

Karabiners: Be Aware!

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More and more accidents are happening because of karabiner failure. This is not because karabiners are not strong enough or because the standard is inadequate, but this is due to the basic concept of the karabiner, which has by definition a hinged gate, allowing the karabiner to open and close. This hinged gate is the weakest part, and it is from here where the problems arise.

1 Opening of the gate when falling

If the gate is closed, the karabiner can withstand a load of at least 20 kN. But when the gate is open, the strength is approximately divided by three (7 kN). This means that, if during a fall a karabiner is for different reasons in a gate-open position it may break.

Different situations:

1.1 Shock of the karabiner against the rock

The karabiner body hits the rock and the inertia of the gate causes it to open (see Fig. 1).

1.2 Even without shock, just by inertia

The rotation of the quickdraw is stopped suddenly by the vertical tension of the rope; by inertia the gate may open. This problem becomes worse, the longer the sling and the higher the fall factor (see Fig. 2).

1.3 Vibrations of the rope

The vibrations of the rope are transmitted to the karabiner and at a certain frequency the gate may open, as reported by ENSA-France to the UIAA Safety Commission during the Chamonix meeting (see Fig. 3).

1.4 Untimely unclip of a karabiner

Taking in the rope from above when climbing, may move the quickdraw as shown on the left side of the following figure. This allows the upper karabiner to get into a bad position. Then, if a drop occurs, the karabiner may unclip from the anchor point as shown on the right side (see Fig. 4).

How to avoid it?

When climbing always look, if the karabiner is in a correct position on the last anchor point.

