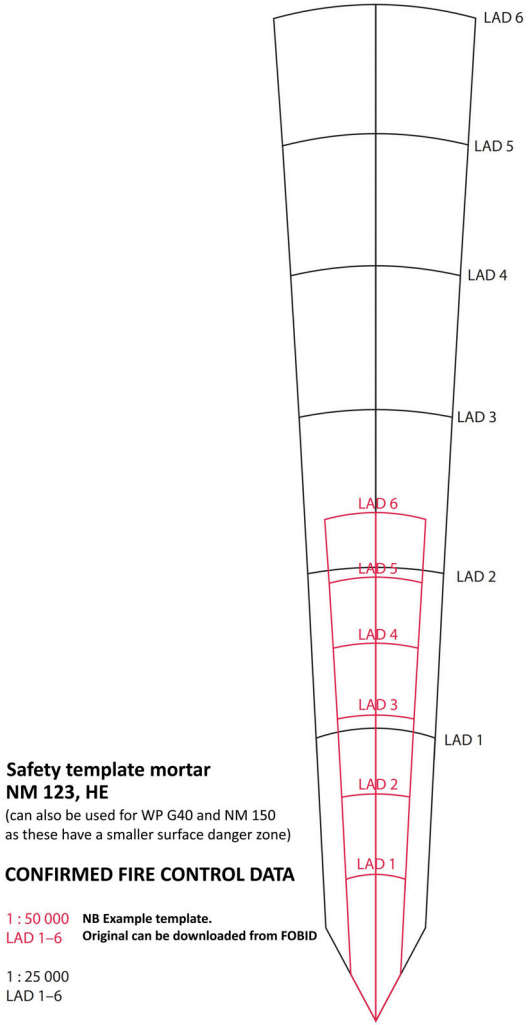


Figure: V10-1

Safety template 81 mm mortar, NM 123, HE, CONFIRMED FIRE CONTROL DATA

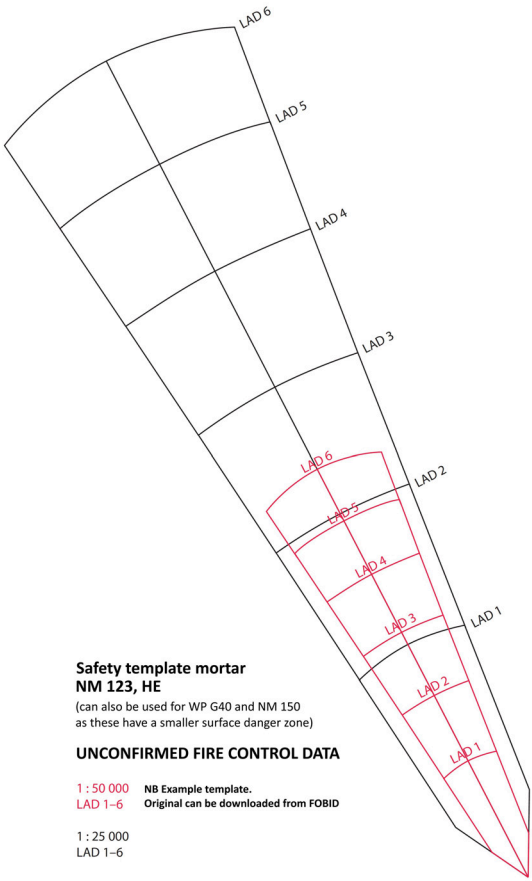


Figure: V10-2

Safety template 81 mm mortar, NM 123, HE, UNCONFIRMED FIRE CONTROL DATA

Appendix 11A.
11a TRANSPORT AND HANDLING OF FLAMMABLE LIQUIDS AND HAZARDOUS SUBSTANCES

General

1 For regulations concerning the handling of flammable, reactive and pressurised substances and also equipment and installations used in handling, see regulations for, among other things, the handling and storage of flammable liquids and hazardous substances

2 **Storing and using chemicals and oils within garrisons**

See:

Act relating to working environment, working hours and employment protection, etc. (Working Environment Act)

The Norwegian Armed Forces' electronic materials card index in Eco online

Transportation, storage, handling and draining during field exercises

3 See:

- ADR – road transport of hazardous goods, issued by the published by the Directorate for Civil Protection (DSB), Act no. 62 of 17-06-2005: Act relating to working environment, working hours and employment protection, etc., chapter 4.
- The Norwegian Armed Forces' electronic materials card index in Eco online
- Act Concerning Protection Against Pollution and Concerning Waste (Pollution Control Act)

Recovering vehicles transporting flammable liquids

4 See:

- ADR – land transport of dangerous goods, published by the Directorate for Civil Protection

Personal protective equipment – exposure to petrol

5 All personnel transferring petrol from petrol tankers to cans over an extended period must use protective masks to protect against exposure to petrol fumes. Protective mask must also be used by drivers and their assistants on petrol tankers and trucks transporting cans when they are exposed to petrol fumes during refuelling, loading and unloading of jerry cans. If there is a danger of petrol splashing onto skin, chemical-resistant gloves must also be worn.

For further information concerning choice of protective equipment, see section 8 of the safety data sheet available in the Norwegian Armed Forces' electronic substances card index in Eco Online.

The following log-in details are available for all users:

Company code: 81

User name: datablader

Password: datablader

Appendix 12.
12 CLASSIFICATION OF SEVERITY IN CASE OF ACCIDENTS AND INCIDENTS – OVERALL IMPACT ASSESSMENT

Severity/ Category	Brief description	Statement of incident impact
A	Critical	5. Critical (extremely serious) – fatal outcome, or may result in death, severe injury, loss of important materiel. Damage to materiel results in it not being operational. The materiel can only be used for spare parts. Emissions greater than 1,000 litres.
B	Severe	4. Severe – may result in severe injury, illness, damage to materiel. Damage to materiel results in it not being operational. Repair team from the depot/ contractor. A main component must be replaced with a new one/overhauled. "Severe personal injury" is defined as: any injury, physical or mental, resulting in permanent or prolonged in ability to work (10 weeks+). Emissions between 50 and 1,000 litres. For environmental damage, the limit is 50 litres or further assessment if it is a particularly harmful substance. -Loss of weaponry. -Near-accidents will not usually be considered potentially severe, though instances are conceivable in which the potential for injury is particularly great and implementing measures is an urgent matter. The potential for injury is assessed based on the likelihood of the injury occurring, the consequences of such an injury and a combination of these two factors.
C	Moderate	3. Moderate – may cause minor injury, mild illness, minor damage to materiel. Incidents with a great potential for injury/damage. Small margins prevented an accident. The materiel suffered minor damage or damage to components other than main components. (damage from fire, major electrical/technical problems and collisions). Emissions between 20 and 50 litres.
D	Low/Minor	2. Low/Minor (Small) – insignificant consequence. The materiel can be driven/transported to the home base for repair. Damage or defects can be rectified using the Unit's own resources. Emissions between 5 and 20 litres.

E	Insignificant	1. Insignificant – an event which, in slightly different circumstances, could have had more serious consequences. The materiel is undamaged, but with a potential for accident, or damage/defect that can be rectified by first line maintenance/next inspection – on the whole an absence of consequence. Emissions of less than 5 litres.

Appendix 13.
13 SAFETY REGULATIONS FOR USE OF LASERS

General

1 These regulations have been derived from and are in addition to chapter 5, point 5.2.7

2 **Safe distance with magnifying optics**

Magnifying optical devices concentrate laser beams passing through the optical system into the observer's eye. Safety distances for magnifying optics are significantly increased and are referred to as EOHD (Extended Ocular Hazard Distance).

3 **Safe distance to the naked eye**

NOHD (Nominal Ocular Hazard Distance) is defined as the shortest distance at which the radiant energy from the laser will not cause injury to an eye being exposed to the laser beam. Stanag 3606 refers to this as Rs.

Safety tables containing safety data for lasers and their different configurations follow.

4 **Effect of magnifying optics**

Use of magnifying optics will increase the safe distance from the laser source.

When using magnifying optics, the given NOHD must be multiplied with the magnifying factor of the optics!

Transmission via optics is 100 %

EOHD = NOHD x Magnification

5 **Effect of laser-attenuating filters on optics**

Laser safety filters on optics reduce the safety distance from the til laser source.

Laser-attenuating filter (Optical attenuation OA)	1	1,5	2	2.5	3	3,6	4	4,5	5	5,5	6
Correction factor	3,2	6	10	18	32	56	100	180	320	560	1000

Note that OA equals dB value/10. In manuals and handbooks the attenuation will be stated either as OA or in dB.

In order to determine corrected laser safety distance (NOHD – corr.) for optics containing laser safety filters, the applicable NOHD safety distance must be divided by the applicable correction factor for non-magnifying optics.

