

5.10 Construction & Use of Snow & One-Season Winter Roads

Throughout much of British Columbia, forest operations are best conducted during the winter months. By using deep snow or frozen ground as the running surface, equipment working on snow roads or one-season winter roads has a lower environmental impact than when working on all-weather roads. Fine-textured soils and muskeg ground conditions are especially vulnerable. Construct these seasonal roads during the early part of the winter, so that harvesting can be completed before snowmelt and the break-up of frozen ground in the spring. If there is insufficient snowpack, these road types cannot be constructed.

Snow roads and one-season winter roads use the strength of ice and snow to produce a stable road bed that will support the design vehicle axle loads. In areas with heavy snowfall, the main reliance is on the snow pack. In either case, weather is the essential and unpredictable factor in the construction process, and logistics are key to constructing and using winter roads effectively. Where mid-winter thaws are common, construct short spur roads, and use and deactivate them in a matter of weeks.

Generally, watercourses are frozen for the life of the road, and in many cases drainage structures may not be required. Compact snow fills across small streams and gullies with the use of log bundles to allow the passage of any seepage that may occur or to reduce the volume of snow required. Where mid-winter thaws are common, install culverts in the snow fill to accommodate possible flowing water.

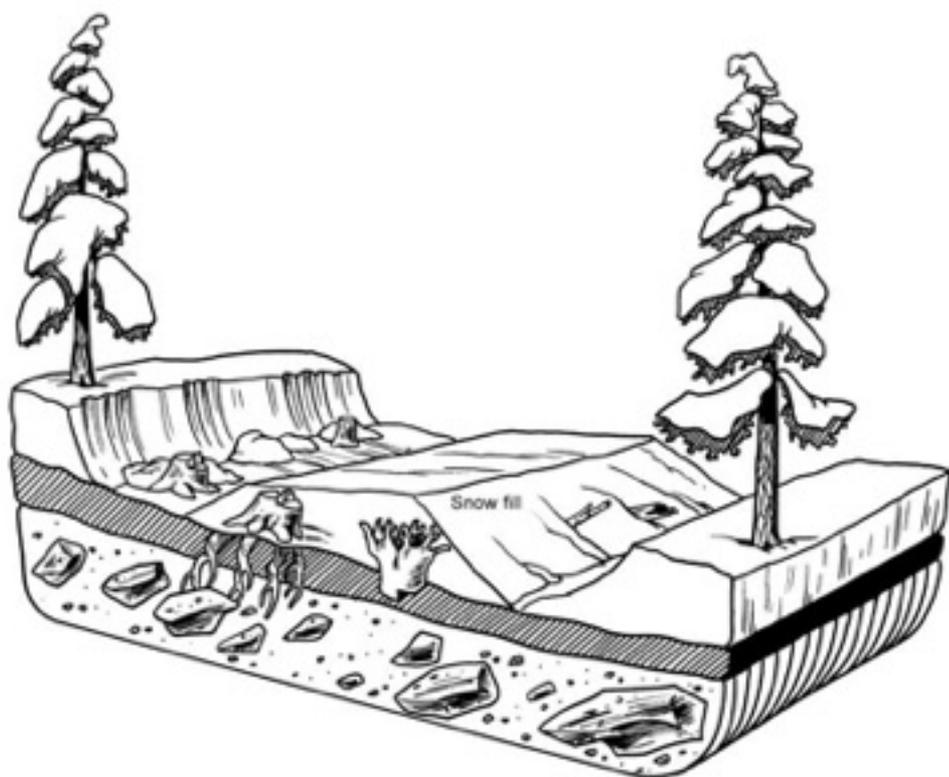
Coordinate deactivation of these road types with operations and complete such work before the spring freshet. Restore all-natural drainage channels while road access is available. Do not leave logs in stream channels, and breach snow fills to prevent the damming of watercourses. Though mid-winter thaws can disable even a well-built road, the high-risk period begins during spring break-up. During that period, snowmelt can occur very quickly, resulting in rapid overland flows of meltwater, high flows in watercourses, and an extreme softness of soil materials that renders them highly susceptible to erosion. Any soils that have been mixed with snow become fluid and highly susceptible to mass erosion. Debris or excavated spoil material piled on top of a snow layer can become unstable on even gentle side slopes. For more information on road deactivation techniques, see [Chapter 7: Road Deactivation](#).

5.10.1 Snow Road Construction

Snow roads are a form of overland construction in which clean snow and ice are used as fill (Figure 5-13) and can support the design vehicle axle loads. Snow roads are appropriate for providing access across gentle terrain to winter-harvest- only areas. Snow roads are limited to terrain with slopes less than 20%, unless there is a very deep snowpack. The surface is often built-up with ice by using water in areas of flat terrain with a minimal snowpack.

Excavation is not permitted (cut slopes or ditches) other than the removal of the occasional stump that cannot be readily covered with snow and ice. The road may be reconstructed and re-used each winter in the same location.