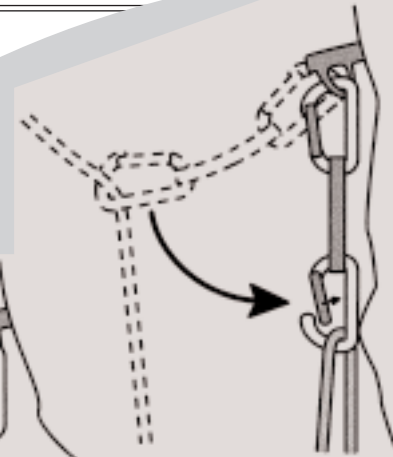


Fig. 1

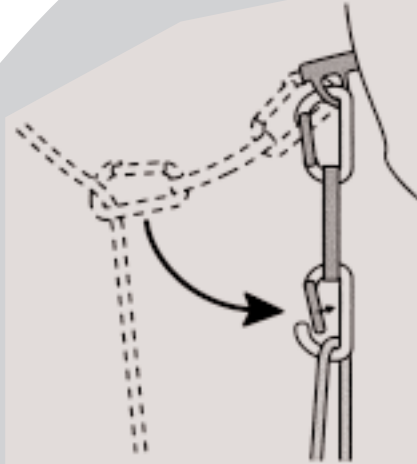


Fig. 2

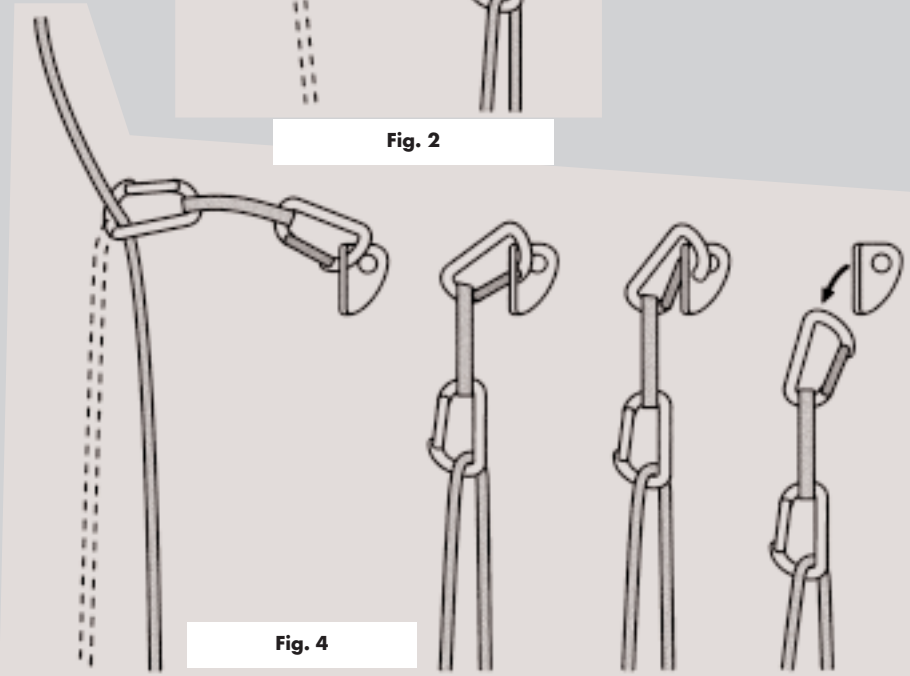


Fig. 4

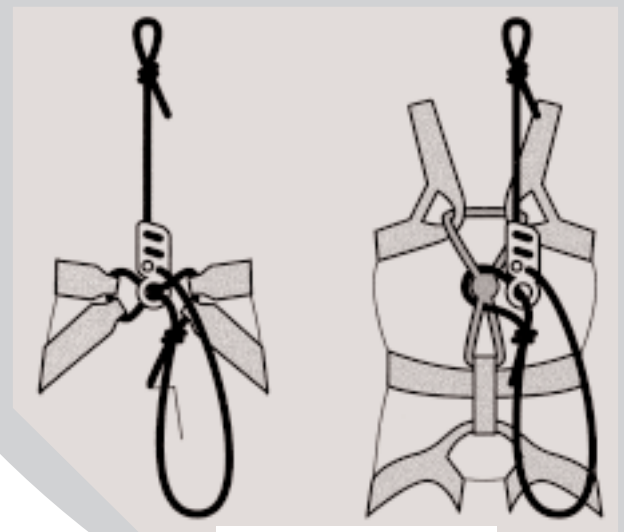


Fig. 7

1.5 General recommendation

There are now karabiners on the market from different manufacturers fitted with a wire gate. It appears that this reduces the danger associated with gate opening of karabiners, due to the lower inertia of the gate.

2 Breaking of the gate when using a figure of eight or an energy absorbing system on a via ferrata

2.1 Figure of eight

When abseiling if the climber does not take care, the figure of eight may move to a bad position on the gate as the drawing in Fig. 5 shows.

Then under just the weight of the climber, the sleeve can break and the figure of eight comes out of the karabiner. (See article by McMillan on page 5.)

How to avoid it?

Before abseiling, or when belaying take care that the figure of eight is in the correct position. This problem can also be solved by use of a quick link or a special karabiner (such as DMM belay master).

2.2 Energy absorbing system

Any kind of energy absorbing system for use in a via ferrata can position itself badly against the gate of the karabiner as figure 6 shows.

In such a configuration the gate can break when a load between 2.2 and 3 kN is applied (depending on the model and on the relative position between karabiner and energy absorbing system).

How to avoid this?

This bad positioning is not a result of misuse, it occurs during the drop without the climber knowing. So to avoid it: a karabiner must never be used to attach an energy absorbing system to the harness.

Different ways to solve the problem:

Attach the energy absorbing system to the harness using

- the part of the rope of the energy absorbing system which is foreseen to attach to the harness (see Fig. 7)
- a quicklink (Maillon Rapide) as shown in the photograph (see Fig. 8)
- a sling.



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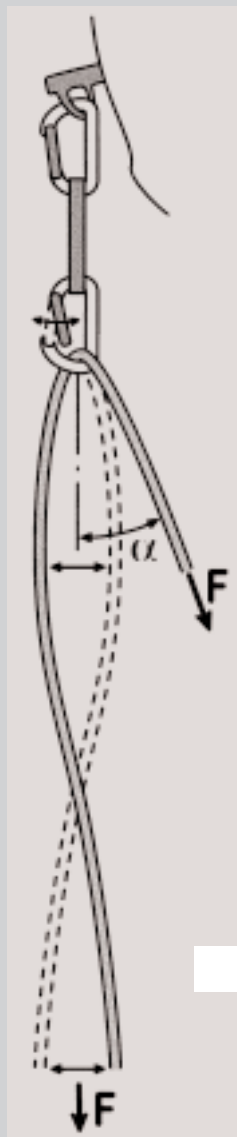


Fig. 3

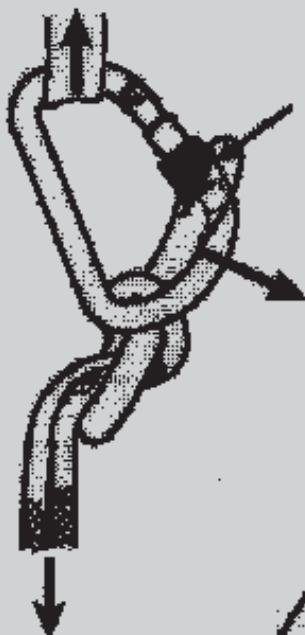


Fig. 5

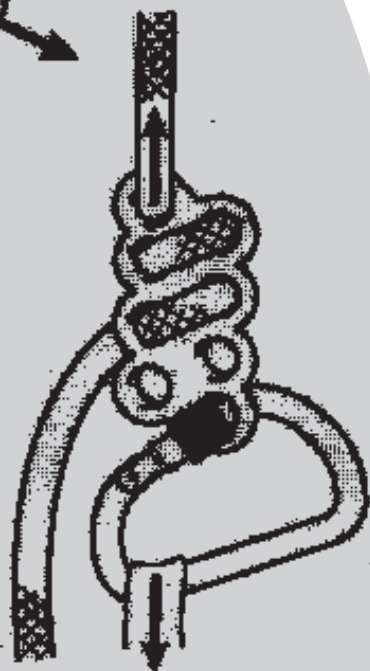


Fig. 6



Fig. 8

photo: P. Schubert