NOHD_corr = NOHD / Correction factor

(Applies to non-magnifying optics)

NOHD_corr = NOHD_M / Correction factor

(Applies to magnifying optics)

6 Basis for calculation

The calculations have been carried out in accordance with European laser standard IEC 60825-1 and STANAG 3606 edition 6. Transmission is set at 100 %, reflectors have 100 % reflectance and a divergence of 1 mrad. When using laser attenuation filters, the table above applies.

7 Safety data

1. Laser range-finders (LRF), hand-held

Configuration						NOHD		EOHD			Required eye protection		
Laser (Product-name)	SAP-ID	Filter	Danger kl.	Wave-length	Effect	Multi Puls/ cont.	Short expon. (<3ms)	7x50+	10x42+	12x120+	non-magnifying OD	Magni-fying OD	Single puls OD
		dB		nm		meter		meter			Not named		
Laser range-finders (LRF), hand-held													
NM129			3B	1064		6900	5100	48000	43950				
PLRF 10			1										
PLRF 15			1										
Vector													
PLRF25C	30130608		1	1550									
Moskito LF	30143604		1	1550									

Figure: V13.1
Laser range-finders (LRF), hand-held

2. Laser pointers, hand-held weapon

Configuration						NOHD		EOHD			Required eye protection		
Laser (Product-name)	SAP-ID	Filter	Danger kl.	Wave-length	Effect	Multi Puls/ cont.	Short expon. (<3ms)	7x50+	10x42+	12x120+	non-magnifying OD	Magni-fying OD	Single puls OD
		dB		nm		meter		meter			Not named		
Laser range-finders (LRF), hand-held													
AN/PEQ-2A	30044674	Low output (L) is exercise mode, high output (H) is tactical/live											
IR-pointer, (L), «AIM LO»			1	840 ±20	0,5 ± 0,1 mW	0		0			0,2		
IR pointer/illuminator, (L), «DUAL LO»			3R	840 ±20	0,5 ± 0,1 mW	40		260			0,2		
IR-pointer, (H)			3B	840 ±20	25 mW ± 10 %	325		2325			2		
IR pointer/illuminator, (H)			3B	840 ±20	30 mW (+50, -20 %)	325		2325			2		
AN/PEQ-16B	30143854	Low output (L) is exercise mode, high output (H) is tactical/live											
IR-pointer (L)			1	840 ±20	600 ±60 µW	0		0					
IR-pointer (H)			3B	840 ±20	25 ±5 mW	220		1550			820-850 D LB4		
IR pointer/illuminator (L/L)			3R	840 ±20	600 ±60 µW/ 3,0 +0,5/-0,45 mW	15		100			820-850 D LB4		
IR pointer/illuminator (H/H)			3B	840 ±20	25 ±5 mW/ 30 +15/-6 mW	220		1550			820-850 D LB4		
Red pointer			3R	635 ±30	4,0 ±1,0 mW	100		675			625-655 D LB4		
M6X													
Red pointer			3R	640 - 670	4,05 - 4,95 mW	175		1250			1,1		
IR-pointer			3R	820 - 850	0,5 - 0,7 mW	15		200			0,2		
LA-5/PEQ	30143859	Output is designated L/M/H (Low/Medium/High)											
Red pointer (L)			3R	625 - 655	4,5 ± 0,45 mW	75		530			625-655 D LB3		
Rød peker (H)			3B	625 - 655	20 mW (± 5,0mW)	170		1210			625-655 D LB4		
IR-pointer (L)			3R	820 - 860	0,6 ± 0,1 mW	10		55			820-850 D LB2		
IR-pointer (H)			3B	820 - 860	25 mW +9,1/-5,3 mW	130		910			820-850 D LB4		
IR pointer/illuminator(L/L)			3R	820 - 860	0,6 ± 0,1 mW / 3,0 mW +,36/-,77 mW	50		345			820-850 D LB3		
IR pointer/illuminator(M/H)			3B	820 - 860	1.5 (± .25 mW) / 150 mW +10/-32 mW	340		2400			820-850 D LB5		
IR pointer/illuminator (H/H)			3B	820 - 860	25 +9,1/-5,3 mW / 150 +10/-32 mW	360		2540			820-850 D LB5		

Figure: V13.2
Laser pointers, hand-held weapon

3. Vehicle-mounted systems

Configuration						NOHD		EOHD			Required eye protection		
Laser (Product-name)	SAP-ID	Filter	Danger kl.	Wave-length	Effect	Multi Puls/ cont.	Short expon. (<3ms)	7x50+	10x42+	12x120+	non-magnifying OD	Magni-fying OD	Single puls OD
		dB		nm		meter		meter			Not named		
Vehicle-mounted systems													
RWS - NORDIC		Low output (L) is exercise mode, high output (H) is tactical/live											
IR-peker (L / H)			1 / 3B	850	0,71 mW / 38 mW	0 / 250		0 / 1450					
SYNLIG-peker (L / H)			2 / 3B	650	0,95mW / 28 mW	0 / 250		0 / 1450					
LAM (L / H)			1	905		0		0					
CV9030 (SPV/OPV/STRILED)		Low output (L) is exercise mode, high output (H) is tactical/live											
Tube laser													
IR-Pointer (L / H)			1 / 3B	850	0,71 mW / 38 mW	0 / 250		0 / 1450					
SYNLIG-Pointer (L / H)			2 / 3B	650	0,95mW / 28 mW	0 / 250		0 / 1450					
LAM (L / H)			1	1540		0		0					
UTAAS													
LAM			1M	1540		0			457				
OTAS													
LEOPARD 2A4		With attenuation filter fitted (M) or without fitted attenuation filter (U)											
M / U			3B			300 / 2500		2000 / 17300					
Vingtaqs I/II		With attenuation filter fitted (M) or without fitted attenuation filter (U), Low output (L) is exercise mode, high output (H) is tactical/live											
LAM			1M	1540	4-12 mJ	0		163					
IR-Pointer (AeroPoint LTP)													
M / L		OD 5	1M	860	500 mW	0		0					
U / H			4	860	950 mW	270	70	1780	6080	10600	3,5		
-pulse M / U			4	860	>950 mW @ 3-4 Hz	0 / 270		0 / 1780	6080	10600	3,5		
Target illuminator (LTD)													
Cilas DHY 307			4	1064	>85 mJ	16300		114000		116000			
- training filter		21,6		1064		1360		9500		9700			

Figure: V13.3
Vehicle-mounted systems

4. Laser pointers, unit weapon + air support

Configuration						NOHD		EOHD			Required eye protection		
Laser (Product-name)	SAP-ID	Filter	Danger kl.	Wave-length	Effect	Multi Puls/ cont.	Short expon. (<3ms)	7x50+	10x42+	12x120+	non-magnifying OD	Magni-fying OD	Single puls OD
		dB		nm		meter		meter			Not named		
Laser pointers, unit weapons + air support													
GBD III			3B	532 ± 10	250 mW	1200	600	8300			2,7		
IZLID 1000P (IR-pointer)													
- High			4	860 ± 10	910 mW	650	200	4500			2,7		
- Low			4	860 ± 10	500 mW	420							
- Puls			4	860 ± 10	910 mW	650							
IZLID 200P													
- high			3B	830 ± 10	195	450	100	3000			2,4		
- low			3B	830 ± 10	105	300							
- pulse			3B	830 ± 10	195	450							
GCP-1/1A			3B	820		100							
GCP-1B			3B	820		250							
HPLT V.4			4	940		1000		6980		7120			
- pulse			4	940		900		6360		6490			

Figure: V13.4
Laser pointers, unit weapon + air support

5.Laser-designators, air support

Configuration						NOHD		EOHD			Required eye protection		
Laser (Product-name)	SAP-ID	Filter	Danger kl.	Wave-length	Effect	Multi Puls/ cont.	Short expon. (<3ms)	7x50+	10x42+	12x120+	non-magnifying OD	Magni-fying OD	Single puls OD
		dB		nm		meter			meter		Not named		
Laser-designators, air support													
GLTD II			4	1064		20000							
LTDI			4	1064	> 70 mJ	45000			319000		5		
+ trainingsfilter			3B			8300			61000				
+ diffusion filter			3B			0,78			5600				

Figure: V13.5
Laser-designators, air support

6. Multifunction binoculars

Configuration						NOHD		EOHD			Required eye protection		
Laser (Product-name)	SAP-ID	Filter	Danger kl.	Wave-length	Effect	Multi Puls/ cont.	Short expon. (<3ms)	7x50+	10x42+	12x120+	non- magnifying OD	Magni-fying OD	Single puls OD
		dB		nm		meter			meter		Not named		
Multifunction binoculars													
MOSKITO TI	30235214												
- Range-finder			1	1550		0		0					
- IR-pointer			1	840		0		0					
JIM COMPACT	30233475	With attenuation filter fitted (M) or without fitted attenuation filter (U)											
- Range-finder			1	1550		0		0					
- IR-pointer (M / U)			1 / 3B	840	14,4 µW / 16,3 mW	0 / 123		0 / 869			LB3 @ [795-860]nm		