Figure 5-13 Typical snow road



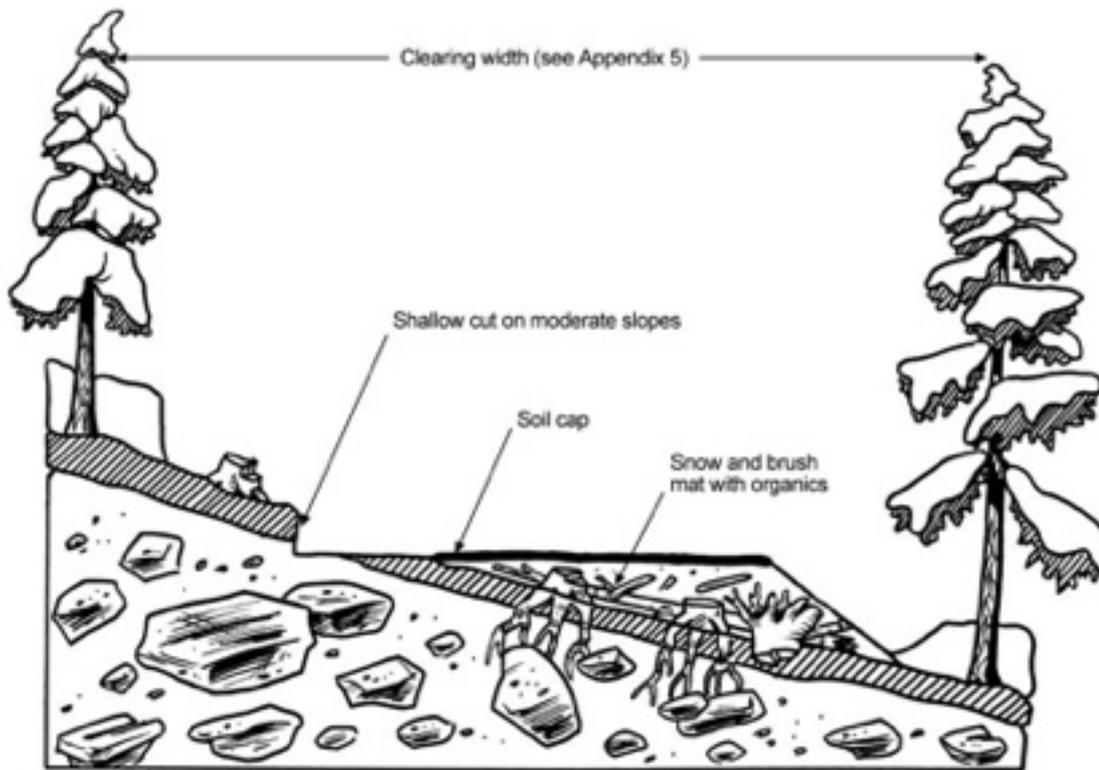
5.10.2 One-Season Winter Road Construction

Similar to snow roads, one-season winter roads are constructed mainly from snow and ice, with a minimal amount of soil (10%-20%) to assist the freezing-in of the road, or to provide a more durable surface where infrequent mid-winter thaws may occur. They are suitable for temporary access to winter harvest areas for one season only and are not intended to be reconstructed.

Because of the high risk of sediment deposition during the spring freshet, do not mix soil with snow in the riparian management area of stream crossings. Only use log bundles and clean snow in gullies and riparian areas.

Limit stripping to the removal of large stumps that cannot be easily covered with snow or ice. For cuts into mineral or organic soil, do not exceed 300mm in depth for sustained distances on slopes greater than 15%, or 500mm in depth for short distances on steeper slopes up to 35%. Figure 5-14 shows a finished one-season winter road.

Figure 5-14 One-season winter road



For one-season winter roads, a mixture of dirt and snow on the road surface can provide a stable roadway when frozen, but it becomes highly liquid during spring thaws. Any appreciable side slopes or gradients may result in mass erosion from the roadway. Debris disposal sites constructed on top of snow can become unstable during melt periods, or can create a situation where meltwater on the roadway cannot run off the road but only run down it.

Plan for and install deactivation measures during the design and construction of one-season winter roads. For example, construct swales, inslope or outslope the subgrade, install log-filled cross-ditches, and stockpile coarse rock for use at armoured swales and cross-ditch locations so deactivation requirements after the life of the road will be reduced.

Where possible, overland the road with a brush mat and snow excavated from the clearing width. Use a small amount of unfrozen dirt as a freezing agent to construct the road surface. Breach berms and snowbanks at intervals of not more than 50m. Smooth the road surface at the time of construction to avoid building in ruts and other irregularities, and construct waterbars on long grades. Remove fills in natural drainage channels, pull back soil-contaminated snow fills in the vicinity of stream crossings, and take measures to prevent sediment from entering streams around crossings.

5.10.3 Road Use

Mid-winter thaws are commonplace in the Interior and can disable even a well-built winter road. Because of heavy use and adverse weather, rutting and deformation of the road surface can occur as the subgrade begins to thaw. Use these roads only in frozen conditions. For this reason, monitor weather forecasts as far in advance as possible. As well:

- schedule night hauling when temperatures are expected to be above freezing during the day; and
- strictly control all light traffic during unfrozen conditions.