# *Winter warfare*

*Planning considerations*
*Mechanized and armoured units during winter.*

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# *Mechanized forces in the arctic*

# *Difference between mechanized and light infantry?*

- The same winter challenges that counts for light infantry/ recon-forces, also apply for mechanized forces. You can in addition add several challenges.
- Mechanized forces have their own infantry that fights dismounted. (NOR Mech Bn: 8 dismounted platoons: 6 inf, 2 recon).
- They are exposed to the elements the same way as continuously dismounted light infantry when dismounted.
- Getting in and out of (warm) vehicle vs cold climate – effects on the equipment and body.
- Limitations in what to bring on an IFV – limited room for cold weather gear. Ammunition and mission essential equipment takes up space.
- Redundancy – when vehicle breakdown or heating source stop working – demand good basic cold weather skills.

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*Dismounted tactical tasks is a big part of armoured and mechanized forces operations.*

*It`s not only about tanks and big guns.*

- Dismounted offensive and defensive tasks
  - Mounted supports dismounts.
  - Dismounts support mounted
- Recon, patrolling
- Security

# *What could be different during winter - logistics*

## *Fuel consumption heavy vehicles (IFV/MBT)*

- Small amounts of snow do not affect fuel consumption other than when terrain/ roads becomes to slippery(ice) to negotiate and vehicles have to drive longer to get to point B.
- Dry snow up to 30cm meter only slightly affects fuel consumption (5% less range )
- Medium wet snow above 30cm could gradually affect fuel consumption by up to 20% depending on the terrain. (20% less range).
- The numbers are representative for other tracked IFV/MBT, but note that CV90 is especially well suited for the terrain in Scandinavia.
- Very wet and heavy snow could easily make heavy and medium heavy tracked vehicles (IFV/MBT etc) almost double their fuel consumption. (up to 45% less range) when driving in terrain. In severe and extremely difficult terrain it can be more.
- Example: A CV90 Mark I have an action range of about 600km on paved/grit-roads. In medium challenging terrain and more than one meter of heavy wet snow, the range will be reduced to aprox 370km.
- For CV90 MII and leopard MBT the fuel consumption will increase a little more because of their very powerful engines and weight.

*Small amounts of snow does not inflict any substantial increase in fuel consumption*

**Small amounts of snow on dry ground does not hamper mobility for tracked combat vehicles in any way, but could be very challenging for wheeled vehicles without chains .**

# *MBT and heavy IFV*

- Most MBT`s have excellent mobility.
- Experienced drivers and crews can negotiate extreme terrain and deep snow, especially with engineer support.
- MBT`s mobility limited by:
  - Drivers lack of experience
  - MBT`s commander lack of experience
  - Little or no training in terrain or on ice and deep snow.
  - Lack of deep/perma-frost in ground.

# *What could be different during winter – engines.*

- Engines can be cold-damaged.
- In very and extreme cold temperatures, larger and many of the more powerful engines have to be pre-warmed to avoid damages (cracks, wrong pressure, turbo-lekeage, etc). Some engines are constructed to handle the cold better than others.
- There are different methods of pre-warming (electric, warm coolant, diesel etc). To light a fire under your engine mostly belongs to the past.
- Most modern engines has their own pre-warming system.
- The process normally makes little to no noise and modern systems has little or no increased visual signature. Thermal signature will increase slightly.
- Pre-warming of engines could take everything from 5 to 90 minutes depending on:
  - Temperature
  - Pre-warming method and system
  - How long since engine was hot.
- When temperatures drop below 30 degrees minus, a CV 90 MIII have to pre-warm an engine for at least 45 minutes if the engine is cold, 60 minutes is strongly recommended.
- The process should be planned and timed according to your movement plan and battle readiness drill.
- Cold starting engines should be avoided and only in critical situations.
- Leopard 2 engines will handle cold starts very well, compared to others.

