

Abstract

Roping glacier travelers together to safeguard against the potentially catastrophic consequence of a crevasse fall has been standard safety practice for decades. Being roped up, however, is not a guarantee against injury. Anecdotal evidence suggests that injuries sustained during roped crevasse falls are the result of striking the walls, obstructions, or “corking” in a constriction. In addition to using proper glacier travel techniques and effective self arrest, the question has been raised: Would the use of low-stretch ropes be a better alternative than high-stretch ropes to limit the length of a crevasse fall and thereby decrease the possibility of injury?

To answer this question, a study was conducted to collect comparative rope-stretch data between small diameter, low- and high-stretch ropes, and large diameter, low- and high-stretch ropes (see note). The study also recorded impact forces at the test mass and the arresting anchor. The test method simulated glacier travel situations. A full 25 meters of rope was deployed for each test, and test masses of 100kg (which approximates the weight of a traveler and pack) and 118kg (which approximates the weight of a traveler, pack, and sled) were used. In total, 21 drop tests were conducted.

Preliminary results point toward low-stretch, small-diameter ropes as an alternative to the traditional use of high-stretch ropes for safely limiting the length of crevasse falls and thereby reducing the probability of injury.

Note:

To define the terms low- and high-stretch I looked to the British Columbia Council on Technical Rescue which defines low-stretch as those ropes that elongate less than 5% under 2kN of tension and high-stretch as those ropes that elongate greater than 10% under 2kN of tension. The Cordage Institute standard 1801-98, defines static ropes as having less than 6% elongation at 10% of minimum breaking strength (MBS), a low stretch rope as having between 6 and 10% elongation at 10% MBS and a dynamic rope having greater than 10% elongation at 10% MBS. Using this standard, the corresponding terminology would be: I tested small diameter low-stretch ropes, small diameter dynamic ropes, large diameter static, and large diameter dynamic ropes.