SUMMARY IN ENGLISH

On the 3 January 2018, a wagon derailed in a switch in Bastuträsk in Västerbotten County. The driver, positioned on a shunter's step at the front of the wagon, fell of and in front of the wagon and was run over. The driver sustained extensive, serious internal and external injuries and died at hospital two days later.

Around 2:00 AM, on the 3 January 2018, the driver had started his shift in Piteå. He drove a train consisting of an electric locomotive and 28 empty timber wagons to Bastuträsk and he was thereafter supposed to transfer the wagons to a timber terminal. Since the part of the track that is used for loading the timber does not have a catenary line the driver disconnected the locomotive from the wagons and shunted the locomotive to the other end of the train, and then pushed the wagons towards the terminal.

The locomotive was equipped with a remote control receiver. The driver could remotely drive the locomotive while standing on a shunter's stand at the front of the first wagon in the direction of travel. There are no witness statements concerning how the driver had chosen to position himself on the stand of the wagon. The nearest other personnel were working in the timber terminal approximately two kilometres away. Normally a driver would use one hand to hold on to a handrail and the other one to operate the remote control transmitter.

When the train was passing through switch number 12 going from Bastuträsk station to the timber terminal, the first wagon's first axle derailed at a speed of 10 to 14 km/h. Shortly thereafter, the wheels on the derailed axle hit a railway crossing for pedestrians and snowmobiles, which caused a sizeable vertical motion. Thereafter, the derailed wagon continued approximately 20 metres and stopped in switch number 13.

At some point, the driver fell of and in front of the wagon and was run over.

Considering the available information, the cause of the derailment cannot be established with absolute certainty. Although, SHK finds it probable that the wagons first axle was raised by the existing deposits of snow and ice in the specific switch, which led to the wheel flange passing over the rail and displacing the axle sideways left to a derailed position.

Underlying causes to the deposits of snow and ice in the switch were that the deposits of ice in the switch had not been cleared during the preceding snowy days and that it probably in some parts still contained snow and ice after the previous occasion of removal of snow and ice.

Contributing causes were that the entrepreneur had not, due to time constraints, thought it possible to do so with regard to the number of switches that needed to be cleared and other remedial tasks that needed to be performed. Additional contributing causes were that the entrepreneur lacked a systematic plan for the removal of ice and snow and a clear work management during the time period.

It is likely that the driver lost his grip on the handrail and his footing on the stand due to the motion that occurred during the derailment and therefore fell of and ended up under the wagon.

Contributing causes to the driver falling off the wagon was that the handrail was bent and it was difficult to wrap an arm around it, and also that the shunter's step was slippery in the lateral direction in the current snowy conditions. It is furthermore likely that the driver operated the remote control transmitter with his right hand and held on to the handrail to the left of him with

his left hand, which could be a contributing cause to the driver falling to the left, forward and ending up on the track and under the wagon instead of rotating outwards and away from the track and vehicle.

Safety recommendations

The Swedish Transport Agency, in conjunction with the Swedish Work Environment Authority and Railway undertakings, is recommended to:

- Examine how a safer design on existing wagons could be achieved. *(RJ 2019:01 R1)*

- Consider how the Swedish internal regulations can be improved from a safety point of view in terms of design, placement and use of handrails and shunter's step for shunting with remotely driven locomotives. Similarly, which initiatives that may need to be taken at European level should be considered. *(RJ 2019:01 R2)*

The Swedish Transport Administration and Infranord is recommended to:

- Jointly follow up and evaluate how they can ensure that it is safe to carry out shunting even under particularly difficult weather conditions. In this context, there may be reasons to follow up and evaluate, for example, routines for dialogue, planning, prioritization between assignments, resource access and notification when there is a risk that requirements cannot be met. *(RJ 2019:01 R3)*