Broken track cable on a cable car

On December 29th around midday, cabin No. 1 of the cable car to the Schilthorn was travelling uphill with 53 passengers on board. When it was approximately 200 m below the summit, the staff in the top terminal heard a bang and saw that one of the track cable wires had come out. They stopped the cable car and organised the rescue of the passengers by helicopter. It turned out that all 21 Z-wires which constitute the covering layer had torn. This layer corresponds to 54% of the whole cross section of the track cable. The remaining core wires of the track cable stood firm to the increased weight so that the rescue of the passengers and the subsequent return of the cabins, could be managed without any further incidents.

Picture from the final report published by the investigation authority

Amount of loss: approx. 3 Mio. CHF (incl. Business Interruption)

Description of damage: Based on the examination of the incident it can be reconstructed as follows:

- By the first cable movement in 1979 an abrasion took place between the track cable and the deflecting piece of the top terminal.
- The abrasions were not discovered by the stipulated visual controls or were judged as irrelevant. In the course of time microscopic cracks occurred in the area of the abrasion from hydrogen-induced stress corrosion cracking.
- The progressive damage of the wires could not be detected by the last magnet-inductive test, due to the fact that at that time, most likely, no profile wire had broken yet.
- With time some cracks had reached a critical size which led to the spontaneous break of the affected profile wires.
- There appeared a concentration of cracks, consisting of approx. three to four adjoining spontaneous breaks.
- The broken profile wires came out of the main cable.
- Other profile wires were overstrained and have also broken.
- The released energy of the cable lead to a chain reaction with which all profile wires broke.

Cause: The wire damage was initiated by an earlier damage which appeared by the first shifting of the wire. The decisive damage process is based on the hydrogen-induced tension tear corrosion in the area of these damages. Microscopic cracks appeared in the wire surface and the material became brittle. This led to the spontaneous failure to all Z - wires.

Literature (in German):

Schlussbericht der Unfalluntersuchungsstelle für Bahnen und Schiffe über den Schaden am Tragseil "B" der Luftseilbahn Mürren – Birg am Mittwoch, 29 Dezember 2004. (www.uus.admin.ch)