Human Environment and Transport Inspectorate
Ministry of Infrastructure and Water Management

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Spoorwegondernemingen in Nederland, houders van treinstellen, en ProRail

ILT
Toezicht veilige mobiliteit
Rail 2

Utrecht
Postbus 16191
2500 BD Den Haag

Contact
[redacted]

Date
4 December 2020

Ons dossier:
[redacted]

Betreft: Braking system passenger trainsets exhaustive in towed situation

The accident

An accident where a towed trainset derailed occurred on October 16 2020 at Dreileben (D). A definitive conclusion as to what the root cause was of this accident has not been determined yet. Based on first preliminary results however, it was established that a loss of air pressure for braking triggered the derailment. The root cause for the loss of air pressure or why the system was not (re-)filled is not found yet.

The two trainsets where towed by a diesel locomotive and were connected by means of a rescue coupler. Before leaving the Main Brake Pipe (MRP) and Brake Pipe where coupled. The brakes where tested according procedure and found in good working order. During the journey the driver experienced a lack of braking power and signalled the operator. The operator took measures to send the train to a sidetrack. There the train derailed with mechanical damage. The driver could leave hospital after checking his condition and care of the minor injuries.

Safety alert

Based on information that was provided by the train manufacturer with regard to the design of the brake system, it has come to the attention of the ILT that a yet unidentified hazard can occur with trainsets with a two pipe brake design that are not “EN-UIC” brake systems. This hazard can occur in towed operation when the towed train is not energized but purely pneumatically braked. In such situations there is no monitoring available of the Main Brake Pipe pressure, and a single failure (loss of main brake pipe pressure) can lead to an unexpected loss of brake power during operation.

In general

Essential for the good functioning of the brake system built in the trainset is the air supply via the MRP. If the supply of the MRP and main reservoir is disrupted the pressure will drop and the auxiliary reservoirs will not be refilled while using the brakes of the train. The braking system of the trainset is compatible with UIC-brake

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systems (but not UIC compliant). In normal operations the driver will not experience a difference in behaviour with UIC-compliant brake system. The pressure in the MRP and reservoirs is monitored by sensors during normal operation. The train will be stopped in a more or less controlled way when the pressure in the MRP is too low.

One of the functions of a UIC-compliant system is the ability to fill the auxiliary reservoir / local brake reservoir (LBR - 8) via distributor valve (7) and in case of disrupted air supply on the MRP. (see diagrams on the next page) An UIC-compliant system does not rely on sensors and electricity while it is failsafe when operated only using the brake pipe. On the vehicles are no indications for the type of braking system used: UIC compliant or not.

Trainsets without ability to fill local brake reservoir (LBR) via BP

In the trainsets involved in the derailment there is no facility to fill the local brake reservoir via the distributor. The connexion 8 → 7 is a one-way link (instead of the two-way link of a UIC compliant system). Distributor valves exist which do not support a redundant link between BP and LBR. The use of such distributor valves is not uncommon for modern trainsets. In towed situation there is a risk the braking system of the train will be exhausted.

Measures

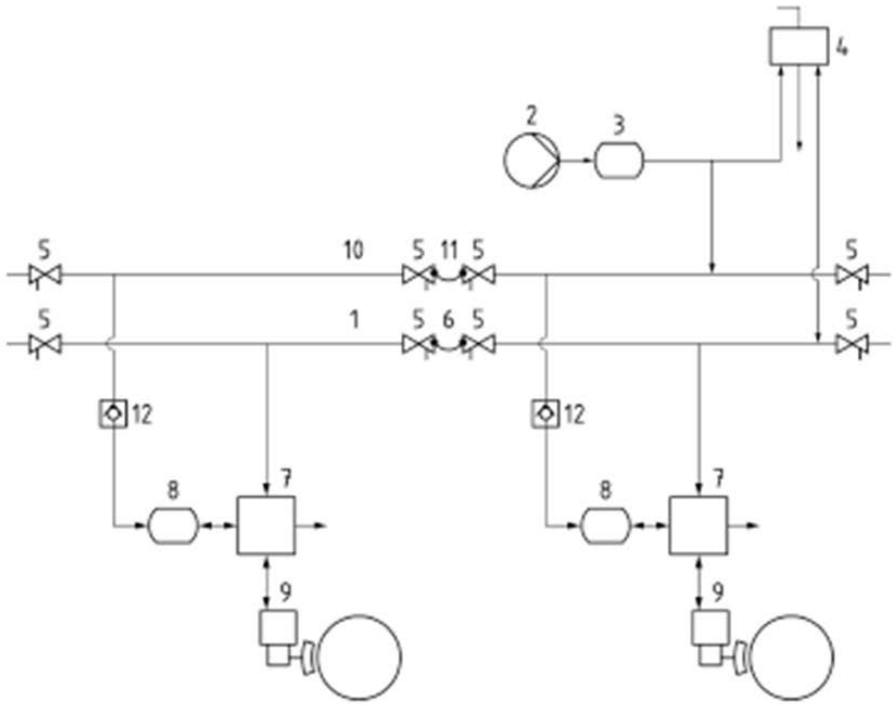
Trainsets which have no redundancy for filling of the braking system (auxiliary / local brake reservoir) have to be checked or monitored in such a way that the MRP has to be considered as part of the braking system in all operating conditions. Technical or operational measures need to be taken to ensure sufficient pressure in the MRP in all possible operating conditions.

Hoogachtend,

DE STAATSSECRETARIS VAN INFRASTRUCTUUR EN WATERSTAAT,
namens deze,
Inspecteur ILT, Rail 2,

[redacted]

[redacted]
senior inspecteur



Key

1	brake pipe
2	train air supply unit
3	main air reservoir
4	brake pipe pressure control system
5	end cocks
6	brake pipe half coupler
7	distributor valve
8	local brake reservoir
9	local brake force generation system (actuator)
10	main reservoir pipe
11	main reservoir pipe half coupler
12	brake reservoir filling device

Figure 3 — Two pipe brake design

The "EN-UIC" brake system shall be capable of applying and releasing the friction brake only when the brake pipe is connected. The performance doesn't need to be the same as with the MRP coupled.