# *What could be different during winter - maintenance*

## *Lubricants*

- Winter conditions may demand special attention to lubricants on weapons and engines due to
  - Temperature
  - Snow/ Ice/ rain
  - Humidity

- Each engine/vehicle and weapons system should have a handbook describing which lubricants to be used during winter, if these are different from summer/warm weather.

- Handbooks should also clarify other – emergency-options that can be utilized. (if improvisation is needed because of re-supply problems).

## *Cover*

- A lot of weapon systems can function and be exposed to rain if maintenance is good. This is not necessarily right when it comes to the same system being exposed to snow and ice.

- Snow and ice could prevent parts from moving and deny proper function and handling.

- Cover (blankets, tarps etc) should be provided to all guns/weapons and exposed sensor systems, this is also the case for heavy weapon systems.

- If cover is not utilized, all soldiers should have a brush and other maintenance equipment to clean systems and remove ice and snow frequently.

# *What could be different during winter - mobiliy*

## *Mobility – own forces*

- Frozen ground, permafrost increases mobility
- Soft ground – lack of frost beneath the snow is the worst conditions for armoured forces.
- Areas where there has been a long and cold period before the snow starts falling is the preferred weather for making the optimal mobility
- Western armour depends on low ground pressure (wide tracks), traction, engine and gearbox power to “push” trough and over the snow.

## *Mobility - Russians*

- Their thoughts around mobility for armoured forces during winter differs from ours. They have the same challenges during summer.
- Russian armoured vehicles a lot lighter. T-80BMV is 45 tons plus. Leopard 2A8 is almost 65 tons. Russians try to utilize terrain axis to a greater extend than we do.
- Russian armour depends more on “floating” on the snow.
- Less depended on permafrost, but normally weaker tracks and less sophisticated control – usually more slow and not that easy to manoeuvre.

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# *Coast vs inland.*
# *On the picture:*

- CV90 MARK III (34 tons) driving on top of 1,5 meters deep snow.
- CV90: low ground pressure because of wide tracks
  - Compared to tracks on RUS IFV
- Look at how deep the tracks are.(only 10-25cm)
- Hard-packed snow (due to rain/heavy snow before last snowfall makes the snow hard and the CV90 can drive on top of it, like on soil/dirt-roads.
- Picture is from coastal are (fjord) northern Norway. – with a lot of changes in temperature, and very different snow conditions.
- Coastal temperatures can change from minus 20 degrees Celsius to 3 plus degrees Celsius in an few hours.
- Temperature difference between coast and inland in Northern Norway can differ by up to 20 degrees Celsius. This plays a big role when attacking from inland toward coast and vica versa.

# *What could be different during winter - tactics*

## *Time - due to mobility considerations*

Example mobil-defence:

- In mobile defence, mobility for STRIKE-force is often prioritized before obstacles and minefields for FIX-force.
- During winter this will be especially important, and up to 80% of brigades ENG assets could be needed to provide axis that facilitate enough speed for attack force to succeed.
- This leaves FIX force with less, so more ENG-assets has to be requested at higher echelon to be able to prepare sufficient obstacles.

## *ISR/sensors - targeting – visibiliy*

- Inflicts targeting. Javelin CLU`s and other similar anti-armour systems will struggle to achieve “LOCK-ON” when its snowing. Planning of weapons emplacements should consider this and weapons with other sights should be planned as back-up to achieve mission success.
- Snow and ice will inflict on all sensors, both UAS and ground sensors. Icing is a huge UAV challenge in the north during winter.
- Hard packed, engineer created snow-walls (3-5 m high and 6-10m wide), is a great low-cost tank-obstacle. (especially when freezing during a night).

# *What could be different during winter - speed*

*Time - due to other mobility considerations*

- Driving in a tactical manner over a 10km terrain axis - mostly hard ground/ stones, minor obstacles and arctic forest/birch wood in summertime, could take 3 hrs with coy-sized armoured unit.
- Same distance could take everything from 2 to10 hrs during winter – depending on snow and ice conditions.
- Snow can both give far better mobility and severely hamper mobility depending on:
  - The degree of permafrost/ frost in the ground and on marches
  - How thick the ice is
  - Snow conditions/ vet/heavy or dry snow
  - Snow depth
  - Weather
  - Temperature
  - Number of wet areas/ creeks that has to be crossed.

