

R2021-01 SAFETY RECOMMENDATIONS

1.1 Ensuring the appropriate maintenance of rolling stock

Based on the investigation, there is no structural fault in the Dm12 rail bus that would make it unusually vulnerable to fire. When new and after a basic overhaul, Dm12 rail buses operate for years without a fire.

First and foremost, dirty engine compartments and liquid leaks have been the cause of fires, which in turn results from wear and tear. For example, the casings in the chassis have become damaged during use so that plenty of combustible material can accumulate inside them. These systematic failures have not been addressed during maintenance. The aim has been to manage the risk by cleaning the engine compartments during the V5 maintenance carried out every 5,000 km. Due to costs, some of the V5 maintenance is carried out in railway yard conditions. In practice, however, cleaning the engine compartment during V5 maintenance in railway yard conditions cannot be done thoroughly enough during the time allocated and with the methods available.

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

VR-Yhtymä Oy ensures that the rolling stock is maintained in the safe condition required by the authorisation for placing in service. [2022-S10]

The responsibility for maintaining the rolling stock does not rest only on the company that is officially responsible for its maintenance. The basic requirement for appropriate maintenance is sufficient funding by the owner of the rolling stock.

1.2 Selection and use of the types of extinguishers

In the case examined, the first-aid extinguishing by the train driver was not effective, even though the driver used several fire extinguishers for the purpose. This was due to the ineffectiveness of the carbon dioxide fire extinguishers easily available on the rolling stock in case of a fuel fire. The effective use of carbon dioxide and other gaseous fire-extinguishing agents also requires that the space is as enclosed as possible, which is not the case in the engine compartment of a Dm12 rail bus, for instance, because its casing is almost invariably damaged. In such cases, a dry powder or a suitable liquid fire-extinguishing agent would be more effective.

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

The railway operators inspect the types of extinguishers available on the rolling stock and ensure that they have been selected correctly in relation to the most likely types of fire. [2022-S11]

With the placement of small hand extinguishers in the rolling stock, it must be ensured that a small hand extinguisher of the correct type can be used quickly. The differences in types of extinguishers must also be taken into account in the first-aid extinguishing training of the personnel.

1.3 Updating the risk assessment on the removal of train personnel from the Dm12 rail buses

The risk assessment on the removal of train personnel from the Dm12 rail bus rolling stock was carried out at a time when the rolling stock had just undergone a basic overhaul, and no fires had occurred for several years. Therefore, a fire and the resulting evacuation of passengers was not considered to be a major risk, and no measures were taken because of it. A situation, in which the train driver was incapacitated, or the passengers would need to exit the train unit on their own initiative for some other reason, was not recognised as a significant risk, either. In the cases investigated, the successful evacuation of the passengers and avoidance of personal injuries was based on the driver being able to act and, moreover, acting in an exceptionally systematic and effective manner.

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

VR-Yhtymä Oy updates the risk assessment concerning the effects of removing train personnel from the Dm12 rolling stock and takes the risks of fire and the potential inability of the driver to function into account in it in particular. [2022-S12]

Based on the observations during the investigation, the emergency signs on the doors that are important for the independent exit of passengers also require further clarification. Passenger safety, such as in situations, in which the driver has been incapacitated, can be improved by returning the train personnel back to the units especially in Dm12 trains that operate with more than one unit.

1.4 Self-monitoring and handling of deviations as a part of the supervision of safety management

Currently, ensuring the safe operating condition of the railway rolling stock is based on self-monitoring by the railway operators and the party responsible for maintaining the rolling stock. The aim is to identify the risks caused by the rolling stock through safety deviations and address them.

Based on the investigation, it can be stated that self-monitoring and the supervision of its implementation in their current form are not enough to guarantee the safety of rail traffic. The connection between the fires and the deteriorating condition of the Dm12 rolling stock was not recognised in the self-monitoring, and the recurring fires in the rolling stock have not

been addressed sufficiently. The risk to passenger safety caused by several similar incidents has not been identified, either.

The Safety Investigation Authority recommends that

The Finnish Transport and Communications Agency develops its operating methods and the focus of its supervision to ensure the functioning of the operators' self-monitoring and handling of deviations in practice. [2022-S13]

The recommendation can be implemented by including the matters as a part of the supervision focus area programme of the Finnish Transport and Communications Agency.

1.5 Expanding the supervision possibilities of the national safety authority

The national safety authority is obliged to supervise the safety management systems of operators in rail traffic. This investigation noted that even though the safety management system and its supervision have been implemented according to the instructions, the activities in accordance with the system are not realised in practice. The same issue has been observed in previous rail traffic investigations. The supervision procedure must be changed so that the monitoring confirms the functionality of the safety management system in addition to its existence.

The supervision by the national safety authority is based on the EU Directive 2016/798 on railway safety. The authority has stated that it cannot increase supervision within the framework of the directive. In its own investigations, the authority has also observed the problems mentioned above in implementing the safety management systems in practice and especially in self-monitoring. For reasons due to the directive, however, it does not feel that it is able to address them. Therefore, improving safety requires changes on the EU level.

The Safety Investigation Authority recommends that

The European Union Agency for Railways (ERA) investigates the potential of expanding the possibilities of the national safety authority to monitor the operators in the field in practice. [2022-S14]

The requirements of Article 17, *Supervision*, of the directive cannot be implemented in practice with the current supervision options.

1.6 Measures that have been taken

After the accident, VR-Yhtymä Oy started training the drivers of Dm12 rail buses on evacuating the passengers.

In order to reduce vibration while the engine is running, VR FleetCare has started replacing rubber vibration dampers with a new type in connection with the general overhaul of engines. In addition, the support of fuel pipes has been changed in connection with the general overhaul.

The safety management system of VR-Yhtymä Oy has been updated on 1 November 2021 and the risk assessment on the operation of Dm12 without train personnel on 17 September 2021.

