

Karabiners *do* break!

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Background

An investigation of accidents and incidents within climbing, mountaineering, caving and high-ropes activities has consistently suggested that it is predominately human error and not equipment failure, that is the primary cause.

As a result it is not unreasonable that systems have been developed that build upon the confidence instructors, technical advisors, operators and practitioners have in equipment.

Whilst the traditional use of karabiners in roped activities may well be supported by the generally unchallenged view that "*krabs don't break*" new activities can expose previously well known and understood issues, such as corrosion micro-cracks, to additional poorly understood forces.

We now know that ***karabiners do break!*** Recent incidents have both specific and more general implications for users.

Specifically.

Petzl Vertigo Karabiners used in conjunction with TRAC or TRAC PLUS pulleys on Zip lines.

In ***three*** instances operators of Zip Lines in mainland Europe have reported VERTIGO Karabiners ***breaking*** in use. The breaks appear to be due to a combination of very small corrosion cracks appearing on the surface of the karabiner ***and*** the resulting effect of vibration during subsequent use.



Initial surface cracks within the karabiner attached to the TRAC or TRAC plus pulley may go unnoticed as they form in the area of contact and are generally out of sight. (See below). Affected karabiners should be identified and removed.

Effective checking should include removing the karabiner to examine it closely.



Further information including a frequency of checks regime adapted for both intensity of use and physical environment can be found at;

<http://www.petzl-parks.com/pdf/TRAC-TRACPLUS-information020214-EN.pdf>

Generally:

This may well be the case in other situations where karabiners are used in conjunction with trolleys and pulleys or anywhere else where the components of a system/rig experience similar forces.

In the past the simplicity and efficiency of single-point attachment systems (one karabiner for example) may have been supported by their potential to reduce instructors and/or participants making a mistake and the perceived confidence that karabiners don't break. (Keep It Simple, Stupid.) However, this new evidence may cause us to rethink this maxim.

The intensity of use appears to be significant. The potential for vibration fatigue to extend surface cracks within the karabiner appears to be increased through repeated use on very long zip lines. The environment in which the zip line is situated and specifically proximity to water and the sea in particular are likely to increase the potential for corrosion cracks to form in the first place.

The frequency of checks upon equipment should reflect use & environment.

In light of these incidents operators should consider the implications of such a failure and modify their practices, at least until metallurgists and designers can assess the wider implications, if any, of these specific failures. In particular operators should:

- 1. Ensure close visual inspection of trolleys *and* karabiners. This may mean dis-assembling the system/rig to some extent.**
- 2. Use additional safeguards. One option would be a back-up such as an additional sling and krab attached directly to the line, but there will likely be other solutions such as enhanced routine inspection.**