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.
M973 Small Unit Support Vehicle
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

<table>
<thead>
<tr>
<th>Load</th>
<th>Minimum One Time Only</th>
<th>Normal Repeated Use</th>
<th>Distance Between Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soldier on skis</td>
<td>1.5 inches</td>
<td>2 inches</td>
<td>5 meters</td>
</tr>
<tr>
<td>Soldier on foot</td>
<td>3 inches</td>
<td>4 inches</td>
<td>5 meters</td>
</tr>
<tr>
<td>¼ ton truck</td>
<td>5 inches</td>
<td>8 inches</td>
<td>16 meters</td>
</tr>
<tr>
<td>HMMV</td>
<td>10 inches</td>
<td>13 inches</td>
<td>27 meters</td>
</tr>
<tr>
<td>SUSV</td>
<td>10 inches</td>
<td>13 inches</td>
<td>27 meters</td>
</tr>
<tr>
<td>UH-60/CH-47</td>
<td>15 inches</td>
<td>18 inches</td>
<td>80 meters</td>
</tr>
</tbody>
</table>
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

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<thead>
<tr>
<th>Movement Mode</th>
<th>Unbroken Trail</th>
<th>Broken Trail</th>
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<tr>
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<td>1.5 to 3 kph</td>
<td>2 to 3 kph</td>
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<td>3 to 4 kph</td>
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<tr>
<td>Skiing</td>
<td>1.5 to 5 kph</td>
<td>5 to 6 kph</td>
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<td>N/A</td>
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(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

<table>
<thead>
<tr>
<th>Day</th>
<th>From Grid</th>
<th>Alt</th>
<th>To Grid</th>
<th>Alt</th>
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<tbody>
<tr>
<td></td>
<td>Start Point</td>
<td>Degree Grid</td>
<td>Degree Mag</td>
<td>Terrain</td>
</tr>
<tr>
<td></td>
<td>Total Distance:_________</td>
<td>Total Elevation Change:_________</td>
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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
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
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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