



Planning Considerations for Over Snow Movement



Terminal Learning Objective



Action: Plan for over snow movement

Condition: You are a small unit leader, given the requirement to move your unit over snow covered terrain.

Standard: Plan a 5 km over snow movement for a squad sized element with a solution plus or minus one hour.



NORTHERN WARFARE TRAINING CENTER • "Battle Cold and Conquer Mountains"



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M973 Small Unit Support Vehicle



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Individual Movement Techniques



- **Skiing**
- **Snowshoeing**
- **Skijoring**



Use Skis When...



- Long distances must be traveled
- Stealth is necessary
- Conditions allow



Military Skiing

- **Military skiing:**
- **is generally done on flat or rolling terrain that requires the use of cross-country (Nordic) skills.**
- **may require skiing down steep slopes using downhill (Alpine) skills.**
- **presents a major training challenge because of the time it takes to train Soldiers to be proficient on skis.**
- **is divided into seven ski lessons.**
- **is an excellent alternative means of conducting physical training in winter**
- **is an excellent means to giving Soldiers practical experience dealing with the cold weather environment**



Use Snowshoes When...



- Moving through heavy brush
- Terrain is rough
- Troops are not proficient with skis



Snowshoeing

The feet are kept apart slightly wider than normal to prevent stepping on or catching the other snowshoe.

The toe of the snowshoe is raised just high enough with each step to clear the snow as the tail slides over it.

On flat and gentle slopes ascent is made by climbing straight uphill

Steeper terrain is ascended by traversing and packing a level trail similar to a creating a shelf across it.

Ski poles may be used as an aid to balance, especially when carrying heavy loads and/or moving uphill.

Movements

Walking

Step turn

Kick turn

Negotiate obstacles



Route Planning Considerations



In addition to the tactical situation consider:

- **Map recon for route selection; feasibility of route during limited visibility**
- **Movement technique (skis, snowshoe, foot)**
- **Soldiers Load**
- **Use of vehicles**
- **Terrain and Weather**



Route Planning Considerations: Open Terrain



Break only one set of tracks

Follow tree lines/natural terrain features



Route Planning Considerations: Hills / Mountains



Use gentle traverse to ascend or descend

Follow contours once elevation is gained

Avalanche considerations



Route Planning Considerations: Water Routes



Generally excellent for navigation

Check ice thickness

Stay close to shore or bank

Overflow



Load Bearing Capacity of Fresh Water Ice



Minimum Ice Thickness (Waterborne)			
Load	Minimum One Time Only	Normal Repeated Use	Distance Between Units
Soldier on skis	1.5 inches	2 inches	5 meters
Soldier on foot	3 inches	4 inches	5 meters
¼ ton truck	5 inches	8 inches	16 meters
HMMV	10 inches	13 inches	27 meters
SUSV	10 inches	13 inches	27 meters
UH-60/CH-47	15 inches	18 inches	80 meters



Route Planning Considerations: Night Movement



Breaks in contact and long halts can cause cold weather injuries

Route must follow easiest possible terrain

Route must be well marked



Trail breaking on skis/snowshoes



Can take considerable effort; personnel must be rotated out frequently

Second Soldier does not step in leaders footprints; helps flatten trail

Third and fourth Soldiers help widen trail by off-setting left and right



Planning Rates of March



Movement Mode and Speed

Movement Mode	Unbroken Trail	Broken Trail
On foot- less than one foot of snow	1.5 to 3 kph	2 to 3 kph
On foot- more than one foot of snow	.5 to 1 kph	2 to 3 kph
Snow Shoeing	1.5 to 3 kph	3 to 4 kph
Skiing	1.5 to 5 kph	5 to 6 kph
Skijoring	N/A	8 to 24 kph

(expected rates of march for troops carrying rucksacks over gently rolling terrain)



Effects of Terrain Angle on Speed



Uphill-

Add 1 hour for every 1000 foot increase in elevation

Downhill-

Add 1 hour for every 1600 foot decrease in elevation



March Table

Day	From Grid	Alt	To Grid	Alt						
Start Point	Degree Grid	Degree Mag	Terrain	Distance	End Leg Grid	Elevation	Change	Remarks		
Total Distance:										Total Elevation Change:
Day	From Grid	Alt	To Grid	Alt						
Start Point	Degree Grid	Degree Mag	Terrain	Distance	End Leg Grid	Elevation	Change	Remarks		
Total Distance:										Total Elevation Change:
Day	From Grid	Alt	To Grid	Alt						
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Total Distance:										Total Elevation Change:



Practical Exercise

Your mission is to conduct a deliberate attack. The distance from your LD to assault position is 5 km.