Figure: V13.6
Multifunction binoculars

7.Air defence systems

Configuration						NOHD		EOHD			Required eye protection		
Laser (Product-name)	SAP-ID	Filter	Danger kl.	Wave-length	Effect	Multi Puls/ cont.	Short expon. (<3ms)	7x50+	10x42+	12x120+	non-magnifying OD	Magni-fying OD	Single puls OD
		dB		nm		meter		meter			Not named		
Air defence systems													
NASAMS, EO sensor MSP 500													
LAM (6 Hz MOLEM)			1M	1543									

Figure: V13.7
Air defence systems

8. OTAS

Configuration						NOHD		EOHD			Required eye protection		
Laser (Product-name)	SAP-ID	Filter	Danger kl.	Wave-length	Effect	Multi Puls/ cont.	Short expon. (<3ms)	7x50+	10x42+	12x120+	non-magnifying OD	Magni-fying OD	Single puls OD
		dB		nm		meter		meter			Not named		
OTAS													
OTAS													
IR-pointer (L / H)			1 / 3B	850	0,67 mW / 30 mW	0 / 180		0 / 1300					
SYNLIG-pointer (L / H)			2 / 3B	650	0,67mW / 30 mW	0 / 320		0 / 2250					
LAM (L / H)			1	1540		0		0					

Figure: V13.8

OTAS

Appendix 14.
14 SAFETY PROVISIONS FOR EXERCISES ETC. AT POWER SUPPLY INSTALLATIONS

Approved by the Directorate for Civil Protection and the Norwegian Water Resources and Energy Directorate with effect from 2021

Foreword

These safety provisions set out safety regulations intended to ensure safe and proper performance of exercises, with an emphasis on reducing the risk involved in performing exercises within high voltage facilities.

"Administrative regulation on safety when working in and operating electrical installations" (FOR 2006-04- 28 nr. 458), laid down by *the Directorate for Civil Protection (DSB)* with the support of the Act of 24 May 1929 no. 4 on the inspection of electrical installations and electrical equipment, is intended to ensure safety when working on or near to electrical installations.

This covers lawful access to fenced-off or closed-off major high-voltage installations. There are requirements for organising safety work, overall organisation and for activities to be sufficiently planned, and also for ensuring that the necessary safety measures are taken to ensure the avoidance of injury to life, health and materiel values.

Pursuant to section 9-5 of the Energy Act (LOV-1990-06-29-50), *Duty of notification, right of access and conditions for access*, , all companies subject to the preparedness chapter in the Energy Act undertake to give the emergency preparedness agency access to grounds, buildings, installations and such like on presentation of valid identification. The same applies to access for the police and military authorities when in connection with preparations for and provision of armed security. The emergency preparedness agency as in chapter 9.*Preparedness* in the Energy Act is delegated to the Norwegian Water Resources and Energy Directorate (NVE). This covers, among other things, authority to issue administrative regulations and to make administrative decisions with respect to preparedness, safety and security measures in power supply, and also covers section 9-5. The NVE presumes therefore that the police and the armed forces will comply with the safety regulations for exercises in and close to electrical high voltage facilities.

The administrative regulation on security and preparedness in the energy supply (the energy preparedness regulation) (FOR-2012-12-07-1157 – as amended by FOR-2018-11-01-1641 in force from 01.01.2019) as laid down by the NVE pursuant to the Energy Act, provides further provisions concerning, among other things, security measures, preparedness planning and exercises.

Section 5-10 of this administrative regulation, **Guarding**, has provisions stating that owners or operators of power supply installations (objects) that are prioritised for guarding in extraordinary situations must contribute to planning and implementing guarding in cooperation with the police and the armed forces.

This duty includes, among other things, the following:

a. Pointing out the installation’s vital parts and other features.

b. Obtaining materiel for securing the installation and taking other action in order to assist the guarding forces.

c. Making preparations for exercises on the installation's premises.

The NVE can, in accordance with this section, issue further provisions for securing objects and for conducting exercises in high voltage installations.

All enterprises (power companies, grid operators or similar) that own or operate relevant objects are units in "The power supply sector’s preparedness organisation" (KBO) with the legally imposed duties this entails with respect to security and preparedness. These units have a designated preparedness coordinator who is able to act as a contact link.

Applicable *"Object security instructions" – "Instructions with respect to guards and securing objects using security forces from the police and the armed forces in times of peace, crisis and armed conflict"* – were laid down by the government on 21 June 2019.

These *"Safety provisions for exercises etc. at power supply installations"* have been drafted in order to clarify the relationship between the above provisions, and to ensure consideration of the correct and safe conduct of exercises at and in power supply installations. The safety provisions provide further regulations for how exercises at power supply installations are to be planned and conducted, and also concerning the individual’s responsibility.

The safety provisions have been approved by the Directorate for Civil Protection and the Norwegian Water Resources and Energy Directorate pursuant to the government agencies’ legislation.

SAFETY PROVISIONS FOR EXERCISES ETC. AT POWER SUPPLY INSTALLATIONS

1 INTRODUCTION

1.1 Area of application

These safety provisions have been stipulated for exercises and similar at all power supply installations to which access is required in accordance with the Administrative regulation on safety when working in and operating electrical installations. The aim of this regulation is to avoid injury to life and health (personal safety) and to materiel values in connection with activities at or near to electrical installations. This will also be applicable when, in accordance with chapter 9 (Preparedness) of the Energy Act, preventive safety and preparedness measures can be ordered.

It is the operations manager at the installation, or someone appointed by this person, who gives access to the high voltage installation when said manager or appointee considers these safety provisions to be met. The authorities and agencies that have been given access to such installations comply with the stipulated safety provisions and contribute to good personal safety.

1.2 Purpose

Certain power supply installations have been or can be prioritised for maintaining armed guards and other measures that may require the use of force should the situation require it. This covers objects that have been designated in advance by the police and so-called key objects according to "object security instructions". Guards/deployed forces (security forces) may come from the police, the Home Guard or other branches of the Norwegian Armed Forces.

In order to ensure that guards familiarise themselves with the installations, plan and train in the deployment that may be required, it is imperative that realistic exercises are conducted. This directive provides rules for how to carry out exercises safely and properly, emphasising how to reduce the risk involved with all exercises at high voltage installations. The safety provisions satisfy the requirements set out in the *"Administrative regulation on safety when working in and operating electrical installations"* (FSE) for this type of activity.

2 NOTIFICATION AND PLANNING

2.1 Notification

The unit from the armed forces, police or similar that is planning exercises at a power supply installation sends written notification to the relevant object owner. All relevant object owners have a preparedness coordinator with whom initial contact is made. Details of the preparedness coordinator can be obtained from the Preparedness Section of the NVE. The preparedness coordinator then contacts the operations manager internally.

Notification is sent as soon as the time of the exercise has been finally decided on no later than two months before the exercise is to be held. Information is provided concerning time frame, duration, scope and other important factors.

The unit from the armed forces, the police or similar must state specifically whether the exercise is planned to be conducted partly or wholly within the power supply installation's fenced-off/closed-off area.

2.2 Contact persons

The unit appoints an OCE, who is in charge of the concrete planning and implementation of the exercise at the relevant power supply installation.

The OCE and the installation owner as represented by his/her operations manager), or this person's authorised representative, will function as contact persons.

2.3 Planning

A meeting is to be arranged in good time before the exercise commences, at which the said contact persons meet, discuss and determine the plan and its details – particularly focusing on safety for personnel.

The power supply installation must be inspected and the specific content of/elements in the exercise are to be decided. The following must be determined (and clearly marked on a map):

- Those areas/parts of the installation where, according to *the Administrative regulation on safety when working in and operating electrical installations*, access permission is required, i.e. rooms and fenced-off areas for high voltage installations.
- Parts of the installation where training must be conducted and where access may be granted (i.e. "safe" and restricted areas)
- Restrictions that must be imposed on the exercise itself or the elements which are to be trained.

For safety measures, see the points below.

3 IMPLEMENTATION – RESPONSIBILITIES AND DUTIES

3.1 Scope

The exercise will normally be limited in time to one working day plus one night (up to 2400 hours). In addition, time during the previous or next working day must be set aside for preparations, instruction, tidying up, etc.

The training force must not be so large that carrying out efficient instructions and checks before the exercise becomes difficult and at the same time keeping full control during the exercise. The permitted number of participants should be considered in each separate case.

3.2 Preparations

The installation's owner

The owner of the installation must ensure sufficient staffing during the exercise so that a general overview can be maintained at all times.

In addition to the operations manager, or a person authorised by him/her, a safety commander must also be appointed during the exercise. Wherever appropriate, this person's responsibilities and tasks will subsequently be in accordance with the Administrative regulation on safety when working in and operating electrical installations, see section 12. Safety in the workplace, and elsewhere, without this being specified at each single point in the following.

