

1 SAFETY RECOMMENDATIONS

1.1 Updating the risk assessment

The risk assessment on the transfer of metros in the railway network was made when the transfers were only at the planning stage. The assessment was not updated after the implementation method and technical solutions used in the transfers were confirmed. The effects of the technical solutions selected on risks were not identified, either.

Even when a comprehensive risk assessment is carried out at the start of the project, it is often impossible to take all risk factors that occur in practice into account. Similarly, the solutions used in the implementation may change from the planning stage. Therefore, the existing risk assessment should be updated when changes to the plans are made. This is the only way to identify and react to risks that emerge during the project or operation.

The Safety Investigation Authority recommends that:

When auditing the safety management systems of railway operators, the Finnish Transport and Communications Agency should evaluate whether the assessments are updated as needed in addition to the risk assessment procedures. [2022-S20]

Risk assessments should be updated in all processes, in which they are carried out, not only in case of changes or exceptional situations.

1.2 The use and maintenance of towing adapters and other auxiliary devices used for connecting trains

The equipment used in temporary transfers, such as towing adapters, has not always been handled as critical to safety in rail traffic. The towing adapters used in the transfer of the metro did not have a maintenance programme, and the adapters had not been identified. This meant that it was not possible to confirm whether the adapter was functional. As a component, however, the adapter is just as critical to safety as the actual automatic coupling of a train or locomotive.

There were no separate instructions on the use of the adapter; in that respect, the instructions of the automatic coupling were followed. This meant that it was not possible to take the special characteristics of the adapter into account.

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

Railway operators should ensure that the towing adapters and other auxiliary devices they use for connections have been identified and are included in the maintenance programme and that there are instructions for their use. [2022-S21]

The structure of a device and the way it is used must be taken into account in drawing up instructions and a maintenance programme. The potential changes in the safety features of the equipment in particular must be taken into account and managed.

1.3 Taking the risk caused by the train breaking up into account

In the accident, the train broke in two between the locomotive and the metro that had been connected to it with a towing adapter. The collision of the metro with the locomotive and the resulting derailment was due to the deficiencies in the installation of the brake pipe used to control the brakes of the measurement carriage connected to the metro, which had no brakes.

A train breaking up is a known risk in rail traffic. The break is not assumed to cause an accident, because in a normal situation, the brake arrangements will ensure that the parts of the train will come to a safe and controlled stop. This risk should be taken into account in temporary transfers, however.

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

Railway operators should verify that brakes work in transfers of rolling stock implemented with special arrangements and take the risk of the train breaking up into account. [2022-S22]

As far as possible, the arrangements of temporary transfers should be implemented in accordance the regulations that guide safe operation. The correct implementation of a temporary brake pipe and coupling hoses in particular is important for ensuring the safe operation of the brakes.

1.4 Measures that have been taken

VR initiated its own investigation into the accident immediately on the day after it occurred. The railway transport of metros was initially paused until the connection problem involved in the accident was understood. After a risk assessment, the transports were restarted.

VR has ensured that the train drivers know about the issues related to connection.

VR has also verified the functionality of the adapters, and the adapters used have been inspected and serviced. In addition, a maintenance programme has been specified for the adapters. The brake pipes in the metro transports have also been installed in such a way that they will not become jammed between anything.

Moreover, VR had drawn up general instructions on how to use a towing adapter. According to the instructions, towing can be done either with another train unit or by a locomotive using an adapter. However, according to the instructions, a train can only be

is carried out according to the towing form described in the instructions. The instructions¹ also include images on using the towing adapter and a link to an online video of the installation of the adapter.

¹ According to the instructions, the adapter cannot be installed manually to a SA3 coupling. The adapter is so heavy that a hoist or forklift is needed for moving and installing it. The adapter has a lifting eye. The instructions describe how to lift the adapter correctly so that it will not fall down. The adapter is lowered on the SA3 coupling from above. The lock tab of the SA3 coupling is turned/guided in to allow the adapter to be lowered down in place. Once the adapter has been lowered down and it is in place, the main container hose can be attached.