



Safety recommendation no. 155

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Safety deficit	<p>On 11 February 2016 at around 3:20 pm, an empty four-seater chair on the Obersäss-Stelli circulating chairlift in Flumserberg crashed to the ground during the descent. The crash occurred in the vicinity of the third pylon from the top, No 16. Noone was injured. The chair that crashed, No 36, was damaged in the event.</p> <p>The chair crashed owing to a clamp failure. During the last clamp revision, the operator installed a non-compliant heavy-duty dowel pin. The mechanical loads and weathering in combination with the properties of the heavy-duty dowel pin resulted first in longitudinal cracks followed by transverse fractures. As a result, the bolt in the pin joint moved against the clamp housing wall and prevented the clamp from closing completely. The clamp thus no longer gripped the cable forcefully and tightly. At pylon No 16, the clamp was forced open and detached itself from the cable.</p> <p>Contributing factors to the accident were:</p> <ul style="list-style-type: none">• The operator was not aware of the requirement to use surface-treated heavy-duty dowel pins.• The heavy-duty pin used was not dacrometised (surface treatment in the form of a zinc flake coating for corrosion protection), so under corrosive conditions longitudinal cracks were more likely to form.• The required maintenance work on the clamps was not carried out as specified (one quarter of the clamps each year, or last maintenance in 2015).• As a result of the wedged clamp design, an exceptional condition occurred in which the faulty condition was not detected in the spring force test. <p>A further risk was identified during the investigation: If cableway operators, manufacturers and distributors do not report to the supervisory authority new findings that may have an influence on installation safety, the authority cannot check in its supervisory activities whether the undertakings concerned have taken measures to remedy the defects.</p> <p>Despite bezels, support bars, spring force testing, maintenance and service specifications, a faulty clamp was not detected.</p> <p>The investigations showed that, in the design of the monitoring facilities and maintenance and testing specifications, it had been assumed that a dead centre clamp can only ever be in one of two positions: either fully open or fully closed. A scenario in which a clamp does not close completely and is not in full positive contact with the cable was not considered. This means that a chair with the AK4.1 type clamp can leave the station with the clamp only partially closed and blocked. Consequently, the clamp may slip on the cable, which may lead to a collision of the vehicle with a vehicle in front or behind, or the clamp may open and the vehicle crash to the ground.</p>
Safety recommendation	For the operation of cableways with this or similar types of clamp and

monitoring equipment, the Federal Office of Transport (FOT) should require companies to provide evidence that blocked clamps can be reliably detected and vehicles with only partially closed clamps can be reliably identified and prevented from leaving the station.

Addressees	Bundesamt für Verkehr
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Stage of the implementation	Implemented. - During the market surveillance process, the FOT informed the relevant supervisory authorities abroad about the STSB findings. - During the market surveillance process, the FOT informed the relevant supervisory authorities abroad about the STSB findings. The manufacturers were requested to ensure that the systems are optimised. - As part of the safety monitoring, the FOT has checked the maintenance measures with regard to the clamps at the operators concerned.
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Investigation report concerning the safety recommendation	<u>Schlussbericht</u> <u>Vorbericht</u>
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