



Safety recommendation no. 95

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Safety deficit	<p>On Saturday 25th April 2015, at 02:49, the five rearmost wagons of a freight train travelling from Basel to Lausanne-Triage derailed on the line between Éclépens and Vufflens-la-Ville in the vicinity of the municipality of Daillens (canton of Vaud). The train consisted of 22 wagons, of which 14 were laden with hazardous goods.</p> <p>Several hundred metres before the position where the derailed wagon came to a halt, part of the running gear detached from one of wagon 20's bogies. When passing over a switch shortly before a right-hand bend, the wagon derailed and was pushed out of the rails. Due to the resulting momentum, two wagons in front of wagon 20 as well as the wagon behind it all overturned, and the rearmost wagon's front bogie derailed. Wagons 18 to 21, all of which were laden with chemicals, rolled over onto their sides. While overturning, wagon 19's tank – which contained 25 tonnes of sulphuric acid – was damaged, and the contents spilled onto the ground next to the track. Due to the pushing effect of the two wagons that followed, wagon 20 rotated by approx. 180° before coming to a stop next to the track. Its tank was damaged and leaked approx. 3,000 litres of caustic soda. The direct cause of train 60700's derailment in Daillens is the loss of wagon 20's front-left axle bearing housing (axle box). The loss of this axle box is the result of a long process which began with maintenance work on the aforementioned axle box in August 2011. During this work, the castellated nut's retaining washer which fixes the bearings onto the axle journal, was not secured correctly. The castellated nut gradually loosened itself, which led, bit by bit, to the following damage: An increase in transverse stress on the axle box's rolling element, the intensification of axle 1's lateral movement and the occurrence of S-shaped pitting on the rolling surface of this axle's wheels, the fatigue and subsequent breaking of the left-hand leaf spring on axle 1. Ultimately, this damage caused the derailment of wagon 20 in Daillens.</p> <p>The leaf spring packs are fundamental components of the running gear. They are one of the pieces that guarantee contact between the wheels and the track. When a leaf spring breaks, it creates an imbalance on the relevant axle and, depending on the track layout and load conditions, can lead to a derailment. The test station values of a leaf spring pack can easily be within the permissible limits even though one or more of the leaf springs exhibit visible notches or small cracks. It is not possible to visually identify damage like this in a pack which consists of eight individual leaf springs arranged on top of each other. During maintenance, it cannot be guaranteed that a leaf spring pack is crack- and notch-free through the inspection of the spring strength alone, even though having no cracks or notches is a prerequisite for</p>

preventing a leaf spring pack from breaking.

Safety recommendation	The STSB recommends that the FOT adapts the technical specifications for the inspection of leaf springs as part of maintenance work, so that an additional inspection, besides checking the spring strength, is stipulated that enables possible notches and fine cracks to be detected in the individual leaf springs.
Addressees	Bundesamt für Verkehr
Stage of the implementation	Partially implemented. The FOT states that responsibility for the continued development of maintenance regulations lies with the Entity in Charge of Maintenance (ECM). The FOT will consequently send an information letter to the ECM, which reports a potential safety deficit and at the same time requests that they continue to develop the maintenance regulations while taking into consideration pertinent events as well as their own experiences and investigations.
Investigation report concerning the safety recommendation	<u>Schlussbericht</u> <u>Rapport final</u>