Your route follows a unbroken trail crossing two ridge lines. The first is 550 feet above the surrounding terrain; the second is 450 feet.

There are 18 inches of snow on the ground. Your troops are proficient on snowshoes but not on skis.

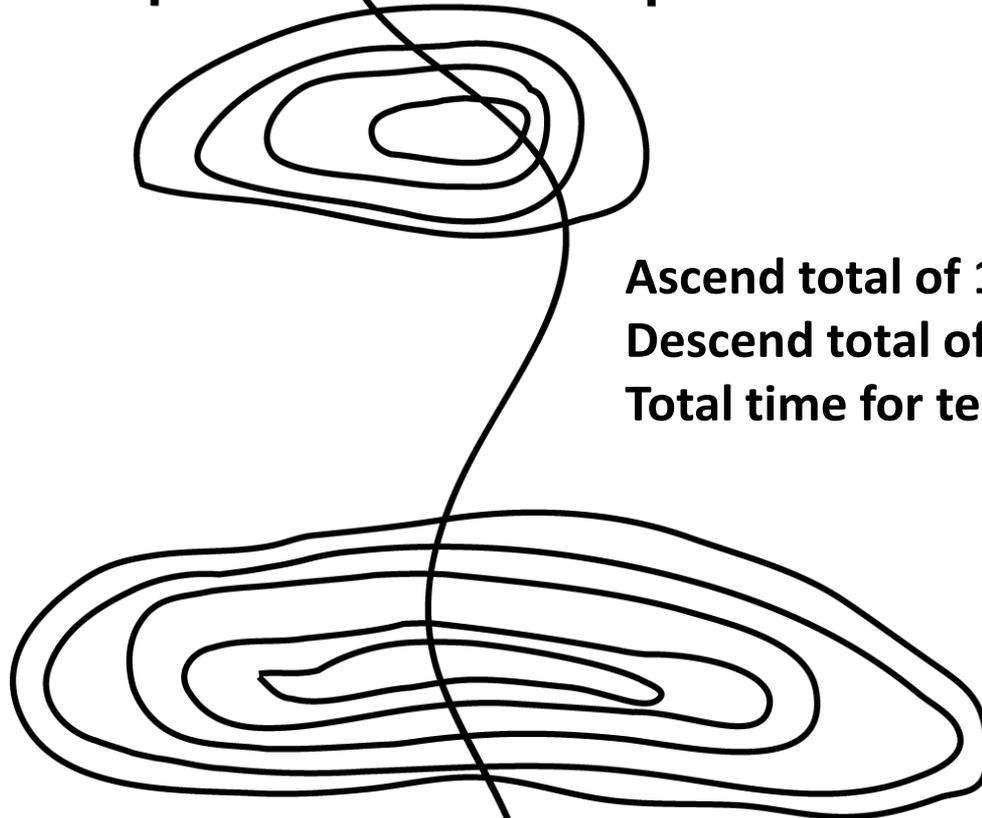


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Uphill – add 1 hour for every 1000 foot increase in elevation
Downhill – add 1 hour for every 1600 foot decrease in elevation



Final Assault Position



**Ascend total of 1,000 feet: Add 1 hour
Descend total of 1,000 feet: Add 40 minutes
Total time for terrain factor: 1 hour 40 minutes**

***Line of Departure
Contour Interval 100 feet***



PE Solution

- **5K on 18 inches of new snow on snowshoes
3 hours and 20 minutes (1.5km/hr) +**
 - **"Terrain factor" - (effect of hills)
1 hour and 40 minutes**
- = 5 hours**



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