

TOWNSITE AVALANCHE PROTECTION AT TUNGSTEN, NWT

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The mining town of Tungsten, North West Territories, is located at 62 degrees north latitude, on the Yukon - N.W.T border. The remote Selwyn Mountains, which form the border of the Yukon and N.W.T., are home to only a few trappers and miners. The town was developed in 1965, to mine the rich tungsten deposits on the west side of the Flat River valley.

A snow safety programme was implemented at Tungsten in 1981, due to expansion of the townsite up the mountain slopes, into avalanche terrain. In the prior 15 years, two avalanches had run into what was then the outskirts of town.

The area has a northern interior highland climate, with cold mean winter temperatures, thin snowpacks and strong wind at ridge elevations. Sharply varying daily temperatures can also be observed, with a potential for temperatures above 0 degrees C in any winter month. In 1968 both the 15 year absolute maximum and minimum for February were recorded (8 and -48.5 degrees C respectively).

Snow depths in town (1250 m) range from a mean of 0.5 m at the end of November, to 1.0 m at the end of February, with the majority being depth hoar and facets. Deep wind drifted snow accumulation is observed in the two bowls which form the starting zones above the town, at 2050 m. In the absence of the townsite, a maximum avalanche event could theoretically reach the Flat River.

Over time various options for protection were evaluated. Starting zone support structures were ruled out due to the cost versus the limited remaining life of the mine, and the rotten rock conditions in the starting zones. Diversion berms were ruled out due to the fact that the diversion, if it worked, would only shift the runout to another part of town. Runout zone defences, such as mounds, were of questionable effect given the 22 degree incline in the runout zone.

In 1981-82 an explosive control programme was initiated, with the objective of bringing more frequent avalanches down under controlled conditions. An avalauncher gun was used in the first few winters, replaced by a 75 mm Recoilless in 1985. A system of closures for avalanche control, and a three stage closure and evacuation programme for avalanche hazard at the townsite were instituted. Building functions were identified and some, such as schools or bunkhouses, were relocated or closed. In the limited available space, the most exposed terrain became parking lots.

The mine shut down during the winter of 1986-87. In April 1988 large natural dry avalanches ran, destroying much of the recreation complex and damaging several other buildings.