Operations manager

The operations manager, or someone authorised by this person, and the safety commander in coordination with the OCE and the exercising unit, ensure there is marking/signage, that "hazardous" parts/areas of the installation are cordoned off, high voltage rooms, battery rooms, switching rooms etc. are locked, or if possible parts of the installation are disconnected.

The training force will normally be allowed to use the installation's facilities, such as toilets, rooms suitable for setting up command posts, official use of telephones, rest rooms, etc. With regard to the preparation of facilities for the guard unit, see section of "Directions for securing power supply installations", section 5-10 Guards.

OCE

The OCE is responsible for briefing the commander of the training unit on all plans and agreements concerning safety at the power supply installation.

Commander of the training unit

Before the exercise commences, the commander of the training unit must study all plans, arrangements and decisions concerning safety etc. at the power supply installation.

3.3 Access

Prior to the exercise

Prior to the exercise the commander of the training unit selects the crews that are to be given access to the power supply installation. All must be individuals he/she considers suitable of being given access. The operations manager, or a person he/she has authorised, must have a list of names of the persons that have been cleared for access.

Persons who have been given access may not use intoxicants or narcotics (alcohol etc.) prior to or during the exercise (the access authorisation). Such substances may not be brought into the installation. The operations manager, or a person he/she has authorised, in cooperation with the OCE, must dismiss such people from the area.

Prior to the exercise, the operational manager, or a person authorised by him/her, must ascertain that the appointed crews receive the required safety instructions, including:

- reviewing the installation's floor plans and construction
- hazards

- hazard distance and safe distance
- electrical accidents and first aid
- a walk-through of the installation
- "safe" area & cordoned-off areas
- special circumstances (movement at heights above ground, use of vehicles, communications equipment, etc.)

The operations manager, or a person he/she has authorised, may give time-limited access to these. Numbered access cards should be used in addition to the list of names in order to maintain an overview over who has been issued a specific card and who has legitimate access.

Commander of the training unit

The commander of the training unit is responsible for the safety of his/her own crews during the exercise. He/she must ensure that all personnel who are given access to the power supply installation in connection with the exercise have been cleared for access and have received the required safety instructions (see point. 3.3.1).

OCE

The OCE is responsible for ensuring that the exercise is conducted within the agreed area(s), and that it is conducted according to plan.

Participating personnel

Participating personnel who do not observe the directions they are given – including signs and cordons – may be dismissed from the fenced-off area for high voltage power installations by the OCE or the commander of the training unit. The operations manager, or a person he/she has authorised, or a safety commander may demand that such action is taken immediately.

If the exercise, or elements of the exercise, is considered to be developing in an undesirable way in terms of safety by the operations manager or a person acting under his/her authority, the exercise/element must be stopped immediately.

3.4 Special provisions

Use of vehicles

As a general rule, the use of the exercising unit’s vehicles is prohibited inside the installation.

If special needs become apparent in the course of planning, the operations manager or a person acting on his/her behalf may authorise:

- Stationary vehicles (command or communication vehicles, ambulances etc.) which are stationed before the exercise commences and withdrawn after completion of the exercise
- Non-stationary vehicles in connection with special missions or tasks, on condition that these only are used on transportation aisles designed for vehicles in accordance with section 4-5 of Regulations on electric supply installations, and marked with cordons

Antennae or other high objects may not be mounted on vehicles.

Long/tall objects

Bringing and using long objects of about 2 metres or more, such as antennae, ladders, etc., is prohibited within the premises of the power supply installation.

Any particular need for ladders for entering buildings etc. must be clarified during planning of the exercise, so that this takes place in a safe area, and with the necessary markings and cordons in place.

Communications equipment and exercise materiel

Use of communications equipment – such as radio transmitters, cables, etc. and use of training ammunition, flash-bangs, illumination shells, smoke grenades etc. must be clarified during planning of the exercise and be authorised by the operations manager, or a person acting on his/her authority.

Darkness and poor visibility

Special consideration is required when conducting exercises in darkness and in poor visibility. If visibility is particularly reduced by e.g. dense fog, snow drift, etc. the exercise should be called off or postponed.

3.5 Responsibility in case of accidents

The operations manager or a person acting on his/her authority has responsibility for the required safety instructions, cordoning off areas, etc. (see points 3.2.2, 3.3.1 and 3.4.2). The OCE and all participants individually are responsible for observing issued instructions, guidelines, restricted areas, etc.

Should an accident occur as a result of non-observance of issued instructions and guidelines, e.g. by not respecting restricted areas, responsibility lies with the OCE and the individual participant.

4 EVALUATION AND FOLLOW-UP

4.1 Shortly after completion of the exercise, there must be an evaluation or debriefing of the exercise, including a review of safety. The commander of the training unit must report back to the owner of the object.

If required, there is a follow-up meeting between the object owner and the training unit.

The OCE and the operations manager are responsible for follow-up in the form of specific measures and additions/amendments to the planning.

The evaluation should also be communicated to the preparedness coordinator and others so that the experiences can be utilised for other installations and other training units.

5 FINANCIAL ASPECTS

5.1 The commander of the training unit is responsible for clearing up etc. after the exercise activity. Any damage caused by those participating in the exercise to the object owner or to others must be immediately reported through official channels.

Each party is to cover their own costs when planning and carrying out exercises conducted in accordance with these provisions.

6 IMPLEMENTATION

6.1 These provisions have been laid down by the Directorate for Civil Protection (DSB) pursuant to the Act of 24 May 1929 no. 4 regarding the supervision of electrical installations and by the Norwegian Water Resources and Energy Directorate (NVE) pursuant to the Act of 29 June 1990 no. 50 relating to the generation, conversion, transmission, trading, distribution and use of energy etc. [Energy Act].

The safety provisions are laid down for use with effect from 2021, and replace the Directive regarding the same of 1 September 1993 with subsequent amendments, which is thus repealed.

Appendix 15.
15 INPUT DATA FOR HOW TO DRAW UP SAFETY TEMPLATES

Small arms I

Weapons	MP 7 single shot	MP 7 automatic fire	HK 416 primary sight single shot	HK 416 sekundary sight single shot	HK 416 automatic fire	LMG Minimi
Ammunition	4.6mm	4.6mm	5.56mm	5.56mm	5.56mm	5.56mm
A_{max} (m)	1310	1310	2970	2970	2970	2970
A_{min} (m)	0	0	0	0	0	0
α_{side} (°)	13	33	8	8	61	19
α_{opp} (°)	13	68	7	7	104	13
α_{ned} (°)	13	48	8	11	75	10
IA_{crit}(°)	533	533	533	533	533	533
β(°)	800	800	800	800	800	800
MRR (m)	1090	1090	2490*	2490*	2490*	2490*
W_R (m)	180	180	420	420	420	420
s (m)	0	0	0	0	0	0
Note						

* MRR=1,900 m and WR=320 m may be used when firing at ranges of up to 600 m.

Small arms II

Weapons	AG-3 single shot	HK 417	MINIMI 7,62/FN MAG/ MG-3	Other 7.62 mm single shot	MRAD .338	MP5	Pistol single shot	GUR
Ammunition	7.62mm	7.62mm	7.62mm	7.62mm	8.6mm	9mm	9mm	40mm
A_{max} (m)	3200	3200	3200	3200	5600	1650	1650	450
A_{min} (m)	0	0	0	0	0	0	0	100
α_{side} (˚)	14	5	24	100	5	17	100	57
α_{opp} (˚)	12	5	22	70	5	12	70	74
α_{ned} (˚)	15	5	19	7	5	25	50	59
IA_{crit}(˚)	533	533	533	533	533	533	533	533
β (˚)	800	800	800	800	800	800	800	800
MRR (m)	2760	2760	2760	2760	4400	1350	1350	380
W_R (m)	460	460	460	460	730	220	220	50
s (m)	0	0	0	0	0	0	0	100
Note		Marksman						

Appendix 16.
16 INPUT DATA FOR DRAWING UP SAFETY TEMPLATES

12,7 mm and Medium calibre

Weapon	AM	M2**	M2	Mk II	Mk II	Mk II	GMG ***
Ammo	12.7 mm MP/ TP	12.7 mm MP/TP	12.7 mm RR	30 mm MP/TP	30 mm APFSDS	30 mm TPDS	40 mm
A_{max} (m)	5150	5330	3820	8770	32410	7400	2210
A_{min} (m)	100	100	0	120	120	120	150
α_{side} (°)	5	19	19	5	5	5	17/27
α_{opp} (°)	5	25	25	5	5	5	14/31
α_{ned} (°)	5	25	25	5	5	5	23/42
IA_{crit} (°)	533	533	533	533	300	533	533
β (°)	800	800	800	800	800	800	800
MRR (m)	4110	4260	3100	6590	13830	5720	1800
W_R (m)	670	700	520	1080	2280	930	280
s (m)	100*	100*	0	120*	0	0	100
β_{sa} (°)				500	500	500	
l_{sa} (m)				70	500	500	
Note (1)	Also apply to Ball/APS						
Note (2)	Apply to tracer. 10% shorter distance without tracer						

