



FAILURE MODES OF SNOW ANCHORS DURING DROP TESTING

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Abstract

Previous slow-pull testing of snow anchors in medium- to high-strength snowpacks has demonstrated that pickets and flukes can hold loads up to 1,500 lb, and occasionally loads up to 2,000 lb can be held [1].

A series of drop tests were performed using various forms of snow anchors, including pickets in various configurations, flukes, and bollards. Slow-pull testing was done in the same snowpack to establish a baseline for comparison with the drop-test data. For the drop testing, a 215-lb (0.96-kN) Cascade litter was used as the test mass and slid 26 ft (8 m) down a 31° snow slope with 26 ft of 7/16" KM-III rope between the test mass and the snow anchor. Peak impact forces were measured with a dynamometer and correlated with whether or not the anchor survived and the type of failure that was seen. Whereas slow-pull testing in high-strength snowpacks generally results in shear failure of the snow, all of the current tests, both slow-pull and drop tests, led to compressive failure of the snow. Recorded peak impact forces during drop tests were roughly one third to one half the force needed to fail a similar anchor during slow-pull testing. In tests when the anchor held the fall, it was noted that as the travel distance of the anchor through the snowpack increased, the measured peak impact forces decreased.



Figure 1. Drop testing with a loaded litter on a snow slope.

Disclaimer: The information contained in this document is based on limited field testing. The user should verify the results and practice the techniques before applying them to a live or critical load. Failure to do so may result in serious injury or death to personnel and/or damage to equipment.