



## Safety recommendation no. 102

<b>Date of the publication</b>	22.09.2016
<b>Number of the final report</b>	2015022001
<b>Safety deficit</b>	<p>On 20th February 2015, shortly after 06:40 in Rafz, on the track near the exit towards Schaffhausen, a regional train collided with the side of an S-Bahn train. The collision can be attributed to the fact that the S-Bahn train driver incorrectly believed that he could depart when a 'Stop' signal was displayed.</p> <p>During the investigation, the cause of the accident was identified to include the following factor: the kind of cooperation in the driver's cab, which gave the impression of mutual control and thereby made it impossible to recognise the error in a timely manner. The investigation found that, among others, the following factors contributed to the accident:</p> <ul style="list-style-type: none"><li>– The coincidental synchronisation of the signal positions which the locomotive crew involved mistakenly believed to be applicable to their own train.</li><li>– Self-imposed time pressure.</li></ul> <p>Amongst other things, the investigation has established the following factors, which contributed to the accident: the different light intensity of the signals which facilitate a mix-up; the presence of poor light conditions, which made it more difficult to see which signals relate to which track. For the installation of signals, operational criteria such as train headways, the usable length of track, travel times, track clearance, etc. are taken into consideration. Signals should primarily satisfy the needs of human capabilities and meeting operational requirements should be secondary. The layout of the track in Rafz, with a gentle S bend, made it more difficult to see which signal aspects applied to which track. The unusual operating position of the regional train overtaking the S-Bahn train coupled with the light conditions present created a situation for the S-Bahn train that could only be interpreted correctly with an above-average level of attention. All of this increased the risk of being enticed into departing when a 'Stop' signal was displayed.</p>
<b>Safety recommendation</b>	<p>The FOT should audit the process used by the infrastructure operators for determining and checking signal locations for whether all signals meet the level of visibility, correlation of signal and track as well as perceptible light intensity required by the crew in all light conditions.</p>
<b>Addressees</b>	Bundesamt für Verkehr
<b>Stage of the implementation</b>	<p>Partially implemented. The FOT states that this safety recommendation is being implemented as part of its safety monitoring activities and adds that by issuing advice regarding risk, the process for determining and checking signal locations used by the infrastructure operators as well as the signals' visibility is being</p>

incorporated into its work. This measure should clarify the infrastructure processes as well as the operational processes with regard to the location of signals and their perceptibility. The companies demonstrate how the visibility of new or changed signal locations can be assessed for new projects and how human perceptibility is adequately considered in this process. In addition, the train operators' procedures must be assessed with regards to how staff systematically report insufficient visibility of signals and how this is processed by the infrastructure operator. Visibility of the signals will be randomly inspected as part of the 'train driver's operational checks'.

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**Investigation report concerning  
the safety recommendation**

Schlussbericht

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