* Only apply to splintering ammunition

** Apply to all platforms

*** GMG values with "/" indicate single/multiple shots.

17 Appendix 17. INPUT VALUES FOR CONSTRUCTING SAFETY TEMPLATES

Anti-tank weapons

Ammunition	M72 live round	M72 training 21mm
A_{max} (m)	1310	840
A_{min} (m)	75	
α_{side} (°)	21	21
α_{up} (°)	25	25
α_{down} (°)	27	27
IA_{crit} (°)	300	
β (°)	800	
MRR (m)	830	
W_R (m)	130	
s (m)	200	
β_{sa} (°)	500	
l_{sa} (m)	200	
u (m)	40	
y (m)	25	
Note		

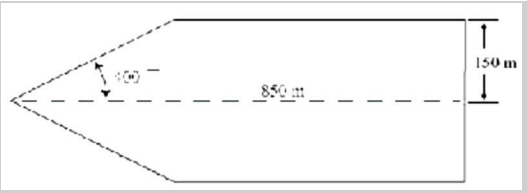


Figure: V17.1

Safety template M72 21mm training

Appendix 18.
18 INPUT VALUES FOR CONSTRUCTING SAFETY TEMPLATES

84mm recoilless gun ”CG”

Ammo	HE FFV441B	HEAT FFV551	SMK FFV469	ILL FFV545	Training NM227	63mm Training NM191	Training 7.62mm
A_{max} (m)	2470	3400	2470	2800	3400	1980	2410
A_{min} (m)	400	150	150	300	50	50	50
α_{side}(°)	21	21	21	200	21	21	21
α_{up} (°)	26	26	26	200	26	26	26
α_{down} (°)	32	32	32	200	32	32	32
IA_{crit} (°)	530	530	530	530	530	530	530
β (°)	800	800	800	800	800	800	800
MRR (m)	2000	2700	2000	2250	2700	1600	2150
W_R (m)	270	420	310	380	450	260	360
s (m)	400	150	150	100	0	0	0
β_{sa} (°)	500	500	500	500	500	500	
l_{sa} (m)	150	150	150	150	150	150	
μ (m)	40	40	40	40	40	40	15
γ (m)	60	60	60	60	60	60	15
Note							

Appendix 19.
19 INPUT VALUES FOR CONSTRUCTING SAFETY TEMPLATES FOR PLASTIC SHORT RANGE TRAINING AMMUNITION

PLASTIC SHORT RANGE TRAINING AMMUNITION

Ammo	5.56 mm	7.62 mm	12.7 mm	12.7 mm SPL
A_{max} (m)	200	260	450	650
A_{min} (m)	0	0	0	0
α_{side}(°) (calm)	8(61)	14(24)	5(19)	5(19)
α_{side} (°) (wind)	14(62)	27(34)	56(59)	46(50)
α_{opp}(°)	7	12	5	5
α_{ned}(°)	11	15	5	5
IA_{crit}	533	533	533	530
β (°)	800	800	800	800
MRR (m)	170	220	380	450
W_R (m)	30	40	60	80
s(m)	0	0	0	0
Comments Single shot with multiple shot in brackets				

Appendix 20.
20 INPUT VALUES FOR CONSTRUCTING SAFETY TEMPLATES

Leo II Tank gun 120 mm

Ammunition	APFSDS DM53A1	TPCSDS GX558B	IM HE/TP NM253/254	27mm ØV SCORE
A_{max} (m)	118400	8810	11380	7180
A_{min} (m)	250	250	250	120
α_{side}(˚)	5	5	5	10
α_{up} (˚)	5	5	5	10
α_{down} (˚)	5	5	5	10
IA_{crit} (˚)	300	300	300	533
β (˚)	800	800	800	800
MRR (m)	28080	6140	6430	5500
W_R (m)	4660	980	1030	900
s (m)	0	0	500*	0
β_{sa} (˚)	500	500	500	-
l_{sa} (m)	700	700	120	-
Note				

* Only apply to splintering ammunition

Appendix 21.
21 INPUT VALUES FOR CONSTRUCTING SAFETY TEMPLATES

Claymore Mines

Ammunition	M19	M100
A_{max} (m)	360	620
α (˚)	200	200
IA_{crit} (˚)	533	533
β (˚)	800	800
MRR (m)	310	530
W_R (m)	50	90
s (m)	300	500
δ (˚)*	1000	900
Note		

* – Total dispersion angle for splinters

Appendix 22.
22 TESTING AND TRIAL OPERATION OF WEAPONS AND AMMUNITION

Approval for testing and trial operation

When conducting the testing or trial operation of weapons and ammunition, there must be approval for testing and trial operation (TFG-TP) from a competent authority for materiel (the Norwegian Defence Materiel Agency). This covers testing or trial operation in the context of development, procurement and configuration-modification of weapons and ammunition, or supplementary equipment for weapon systems and ammunition. TFG-TP is provisional and time-limited to a maximum of 6 months.

Risk assessment

Risk assessment of testing or trial operation must be conducted and documented as part of TFG-TP. Special measures for reducing the risk of injury to friendly personnel and third parties must be considered. These measures could include personal protective equipment, physical measures or protective rooms.

Test plan

TFG-TP must include a test plan containing detailed descriptions of tests to be conducted. The test plan must also include a risk assessment, safety templates and EOD procedures if required. The test plan must be submitted to and approved by the competent authority for firing ranges and training grounds before testing begins. Deviations from the plan require to the approval of the test commander and competent authority. If necessary, a new risk assessment must be conducted and documented. The test plan must include a plan for potential visitors and someone must be assigned to accompany said visitors.

Personnel for command and control

The risk assessment must cover a requirement for personnel for command and control. For test firing, the following personnel with responsibility for safety are to be appointed:

- Test commander (may also function as firing commander)
- Firing commander (may also function as test commander)
- Safety commander (may also function as safety supervisor and EOD operator)
- Safety supervisor
- Safety guards (according to instructions and types of tests)
- EOD operator

In case of comprehensive tests requiring large number of test personnel and measurements, the test commander will usually be from the Norwegian Defence Materiel Agency’s Land Systems Division, testing and verification department.

Before testing begins, the test commander must ensure that all participating personnel are familiar with the test plan and applicable safety regulations.

Safety templates

If safety templates are not available, a risk analysis must be conducted in order to establish safety templates applicable to testing and trial operation. This must include an evaluation of safety for own personnel and third parties. The probability of injury to own personnel and any third parties should be in accordance with what is acceptable to society in general.

It is acceptable for existing safety templates to be reduced in cases where the weapon's movements are physically restrained and special documented procedures secure that the weapon systems are set up correctly. This will also apply when the explosion of ammunition is guaranteed, for instance when firing from a culvert.

Appendix 23.
23 INPUT DATA FOR DRAWING UP SAFETY TEMPLATES
M109/ L39 barrels

Introduction

Construction of the templates is based on the following factors:

D_{max}:	Max. firing distance which can be achieved with a specific charge/round combination
A_{min}:	Minimum permitted firing distance for a specific charge/round combination
D_r:	If the firing distance is greater that D_r, the danger of ricochets can be disregarded
A:	Actual firing distance (each 1,000 m from A_{min} to D_{max})
Q_p:	The distance from the target to the point from which the ricochet angle Q is to be measured
c:	Ricochet angle
BR_h:	The width of the danger area on this side of the target
k:	Splinter distance, varies with calibre. For 155mm, set k to 600m
M:	Safety angle
Q:	Ricochet angle
W:	Angle of lateral dispersion
l:	Danger distance beyond the target
f:	Danger distance on this side of the target

A list of D_{max} , D_{r} , A_{min} for 155 mm and 105 mm NM 28 and OEF3 HB/BB in the M109A3GNM is shown in the following table:

Ammunition (155 mm/39 kal)	**Charge**	**D_{max}**	**D_r**	**A_{min}**	**Vo-area**
NM28/ OEF3 HB	3W	8000	7000	2000	275-310
NM28/ OEF3 HB	4W	9000	8000	4000	310-355
NM28/ OEF3 HB	5W	11000	9000	5000	370-415
NM28/ OEF3 HB	6W	13000	11000	6000	445-490
NM28/ OEF3 HB	7W	15000	12000	7000	530-580
NM28/ OEF3 HB	30	14000	11000	6000	475-550
NM28/ OEF3 HB	40	18000	14000	8000	610-690
OEF3 HB	50	23000	16000	12000	765-850
OEF3 BB	7W	18000	14000	9000	550-600
OEF3 BB	40	22000	16000	11000	635-700
OEF3 BB	50	29000	20000	15000	780-870
BONUS	7W	17000	10500	8000	520-570
BONUS	40	21000	12500	10000	600-700
BONUS	50	27000	15500	15000	730-860

