



Transport safety alert

Transport safety alerts are published by ITSR under section 42L(2) of the *Transport Administration Act 1988* to promote the safe operation of transport services.

Transport safety alerts are intended to provide information only and must be read in connection with obligations under relevant legislation.

26 August 2011 | TSA no. 37

Safe operation of unfired pressure vessels on rolling stock

Background

A locomotive main reservoir recently suffered a catastrophic failure during a planned but infrequent maintenance intervention when it was unable to sustain a significant over-pressurisation condition. At the time, maintainers were calibrating the brake rack to accommodate a new software package which, in turn, would provide the future capability to calibrate the main reservoir pressure transducers.

The pneumatic system on most modern locomotives is normally a fully automatic arrangement requiring a minimal interface with the train crew, aside from a few alarms/alerts associated with monitoring the pressure of the system. Furthermore, these locomotives would normally have an in-cab control computer that delivers the 'unloading' function of the pneumatic system on the compressor, thereby ensuring the maximum operating pressure is not exceeded. This is achieved through the use of in-line pressure transducers, solenoid valves, isolation cocks and pressure relief valves.

An investigation of the incident has identified a number of causal factors, which may have significant safety ramifications for other above-rail operators, their suppliers and maintainers:

- arrangement of the ancillary air equipment and components enabled the circumvention of the pneumatic system unloading function
- structural inadequacy of the aluminium main reservoir, in particular, the poor weld quality of the longitudinal seam
- both high pressure relief valves failed to lift at the prescribed setting. There was a much reduced requirement for the safety valves to activate during normal rail operations due to the specific configuration and functionality of the pneumatic brake system. As a result of this 'reduced demand' inactivity on these valves, it is likely that this has resulted in the spool sticking due to the accumulation of silt and other debris over a considerable period of time, thereby preventing the valves from venting when required.

Actions

Rolling stock operators should therefore reassess as soon as reasonably practicable:

- the adequacy of coverage of these matters in their standards, risk registers, defect management systems and other relevant documentation including customer specifications to effectively communicate the risk control measures

- the certification, maintenance and inspection regimes which manage the design, construction and degradation of pressure vessels
- the capability and functionality of pressure relief valves to perform as intended (and in a fail safe manner) between defined maintenance interventions
- the adequacy of instructions for the adjustment and testing of the pneumatic braking system, including the requisite knowledge and skills to identify and manage any significant occupational hazards that may arise from such activities
- the appropriateness of the layout and functions of the ancillary equipment and components to ensure the safe operation of the reservoirs at all times
- the adequacy of processes for monitoring compliance with the above relevant instructions and procedures
- the risk review process of design, manufacture (including software orientated control systems), installation and maintenance of systems, sub-systems and components that perform safety critical functions.

For further information contact: Grant Holliday, Rolling Stock Specialist, on (02) 8263 7182.



Len Neist
Chief Executive