Compression Test

Objective

The compression test was first used by Parks Canada Wardens working in the Canadian Rockies in the 1970s. The following procedure was developed by the University of Calgary avalanche research project in the late 1990s. Similar tests have been developed elsewhere. This test identifies weak snowpack layers and is most effective at finding weak layers near the snow surface. Manual taps applied to a shovel blade placed on top of a snow column cause weak layers within the column to fracture. These fractures can be seen on the smooth walls of the column. The test can be performed on level or sloping terrain. The objectives of the compression test are to locate weak layers in the upper snowpack (approximately 1 m) and provide an indication of their triggering potential on nearby slopes with similar snowpack conditions.

Site selection

Select a safe site that has undisturbed snow and is representative of the slopes of interest. Observation guidelines and recording standards for weather, snowpack and avalanches © Canadian Avalanche Association 2014 37

Equipment

The equipment required is the same for test snow profiles (refer to Section 2.2.5). A snow saw is useful for cutting the test column.

Procedure

1. Isolate a 30 cm x 30 cm column of snow deep enough to expose potential weak layers on the smooth walls of the column. The uphill dimension is measured slope-parallel. A depth of 100-120 cm is usually sufficient since the compression test rarely produces fractures in deeper weak layers. Also, taller columns tend to wobble during tapping, potentially producing misleading results for deep weak layers.

2. Rate any fractures that occur while isolating the column as very easy (CTV).

3. Place a shovel blade on top of the column. Tap 10 times with fingertips, moving hand from wrist, and rate any fractures as easy (CTE).

4. If the snow surface slopes, remove a wedge of snow to level the top of the column.

5. If, during tapping, the upper part of the column slides off or no longer “evenly” supports further tapping on the column, remove the damaged part of the column, level the new top of the column and continue tapping.

6. Do not remove the portion of the column above a fractured weak layer, provided that it evenly supports further tapping, since further tapping may cause fractures in shallower weak layers.

7. Tap 10 times with the fingertips or knuckles moving forearm from the elbow, and rate any fracture as moderate (CTM). While moderate taps should be harder than easy taps, they should not be as hard as one can reasonably tap with the knuckles.

8. Finally, hit the shovel blade moving arm from the shoulder 10 times with open hand or fist and rate any fractures as hard (CTH). If the moderate taps were too hard, the operator will often try to hit the shovel with even more force for the hard taps - and may hurt his or her hand.

9. Rate any identified weak layers that did not fracture as no fracture (CTN)

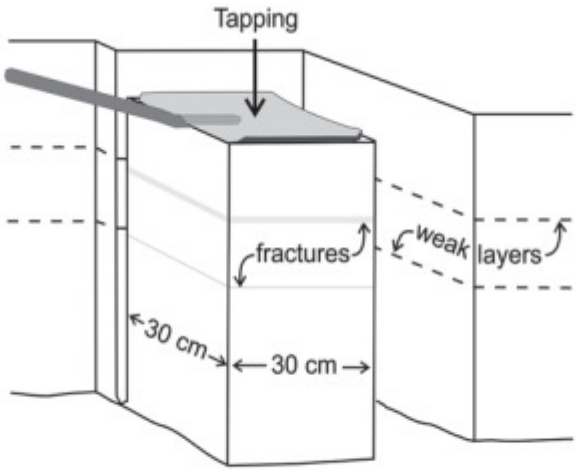

Figure 8 *Compression test and deep tap test technique and column dimensions.*

Results

Score each fracture according to the following table:

Term	Description	Data code
Very easy	Fractures during cutting.	CTV
Easy	Fractures before 10 light taps using finger tips only.	CTE
Moderate	Fractures before 10 moderate taps from elbow using finger tips.	CTM
Hard	Fractures before 10 firm taps from whole arm using palm or fist.	CTH
No fracture	Does not fracture.	CTN

Limitations

The compression test may not produce useful results for weak layers that are very close to the snow surface. Deeper weak layers are generally less sensitive to the taps on the shovel resulting in higher ratings.