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# *Tempo created by system*

- Larger MBT/IFV formations have to be supported and accompanied by heavy ENG and recovery-vehicles to maintain tempo and make sure combat power is maintained.

- Utilizing terrain axis and survive in open terrain in Northern Norway is not a question of only MBT and IFV mobility. All supporting arms must have the same mobility. (ENG, Arty/Mortar, Air Defence, medical, logistics, recovery etc).

- The combined arms system, not the individual platforms, are still the key to tactical success.

# *Snow and change of temperatures.*

## *Snow in tracks*

- Like ski-doos, MBT`s and other heavy`s can actually freeze to the ground.
- Precautions have to be taken - like removing snow and ice from tracks and other moving parts when standing in a battle or hide position for several days or hours during changing temperatures.
- Vet snow can freeze and deny track-parts and wheels from functioning. Thousands of ice-krystalls tied to each other and glued to metal, represents a strong power to break.
- Bring trees and bushes to put under tracks (the bigger the vehicle, the bigger the tree. Prevents them from freezing to the ground. (Air between ground and tracks).
- Remove snow from moving parts.

## *Snow as camouflage*

- To let your systems and vehicles “snow down” is a smart and tactically good solution to reduce and remove thermal and visual signature – remember: sensors and gun-tubes must be clean and with no snow or ice to disturb vision or field of fire.
- Cold vehicle will reduce signature even more, warm vehicle will increase.
- Make sure batteries for comms etc is not wearing down. (Then you have to start engine).
- Make sure crews can survive in or close by vehicle when its cold by bringing good sleeping-bags and low signature heating sources for food. (how to live in a freezer).
- Remember: reduced thermal signature is almost always useless if radio-discipline and silence is not proper, especially against near-peer opponents as Russia (EW threat).
- The best camo would also be useless if personnel walks outside the camo-net.

# *Vehicles and weapons*

## *Combat vehicles - dismounts*

- Dismounts move from the usually warm IFV, to the cold outside – and back inside again:
  - What happens to their body and gear/equipment and weapons?

## *Crews*

- Crews with hatches open are exposed and have to be dressed proper.
- Ex IFV commander –
  - Lower body: extremely warm
  - Upper body: cold injuries if not dressed properly.
- Discipline and good habits.

# *What could be different during winter - munitions*

## *Effect of ammunition in deep snow*

- The effects from munitions, also from high power guns and high calibre explosive ammunition, will be inflicted and most certainly limited in snow more than 1 meter deep.
- More ammunition is required to achieve the same effect. Example 81mm mortar:
  - Ammunition spending pr fire-mission could increase by up to 38% depending on snow depth.

## *Snow as cover from munitions*

- Snow can provide cover from some ammunitions types.
- High velocity munitions (120mm APFSDS) will penetrate several meters of hard packed snow, without loosing to much energy or power – snow cover for IFV/MBT have to be combined with other materials/ sandbags/ soil.
- Munitions with less velocity will loose energy must faster
- It takes at least 4.5m of very hard packed snow and ice to completely stop an 12,7mm bullet.
- Hard packed snow thicker than two meters will stop most artillery fragments.

## MAIN TAKE-AWAYS:

- All the factors affecting light infantry and similar forces also affects mechanized forces – dismounted infantry is still an crucial part of mech and armour forces combat power and protection.
- Increased fuel-consumption demands more fuel-supplies . Big impact on logistics planning.
- The snow could be both an mobility party-pooper and a great asset for improved mobility, depending on ground/ soil, temperature/frost, snow depth and snow-humidity.
- Winter climate differences between coast (wet) and inland (more dry) sometimes have big impact on mech-forces.
- Snow is great camouflage.
- Snow is only partly good cover – demands preparations .
- Snow affect ammunition effects.


Questions??