When firing Base Bleed ammunition a theoretical possibility must be considered that the Base Bleed element will not function and that the round will therefore have a considerably shorter range than estimated. To allow for this when calculating the safety template, Danger distance on this side of the target must be calculated based on a shortened firing distance A according to the table below:

Round: OEF3 (155 mm/39 kal)			
	Charge 7W BB	Charge 40 BB	Charge 50 BB
Target distance (km)	Shortened target distance (km)	Shortened target distance (km)	Shortened target distance (km)
9	7,9		
10	8,7		
11	9,5	9,6	
12	10,4	10,3	
13	11,2	11,1	
14	12,1	11,9	
15	12,9	12,7	12,9
16	13,7	13,5	13,7
17	14,5	14,4	14,4
18	15,2	15,2	15,2
19		16,1	16,0
20		16,9	16,8
21		17,7	17,6
22		18,4	18,4
23			19,2
24			20,0
25			20,8
26			21,6
27			22,4
28			23,2
29			23,8

Round: BONUS (155 mm/39 kal)			
	Charge 7W BB	Charge 40 BB	Charge 50 BB
Target distance (km)	Shortened target distance (km)	Shortened target distance (km)	Shortened target distance (km)
8	6,8		
9	7,8		
10	8,8	8,6	
11	9,7	9,6	
12	10,6	10,5	
13	11,5	11,3	
14	12,4	12,2	
15	13,2	13,1	13,2
16	14,0	14,0	14,0
17	14,5	14,9	14,9
18		15,8	15,7
19		16,6	16,6
20		17,4	17,4
21		17,7	18,3
22			19,1
23			20,0
24			20,9
25			21,7
26			22,5
27			22,6

Danger area is calculated as follows:

For A < D_r (ricochet may occur)

l	= 0,4 x D_r - 0,3 x A
c	= 0,001 x (D_{max} x W) + 0,1 x (D_r -A)
BR_h	= 0,001 x D_{max} x W
f	= 0,1 x A

NB! f min = 400 meter

For A > D_r (ricochet risk disregarded)

l	= f = 0,1 x D_r
c	= BR_h = 0,001 x D_{max} x W

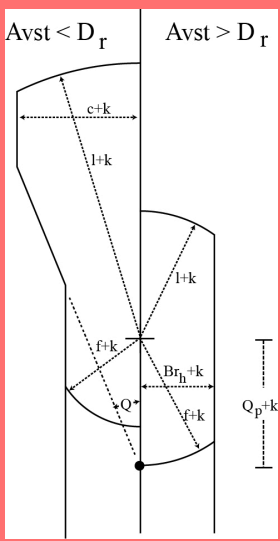


Figure: V23-1
Construction of safety templates for field artillery

Appendix

Appendix 24.
24 FORM FOR EVALUATING/ASSESSING RISK

Risk management

Mission/task:

Executed by:

Date:

Page:

of total no.of pages:

Unit:

No.	Main activity:	Danger:	Cause:	C :(1)	P :(2)	R:(3)	Measures:		Remaining risk:	Note:

Further comments:

[1] Consequence: 5 – critical, 4 – serious, 3 – moderate, 2 – minor, 1 - insignificant

[2] Probability: 4 – probable, 3 – possible, 2 – maybe, 1 - unlikely

[3] Consequence * probability

[4] Responsibility and deadline

[5] For instance: Approval from higher authority, more facts needed, conducting ORM for the main activity required, etc.

Appendix

UD 2-1 Armed Forces Safety Rules and Regulations.

Appendix 25.
25 LIST OF CERTIFIED TRAINING - ARMY

25.1 Competent authority Manoeuvre

Specialisation code	Specialisation/ Service position	Requirements		Course title	Time in education	Pass requirement	Validity	Note
		Driving licence	Personnel					
1314190047	Driver Leopard 2	Class B	Soldiers/ grenadiers/ officers/NCOs	Hull course Leo 2	According to technical plan	Final exam, theory and practice	10 years	
1314190046	Driver Leopard 1	Class B	Soldiers/ grenadiers/ officers/NCOs	Hull course Leo 1	According to technical plan	Final exam, theory and practice	10 years	
1314170010	Driver CV-90 SPV	Class B	Soldiers/ grenadiers/ officers/NCOs	Hull course CV9030N	According to technical plan	Final exam, theory and practice	10 years	
	Driver CV-90RWS	Class B	Soldiers/ grenadiers/ officers/NCOs	Hull course CV90RWS	According to technical plan	Final exam, theory and practice	10 years	
	Driver Wisent 2	Class B	Soldiers/ grenadiers/ officers/NCOs	Hull course Wisent 2	According to technical plan	Final exam, theory and practice	10 years	
1314180019	Driver M113 A2	Class B	Soldiers/ grenadiers/ officers/NCOs	Hull course M113 A2	According to	Final exam, theory and practice	10 years	

					technical plan			
1314180020	Driver M113 F3	Class B	Soldiers/ grenadiers/ officers/NCOs	Hull course M113 F3	According to technical plan	Final exam, theory and practice	10 years	
1316180057	Driver M109	Class B	Soldiers/ grenadiers/ officers/NCOs	Hull course M109	According to technical plan	Final exam, theory and practice	10 years	
	Driver K9/K10	Class B	Soldiers/ grenadiers/ officers/NCOs	Hull course K9/K10	According to technical plan	Final exam, theory and practice	10 years	
	MUAS Operator certification	MUAS introduction course	Grenadiers/ officers/NCOs	Operator course Puma RQ-20B	1+3 weeks	Exam, theoretical and practical	No expiry date	
	MUAS Operator certification	MUAS introduction course	Grenadiers/ officers/NCOs	Operator course Wasp RQ-12A	1 week	Exam, theoretical and practical	No expiry date	
	MUAS Operator certification	MUAS introduction course + pass in MUAS Operator	Grenadiers/ officers/NCOs	Conversion course between systems	1+3 weeks	Exam, theoretical and practical		
	MUAS Operator certification	no requirements	Soldiers/ Grenadiers/ officers/NCOs	Operator course PD-100	1 week	Exam, theoretical and practical		

	Gunner/loader Leopard 2	Selection by unit	Conscripts/ grenadiers/ officers/NCOs	Turret course Leo 2	According to technical plan	Final exam theory and practice. Live firing.	No expiry date	
	Gunner CV-9030	Selection by unit	Conscripts/ grenadiers/ officers/NCOs	Turret course CV9030	According to technical plan	Final exam theory and practice. Live firing.	No expiry date	
	Vehicle commander Leopard 2	Class B	OR4 with company commander school/officer/ NCO	Vehicle commander course Leopard 2 (assuming passes in hull and turret courses)	According to technical plan	Final exam theory and practice. Live firing.	10 years	
	Vehicle commander Leopard 1	Class B	OR4 with company commander school/officer/ NCO	Vehicle commander course, combat support vehicle (assuming pass in hull course, Leopard 1, weapons and mounted equipment)	According to technical plan	Exam, theoretical and practical .	10 years	
	Vehicle commander CV 9030	Class B	OR4 with company commander school/officer/ NCO	Vehicle commander course CV9030 (assuming passes in hull and turret/ weapon courses CV90)	According to technical plan	Final exam theory and practice. Live firing.	10 years	
	Vehicle commander CV 90RWS	Class B	OR4 with company commander school/officer/ NCO	Vehicle commander course CV90RWS (assuming passes in hull and turret/ weapon courses)	According to technical plan	Final exam theory and practice. Live firing.	10 years	

	Vehicle commander M-113	Class B	OR4 with company commander school/officer/ NCO	Vehicle commander course, combat support vehicle (assuming pass in hull course, M-113, weapons and mounted equipment)	According to technical plan	Exam, theoretical and practical .	10 years	
	Vehicle commander Sisu	Class B	OR4 with company commander school/officer/ NCO	Vehicle commander course, SISU (assuming pass in hull course, SISU, weapons and mounted equipment)	According to technical plan	Exam, theoretical and practical .	10 years	
	Vehicle commander Fuchs	Class B	OR4 with company commander school/officer/ NCO	Vehicle commander course, FUCHS (assuming pass in hull course, FUCHS, weapons and mounted equipment)	According to technical plan	Exam, theoretical and practical .	10 years	
	Vehicle commander wheeled vehicles with RWS	Class B	OR4 with company commander school/officer/ NCO	Vehicle commander course, combat support vehicle (assuming pass in hull course, RWS operator course and weapons training)	According to technical plan	Exam, theoretical and practical .	10 years	

