Extended Column Test

Objective

The extended column test is a snowpack test that aims to indicate the propensity (tendency) of slab and weak

layer combinations in the upper portion of the snowpack (< 1m deep) to propagate a fracture.

Site selection

Select a safe site that has undisturbed snow and is representative of the slopes of interest.

Equipment

The equipment required is the same for test snow profiles. Eight meters of 4 to 7 mm cord with overhand knots tied every 20 or 30 cm can be used cut the upper wall provided no hard crusts are encountered. Long snow saws are useful to cut hard crusts. A cord with two collapsible probes can be used cut the upper wall and both sides of the column at the same time.

Procedure

1. Isolate a column of snow 90 cm across the slope, 30 cm up the slope, and deep enough to expose potential weak layers. Depth should not exceed 100 cm since the loading steps rarely affect deeper layers.

2. Rate any fractures that cross the entire column while isolating it as ECTPV.

3. If the snow surface is hard and inclined, remove a wedge of snow to level the top of the column at one edge.

4. Place the shovel blade on one side of the column and apply 10 light, 10 moderate and then 10 hard taps as for a compression test.

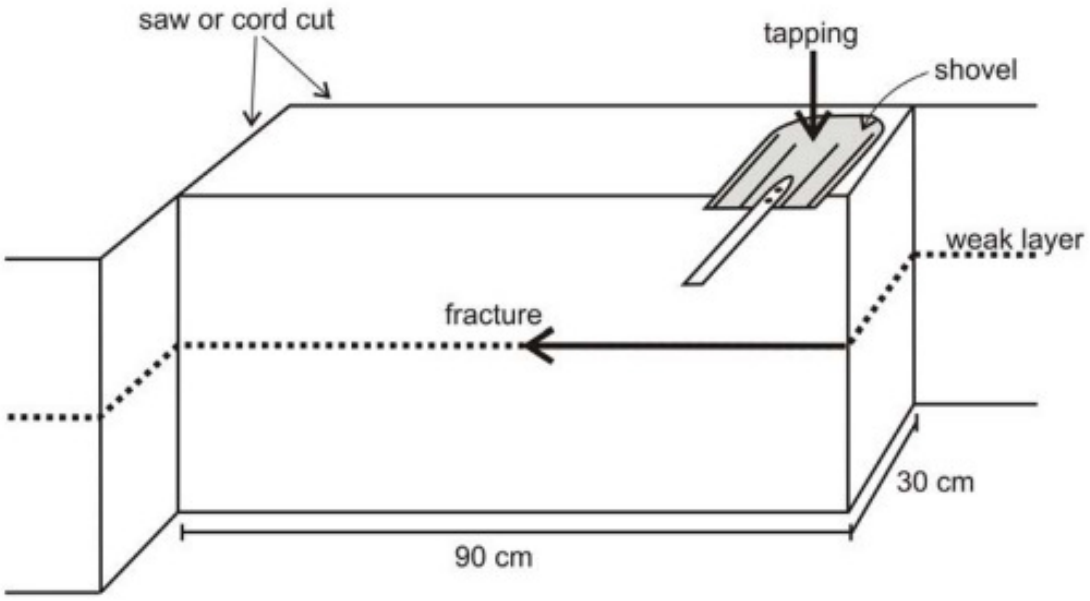

Figure 9 *Extended column test setup.*

Results

Score each fracture according to the following table:

Data code	Observed results
ECTPV	Fracture propagates across the entire column during isolation
ECTP##	Fracture propagates across the entire column on the ## tap OR fracture observed on the ## tap and propagates across the column on the ## + 1 tap
ECTN##	Fracture observed on the ## tap, but does not propagate across the entire column on either the ## or the ##+1 tap.*
ECTX	No fracture observed during the test

Note: ** Fracture either propagates across only part of the column (observed commonly), or it takes more than one additional loading step to propagate across the entire column (observed relatively rarely).*

Recording

Record test results according to the following:

<data code with ## taps><reference direction> <location in profile> <"on" layer characteristics> <comments>

Indicate the reference direction to locate the fracture position (down = from surface; up = from ground). Down is the default direction (i.e. from the snow surface), however, there may be situations where measuring up from the ground is more convenient.

Example 1: An extended column test fractures across the entire column on the 13th tap. The column releases on a layer of 6 to 10 mm depth hoar that is 35 cm above the ground and was buried on November 22.

Record as: ECTP13 up 35 on DH 6.0–10.0 Nov. 22

Example 2: During testing a slab fracture occurs, which propagates into the weak layer then across the remainder of the column on the 25th tap. The column releases on a layer of 8 mm surface hoar that is 65 cm deep and was buried on February 14th.

Record as: ECTN25 down 65 on SH 8.0 Feb. 14 WL fracture initiated from slab fracture

Limitations

The extended column test is not a good tool to assess weaknesses in soft (F+ or less) upper layers of the snowpack or in mid-storm shear layers. In these cases the shovel edge tends to cut those soft layers. It is not a good tool to assess fracture propagation propensity on a weak layer deeper than approximately 80 to 100 cm.