**R2021-01, Fire in the Dm12 rail bus between Huutokoski and Siikamäki in Joroinen on 5 June 2021, summary**

A train consisting of two Dm12 rail bus units was travelling from Joensuu to Pieksämäki via Varkaus on Saturday 5 June 2021. While the train was in Joroinen between Huutokoski and Siikamäki, the fire extinguishing system in the engine compartment of the first unit of the train sounded the fire alarm at 17:30.

The train driver knew the section of track well, and stopped the train at an advantageous location with regard to evacuation of the passengers and access to the site by pump crews. After stopping the train, the driver started to evacuate the passengers from the unit that was on fire. The driver confirmed the functioning of the extinguishing system from the function button in the cab and took a portable fire extinguisher along from the cab. The driver attempted to extinguish the fire through a crack in the casing of the engine compartment, but failed.

After the extinguishing attempt, the driver disconnected the rail bus units from each other and moved the other unit to a safe distance from the unit that was on fire. After this, the driver reported the fire to the Emergency Response Centre and returned to continue first-aid extinguishing in the unit on fire. However, extinguishing was not possible with the carbon dioxide fire extinguishers found in the cab. The extinguishing attempts were also hindered by the large amounts of smoke generated that prevented the use of the extinguishing holes in the engine compartment casing.

The accident did not result in personal injuries. The dangerous situation occurred, because the evacuation of a passenger with reduced mobility was difficult due to the height difference between the lowest step of the carriage door and the bank of the railway track. There were no instructions for the evacuation, and it had not been practised.

The rail bus sustained considerable damage in the fire. The fire started due to a crack in the fuel return pipe. Fuel leaked inside the engine compartment casing, impregnating the combustible material accumulated there, which caught fire due to the heat of the turbocharger. The structure of the engine compartment of a rail bus allows impurities to accumulate inside the casing, creating favourable conditions for a fire. The purpose of the casing is to prevent problems caused by the snow and ice that accumulate around the engine during winter. Cleaning the space in railway yard conditions is difficult.

Several fires have occurred in rail buses during 2008–2021. In the incidents, it has been necessary to evacuate the passengers either on the tracks or at a halt or station. More than half of the fires occurred at a time when there were no train personnel in the passenger cabin, and the train driver took care of the evacuation.

There are risks involved in working alone. If the train driver is incapacitated, the evacuation and its implementation depend completely on the passengers. Despite the recurrent fires, the risk assessment of working alone has not been updated in this respect after the arrangement began in 2015. The similar safety deviations caused by the eight fires that have occurred since then have not initiated a new risk assessment, even though the deviations were handled in accordance with the operator's safety management system.

In order to improve the fire safety of the Dm12 rail bus stock, the Safety Investigation Authority, Finland, issues the following recommendations:

1. VR-Yhtymä Oy ensures that the rolling stock is maintained in the safe condition required by the authorisation for placing in service.
2. 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.
3. 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.
4. 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.
5. 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.