25.2 Competent authority FTS

Specialisation code	Specialisation/ Service position	Requirements		Course title	Time in education	Pass requirement	Validity	Note
		Driving licence	Personnel					
	Driver MB military light utility vehicles, max. permitted total weight 3,500 kg	Class B	All personnel in the Norwegian Armed Forces	Driver MB military light utility vehicles	According to technical plan	Final exam, theory and practice		
	Driver MB military light utility vehicles, max. permitted total weight 3,500 kg	Class C1	All personnel in the Norwegian Armed Forces	Driver MB military light utility vehicles	According to technical plan	Final exam, theory and practice		
	Driver MB Multi	Class C1	All personnel in the Norwegian Armed Forces	Hull course MB Multi	According to technical plan	Final exam, theory and practice	10 years	
	Driver MB 814/815/816/ Vario	Class C1	All personnel in the Norwegian Armed Forces	Driver heavy vehicles	According to technical plan	Final exam, theory and practice		
	Driver Toyota Land Cruiser 200 ATM	Class C1	All personnel in the Norwegian Armed Forces	Driver Toyota Land Cruiser	According to technical plan	Final exam, theory and practice		

	Driver Toyota Land Cruiser 78/79/100/105/120, Maximum total permissible weight 3,500 kg	Class B	All personnel in the Norwegian Armed Forces	Driver Toyota Land Cruiser	According to technical plan	Final exam, theory and practice		
	Driver Iveco LMV 3	Class C1	Soldiers/ grenadiers/ officers/NCOs	Body course Iveco LMV LAV 3	According to technical plan	Final exam, theory and practice	10 years	
	Driver Iveco LMV LAV 4	Class C1	Soldiers/ grenadiers/ officers/NCOs	Body course Iveco LMV LAV 4	According to technical plan	Final exam, theory and practice	10 years	
	Driver Iveco LMV LAV 4 with trailer	Class C + C1E	Soldiers/ grenadiers/ officers/NCOs	Body course Iveco LMV LAV 4	According to technical plan	Final exam, theory and practice	10 years	
	Driver LTK-S	Class B	All personnel in the Norwegian Armed Forces	Driver LTK-S	According to technical plan	Final exam, theory and practice		
	Driver LTK-V	Class B	All personnel in the Norwegian Armed Forces	Driver LTK-V	According to technical plan	Final exam, theory and practice		
	Driver BV 206	Class B	All personnel in the Norwegian Armed Forces	Driver BV 206	According to technical plan	Final exam, theory and practice		

	Driver Scania P92/P93/P113	Class C	All personnel in the Norwegian Armed Forces	Driver heavy vehicles	According to technical plan	Final exam, theory and practice		
	Driver RMMV/ MAN	Class C	All personnel in the Norwegian Armed Forces	Driver heavy vehicles	According to technical plan	Final exam, theory and practice		
	Driver Mercedes Actros	Class C	All personnel in the Norwegian Armed Forces	Driver heavy vehicles	According to technical plan	Final exam, theory and practice		
	Driver Scania fire engine	Class C	All personnel in the Norwegian Armed Forces	Driver Fire engine + any additional modules	According to technical plan	Final exam, theory and practice		
	Driver SISU	Class C	Soldiers/ grenadiers/ officers/NCOs	Hull course SISU	According to technical plan	Final exam, theory and practice	10 years	
	Driver Fuchs	Class C	Soldiers/ grenadiers/ officers/NCOs	Hull course Fuchs	According to technical plan	Final exam, theory and practice	10 years	
	Driver Dingo 2	Class C	Soldiers/ grenadiers/ officers/NCOs	Hull course Dingo 2	According to technical plan	Final exam, theory and practice	10 years	

	Driver Dingo 2 with trailer	Class C + C1E	Soldiers/ grenadiers/ officers/NCOs	Hull course Dingo 2	According to technical plan	Final exam, theory and practice	10 years	
	Driver TT	Class CE	All personnel in the Norwegian Armed Forces	Driver heavy vehicles	According to technical plan	Final exam, theory and practice		
	Driver EMPL ATWS LOG-trailer	Class CE	All personnel in the Norwegian Armed Forces	Driver heavy vehicles	According to technical plan	Final exam, theory and practice		
	Driver Motorcycle	Class A, A1 or A2, according to applicable driving licence provision	All personnel in the Norwegian Armed Forces	Motorcycle training	According to technical plan	Final exam, theory and practice		
	Driver VW Amarok	Class B	All personnel in the Norwegian Armed Forces	Driver VW Amarok	According to technical plan	Final exam, theory and practice		

25.3 Competent authority The Norwegian Armed Forces Joint Medical Services (FSAN)

Specialisation code	Specialisation/ Service position	Requirements		Course title	Time in education	Pass requirement	Validity	Note
		Driving licence	Personnel					
	Medical service level 2	Pass	Soldiers/ grenadiers/officers		102 hours	Exam, theoretical and practical	FSAN	Requirement for re-certification for operations abroad. Content as in FSAN's curricula
	Medical service level 3	Pass	Soldiers/ grenadiers/officers		39 hours	Exam, theoretical and practical	No expiry date	Requirement for re-certification for operations abroad. Content as in FSAN's curricula

25.4 Competent authority The Norwegian Armed Forces Security Department

Specialisation code	Specialisation/ Service position	Requirements		Course title	Time in education	Pass requirement	Validity	Note
		Driving licence	Personnel					
3450027	Crypto grade II		Personnel must have access to encryption graded up to SECRET, marked CRYPTO or in order to repair and maintain the equipment (FIS, section 7-14)		2 days	Pass	No expiry date	The Security Act with administrative regulations
284004	Crypto grade II		Personnel must have access to encryption graded up to TOP SECRET, marked CRYPTO, produce encryption keys or operate an encryption system approved for ATOMAL, TOP SECRET, CRYPTO, EXCLUSIVE or equivalent. (FIS section 7-15)		5 days	Pass	No expiry date	The Security Act with administrative regulations

25.5 Competent authority Engineer

Specialisation code	Specialisation/ Service position	Requirements		Course title	Time in education	Pass requirement	Validity	Note
			Personnel					
	Ferry	Service in Bridging and Crossing	Crew operating motorised pontoons and tugs		2 weeks	Exam, theoretical and practical		
	Boat	Service in Bridging and Crossing	Crew operating boats in daylight and without a major requirement for navigation		2 weeks	Exam, theoretical and practical		
	Ferry	Ferry class 1	Officer commanding a ferry and in charge of navigation.		1 week	Exam, theoretical and practical		
	Boat	Boat class 1	Crew operating boats in darkness and low visibility with a requirement for navigation.		1 week	Exam, theoretical and practical		
	Ferry	Ferry class 2 for at least 1 year and application to competent authority	Officer		Not set	Exam, theoretical and practical		
	Boat	Boat class 2 for at least 1 year and application	Officer		Not set	Exam, theoretical and practical		

		to competent authority						
	Leguan Bridge-layer	Civil HGV class C			2 weeks	Exam, theoretical and practical		
	MAN SX 2000	Civil HGV class C			1 week	Exam, theoretical and practical		
21060D, 21404	Construction machinery	Has or is intended to have relevant service	Teams and officers with the task of operating machinery with a requirement of having completed a 32-hours safety course		32 hours (1week)	Passed theory exam	No expiry date	
21060D, 21404	Construction machinery	32-Hour safety course	Teams and officers requiring certificates of competence for construction machinery in the service.		40 hours (week)	Exam, theoretical and practical	No expiry date	Results in civilian certification of competence in construction machinery
21060D, 21404	Construction machinery	Machine operator's licence, driving licence class B (C for dump trucks)	Teams and officers that need to drive specialised machinery in the Norwegian Armed Forces.		23 hours (3 days)	Exam, theoretical and practical	No expiry date	

	Volvo L50C and L50D	Class BE, C or T	Conscripts/ recruits/officers/ NCOs					Volvo wheel loader C, D and E models
	Volvo L50G	Class BE, C or T	Conscripts/ recruits/officers/ NCOs					Volvo wheel loader L50G
	Volvo L70c and L90C	Class BE, C or T	Conscripts/ recruits/officers/ NCOs					Volvo wheel loader C, D and E models
	Volvo L120C, L120D and L120E	Class C or T141*	Conscripts/ recruits/officers/ NCOs					Volvo wheel loader C, D and E models
	Volvo L70G and L90G	Class BE, C or T	Conscripts/ recruits/officers/ NCOs					Volvo wheel loader L60G-L110G
	Volvo L110G	Class C or T141*	Conscripts/ recruits/officers/ NCOs					Volvo wheel loader L60G-L110G
	Volvo L160, L150C, L150E and L180E	Class C or T141*	Conscripts/ recruits/officers/ NCOs					Volvo wheel loader C, D and E models
	Volvo L150G and L180G	Class C or T141*	Conscripts/ recruits/officers/ NCOs					Volvo wheel loader L150G-L180G
	Liebherr 574	Class C or T141*	Conscripts/ recruits/officers/ NCOs					Liebherr 574 wheel loader

