

## Safety notification

Investigations by the DHV and the company Finsterwalder GmbH have shown that many paraglider- and hanglider karabiners are not fatigue resistant below the point of actuation by gravity of their catch. Aluminium as well as steel karabiners can be affected.

Harness karabiners with conventional catch fasteners show different fatigue resistance over and below the point of actuation by gravity of their catch. The point of actuation by gravity has not been investigated by the karabiner manufacturers and is subject to an unknown tolerance range.

Endangered above all, are those karabiners, by which the point of actuation by gravity in the fastening catch occurs by a loading ( $F_k$ ) that is larger than the fatigue strength ( $F_{ou}$ ) – reduced by 20% – established for the fatigue strength with open catch by the least favourable harness arrangement. By these karabiners, load oscillation tensions can arise on the inner bends of the karabiner, which are greater than the fatigue strength of the material. The reduction of 20% is a result of the safety coefficient of 1.2 with which the fatigue strength must be provided in order to take account of fluctuations in material and finishing. There is no warning before a breakage due to metal fatigue, as pronounced deformation does not occur, and is therefore not recognisable.

A karabiner fastener is "actuated by gravity" when there is no play present in the fastener. Karabiners with catch fasteners exhibit "catch play" from 0.2 mm to 2.5 mm. "Actuation by gravity" first occurs when the catch play is reduced to zero by deformation as a result of loading ( $F_k$ ).

The point of actuation by gravity  $F_k$  can be roughly established by every pilot by testing the size of the load at which the karabiner fastener can still be easily opened.

The DHV has requested the karabiner manufacturers to establish and announce exact values for the fatigue strength  $F_{ou}$  by March 1<sup>st</sup> 2005. This deadline has now been extended to the middle of April.

Endangered karabiners as defined above are not airworthy.

### **The Finsterwalder GmbH therefore takes the following precautionary safety measure:**

It is recommended to use only karabiners whose fatigue resistance has been verified.

*Munich, February 2005*

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On February 3<sup>rd</sup> 2005 the DHV had requested the karabiner manufacturers to proof the fatigue endurance until the point of actuation by gravity of their karabiners until March 1<sup>st</sup> 2005, **because otherwise the connectors are classified as not appropriate**. As conditions for the proof the DHV had ascertained:

- The proof has to be accomplished by an accredited testing institute.
- The test has to be accomplished with open catch.
- The testing range firstly consists of at least three karabiners per type.
- The karabiners are burdened through webbing loops in the „most disadvantageous“ point of application (with largest possible lever arm).
- The load is effected with a constant stress ratio of  $R = 0,1$  ( $F_v/F_o = 0,1$ ) in the range of the fatigue endurance.

The proof of fatigue endurance until the point of actuation by gravity according to the defined method would be adduced if it is proven, that the maximum point of actuation by gravity of the karabiners lies below the ascertained fatigue endurance. If this applies onyl for a part of the karabiners in use, the karabiners currently in use would have to be tested for their point of actuation by gravity.

**At a meeting of the karabiner manufacturers with the DHV on May 11<sup>th</sup> 2005 finally the fatigue endurance tests of the karabiner manufacturers were presented.**

Report of the meeting on May 11<sup>th</sup> [here](#).