R2021-02 SAFETY RECOMMENDATIONS

1.1 Preparations for railway work and final inspection on tracks with a weakened support layer

The surface structure of the section of track being examined is based on a gravel support layer supplemented with an incomplete support layer of chippings in the early 2000s. The characteristics of the support layer make the surface structure of the track vulnerable to environmental conditions and the external stress caused by the railway work. Due to the weakened characteristics of the support layer, the correct operation of rail joints is especially important in these sections of track. Currently the instructions do not require a sufficient investigation into these matters in the planning of railway work, and they are not taken into account in the monitoring or final inspection of the work. Extensive railway work on the support layer, such as replacing the sleepers, always affects the stability of the track. In order to ensure the safety of traffic once the railway work is complete, the sufficient lateral support of the track should be confirmed with measurements.

The Safety Investigation Authority recommends that the Finnish Transport and Communications Agency (Traficom) ensure the implementation of the following recommendation:

> *The Finnish Transport Infrastructure Agency instructs that when preparing for railway work on the surface structure of sections of track where the support layer is weakened, the condition of the support layer and the rail joints should be examined and they should be taken into account in the planning, scheduling and implementation of the work. The ability of the rail to withstand lateral forces in particular must be verified in the final*

A simple visual inspection of the track in connection with a walking inspection before starting the railway work is not enough to verify the real condition of the track support layer and the rail joints. Following the instructions of the Finnish Transport Infrastructure Agency is recommended when inspecting the condition of the track support layer and verifying the functioning of the rail joints. When the railway work is complete, it is recommended that limited speed is used in the traffic until the condition of the track has been confirmed.

1.2 Recording and monitoring rail temperatures in railway work

Railway work is mainly carried out in the summer, when the temperature of the rails is likely to exceed the safe limits. Traditionally, the risk has been managed by scheduling the work during the night, when it is cooler. Due to the climate change, periods of hot weather will become longer and the temperatures during the night will also rise. This causes more requirements on the monitoring of temperatures during railway work.

At the moment, the instructions state that temperatures must be measured. However, they do not instruct that the temperatures should be recorded or communicated to the parties managing and monitoring railway work. This, together with potential remote management, may pose a risk of rising temperatures not being identified and the management of railway work not being able to address the issue.

The Safety Investigation Authority recommends that the Finnish Transport and Communications Agency (Traficom) ensure the implementation of the following recommendation:

> *The Finnish Transport Infrastructure Agency instructs that the rail temperatures should be recorded regularly and that the parties managing and monitoring railway work should monitor their development in real time and take measures, if necessary. [2022-S7]*

Using a centralised computer system would be the most effective way of recording and monitoring the temperatures.

1.3 Specifying clear interruption criteria and procedures for railway work in exceptional environmental conditions

Even though railway work has specified rail temperature limits, above which the work must be interrupted, the interruption process has not been defined. This means that it is possible to continue work even in temperatures with a high risk. In the instructions, the responsibility for monitoring temperatures is divided between several parties, but there is no clear specification on who makes the decision to interrupt work. In addition, the financial impact that will likely be caused by the interruption makes it more difficult to make the decision.

The Safety Investigation Authority recommends that the Finnish Transport and Communications Agency (Traficom) ensure the implementation of the following recommendation:

> *The Finnish Transport Infrastructure Agency clearly defines the criteria for interrupting railway work, the party responsible for the decision and the allocation of the costs due to the interruption. [2022-S8]*

At the moment, financial considerations strongly guide the maintenance of the track and the related work processes, among other things. The responsible parties and criteria must be defined so clearly that the costs of interrupting the work due to safety considerations does not result in any ambiguities, and no financial sanctions are caused by taking safety into account.

1.4 Taking deviations from normal operation such as track buckles into account in safety management systems

Currently safety management and systems are mainly focused on managing the risks of situations involving a change. Track buckles and other deviations in the surface structure of the track always pose a serious risk to the safety of railway traffic. They are handled in accordance with the instructions on deviations, but they may not lead to immediate decision-making or a change in the operating methods. Handling deviations and developing operations are a part of safety management, and their processes are defined in the safety management systems required from actors. The problem is that the potentially cumulative risks of deviations that occur in daily activities are not identified.

The Safety Investigation Authority recommends that:

The Finnish Transport and Communications Agency emphasises safety management methods when auditing the monitoring of deviations in everyday activities and the assessment and management of risks identified through them in addition to situations involving change. [2022-S9]

The recommendation can be implemented by including the proposed issue as one of the focus areas of annual monitoring, for example.

1.5 Measures that have been taken

After the notification on the threat of an accident issued by the Safety Investigation Authority, Finland, on 19 November 2021, the Finnish Transport Infrastructure Agency has lowered the speed limits on the section of track on 24 November 2021. The limits will remain in force on the section of the track until sufficient repairs have been completed.

The Finnish Transport Infrastructure Agency has inspected the Jyväskylä–Petäjävesi section of track in the autumn of 2021. The decision was made to carry out repairs of rail joints, among other things, on the section of track during the 2022 work season.