	Komatsu PC78US and PC210	Class B, BE, C or T141*	Conscripts/ recruits/officers/ NCOs					Komatsu PC55, 78 and 210 excavator
	Komatsu PW170	Class BE, C or T141*	Conscripts/ recruits/officers/ NCOs					Komatsu PW 170 wheeled excavator
	Caterpilar 307 and 312	Class B, BE, C or T141*	Conscripts/ recruits/officers/ NCOs					Cat 307 and 312 excavator
	Volvo EW160B	Class BE, C or T141*	Conscripts/ recruits/officers/ NCOs					Volvo EW 160B wheeled excavator
	Liebherr 902	Class B, BE, C or T141*	Conscripts/ recruits/officers/ NCOs					Liebherr 902 excavator
	Komatsu PC55	Class B, BE, C or T141*	Conscripts/ recruits/officers/ NCOs					Komatsu PC55, 78 and 210 excavator
	Volvo A25C armoured	Class CE	Conscripts/ recruits/officers/ NCOs					Volvo A25 armoured
	Moxy MT31	Class CE	Conscripts/ recruits/officers/ NCOs					Moxy MT31 dump truck
	Hydrema 912C	Class BE, C or T	Conscripts/ recruits/officers/ NCOs					Hydrema 912C dump truck

	Volvo G976	Class C or T141*	Conscripts/ recruits/officers/ NCOs					Volvo G976 grader
	Champion 736A	Class C or T141*	Conscripts/ recruits/officers/ NCOs					Champion 736 grader
	Atlas Copco D7	Class B, BE, C or T141*	Conscripts/ recruits/officers/ NCOs					Atlas Copco D7 drill rig
	Volvo BM 6300	Class C or T141*	Conscripts/ recruits/officers/ NCOs					Volvo 6300 backhoe loader
	Lännen 940 P	Class BE, C or T	Conscripts/ recruits/officers/ NCOs					Lännen 940 backhoe loader
	Kubota KX41	Class B, BE or T141*	Conscripts/ recruits/officers/ NCOs					Kubota KX41 excavator
	Yanmar B15	Class B, BE or T141*	Conscripts/ recruits/officers/ NCOs					Yanmar B15 excavator
	PPM 590 ATT	Class C	Conscripts/ recruits/officers/ NCOs					PPM 590 ATT mobile crane
	Grove RT760E	Class C	Conscripts/ recruits/officers/ NCOs					Grove RT760E mobile crane

	Tadano ATF 60G	Class C	Conscripts/ recruits/officers/ NCOs					Tadano ATF 60 mobile crane
	Caterpilar D6K	Class B, BE, C or T141*	Conscripts/ recruits/officers/ NCOs					Cat D6K bulldozer
	Komatsu D65	Class B, BE, C or T141*	Conscripts/ recruits/officers/ NCOs					Komatsu D65 bulldozer
	Komatsu D85	Class B, BE, C or T141*	Conscripts/ recruits/officers/ NCOs					Komatsu D85 bulldozer
21555E	Hydrema 910 MCV-2	Driving licence class BE	Conscripts/ recruits/officers/ NCOs		3 weeks	Exam, theoretical and practical	5 years	1 week mines with MER, 2 weeks vehicle-training with PAMA
21455E	Armoured engineer vehicle NM189 operator course	Military driving licence for Leopard 1 hull, 32 t safety course	Conscripts/ recruits/officers/ NCOs		4 weeks	Exam, theoretical and practical	5 years	
21257D	Armoured bridge-layer NM190, operator course	Military driving licence for Leopard 1 hull	Conscripts/ recruits/officers/ NCOs		4 weeks	Exam, theoretical and practical	5 years	
	Demolition class 1	Basic demolition	Grenadiers/ officers/NCOs		10 days	Pass in 80% of theory/practice	Nothing	

	Demolition class II A	Rock blasting	Officer desirable if B&A background		113 hours	Pass in 80% of theory/practice	5 years	
	Demolition certificate class 1A		General demolition competence with UXO demolition			70% pass in practical and theoretical exams		
	Advanced mine-clearance	Officer Engineer aimed at purely mine-clearing operations	Mine/explosive clearer		292 hours	70% of theory/ practice	5 years	
	WICS - work in confied spaces	Officer and team, must have intermediate search in ground, EOR desirable	Eng. soldiers and officers with EOR		40 hours (week)	Exam, theoretical and practical	2 years	Purchased from British forces - NSC

25.6 Competent authority FKL

Specialisation code	Specialisation/ Service position	Requirements		Course title	Time in education	Pass requirement	Validity	Note
		Basic requirements	Personnel					
	Demolition certificate class 1B	Requirement for prior learning is demolition certificate class I A	Rock blasting		4 weeks	70% pass in practical and theoretical exams		
	Demolition certificate class 3B	Requirement for prior learning is demolition certificate class I B	EOD		12 weeks	70% pass in practical and theoretical exams	5 years	
	Demolition certificate class 3C	Requirement for prior learning is demolition certificate class III B	EOD		5 weeks	70% pass in practical and theoretical exams	1 year.	
	Demolition certificate class 3F.	Requirement for prior learning is demolition certificate class I B					5 years	“The Norwegian Army's former class III. In addition to class I B, being in charge of, directing and

								instructing in explosives clearance of all types of explosive and UXOs”

25.7 Competent authority The Norwegian Armed Forces NBC school

Specialisation code	Specialisation/ Service position	Requirements		Course title	Time in education	Pass requirement	Validity	Note
		Driving licence	Personnel					
	Chemical diving	Officer and team, must have completed smoke diving	CBRN soldiers and officers		40 hours (week)	Exam, theoretical and practical		Purchased from civilian sector
	Smoke diving	Officer and team	CBRN soldiers and officers		40 hours (week)	Claustrophobia test + theory and practice exams		Can be purchased from both civilian sector and SSS

25.8 Competent authority The Norwegian Armed Forces MPA

Specialisation code	Specialisation/ Service position	Requirements		Course title	Time in education	Pass requirement	Validity	Note
		Driving licence	Personnel					
	Instructor course in escort service	As in notice	Career officer / divisional officer		14 days	Practical and theory test	5 years	
	Instructor course, pepper spray and baton	According to technical plan	Career officer / divisional officer		50 hours	Practical and theory test	Unresolved	

25.9 Competent authority The Norwegian Armed Forces military working dog school

Specialisation code	Specialisation/ Service position	Requirements		Course title	Time in education	Pass requirement	Validity	Note
		Driving licence	Personnel					
	Patrol dog driver level 6. 0	Pass in: Practical test with dog according to the approval programme	All categories International secondary national		*	* Pass in: Certified operator patrol dog driver level 6	Valid for 1 year.	
	Search dog driver level S 6. 0	Pass in: Practical test with dog according to the approval programme	All categories International secondary national		*	* Pass in: Certified operator patrol dog driver level 6	Valid for 1 year.	

Appendix 26.
26 APPLICATION FOR WAIVER FROM UD2-1

	**Application for waiver from safety rules and regulations in UD 2-1 The Norwegian Armed Forces Safety Rules and Regulation for Land based military activities.**
Unit applying:(1)	
Waiver applies to:	
Which sub unit(s) the Waiver should apply to:	
Time frame for waiver validity:	
Which regulations does the waiver apply to:	
Reason for waiver:	
Plan(2) for implementation(3):	
Higher units endorsement (4):	
Professional approval (If possible by professional responsible unit):	
Approval of Waiver (5) (cf UD 2-1 item 0.1.3.3):	

UD 2-1 Armed Forces Safety Rules and Regulations.

Rules and regulations is described in UD 2-1 Item 0.1.3.

Application is forwarded through the chain of command in doculive.

Explanation:

(1) Unit Name

(2) Use if possible appendices, presentations, training plan etc

(3) Activity must be evaluated for risk

(4) If possible endorsement from higher unit

(5) Approval and signature

PROFESSIONAL RESPONSIBILITY

The Army General Inspector has delegated the responisibility of the professional ajournment of the safety rules and regulations for land based military activities to the safety inspector of the Army and the repective professional responsible within or oustide of the Army. The other branches of the armed forces and common units are responible to ajoun their respective areas within the rules and regulations. Other institutions who has their professional responsibility in the rules and regulations, is requested to maintain their respective area. Within Land Warfare Centre(LWC), the commander in chief of LWC is the main responisible officer. This is why Chief LWC is listed first for all areas where LWC is the professional responsible, prior to the section leader who is delegated the professional rsponsibility within LWC. Where there are more than one listed as professional responsible, the first listed has the coordinating resposibility. Questions of a professional character can be raised directly to the responsible unit.

PROCEDURE FOR CHANGE

Proposals/need for changes/corrections is sent through the chain of command to the respective professional reponsible, with a copy to the commander in chief of LWC. The respective professional responsible evaluates the proposal and confers with the organization using the equipment/ procedure and then develops a document to reflect the wanted change.

Changes is published by The Army General Inspector. The change/correction is then incorporated in the electronic edition as a Corrctions and Additions.The professional responsible has the responsibility to implement the correction/addition into the respective rules and regulations.

FOREWORD

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