

Presenter Bio:

Zephyr Feryok is a climber and rescuer originally from Sitka, Alaska. He received a degree in Mechanical Engineering from Tufts University, and works as a Research and Development Engineer for Rock Exotica in Clearfield, Utah. He develops products, techniques, and testing procedures for the rope rescue and work-at-height industries, and has presented at the International Technical Rescue Symposium and the Mountain Rescue Association conference. Zephyr has worked for Sitka Mountain Rescue and Weber County Search and Rescue, and teaches rope rescue techniques and practices. He spends most of his free time climbing and skiing in the Southwest.

Abstract:

Forces on carabiners and other rescue equipment rarely approach the tested minimum breaking strengths, but lower loads can still cause damage in materials. Aluminum is especially susceptible to damage from repeated loading, or fatigue. Fatigue failure in carabiners is a largely untested and poorly understood phenomenon. This paper examines the effect of repeated loading on carabiners of different shape and construction, as well as the influence of nicks, dings, and other stress concentrators on carabiner lifespan. Testing was completed using production carabiners with the intent of mimicking real-world use cases as closely as possible.