



# Rail Industry Safety Notice

RISN No. 23

## POTENTIAL DEFECTS IN SPOKED WHEELS AND DRAWHOOKS

### Background

#### *Spoked Wheels*

A set of cast driving wheel centres from a steam locomotive was recently scrapped due to the presence of fractures located between the spoke junctions (i.e. segments) on the inner diameter of the wheel rim (see Figures 1 & 2 below). Of the 10 segments on one wheel centre, 8 were found to be cracked and of the 11 segments tested on another wheel centre, 6 were also cracked.



**Figure 1 – Inner wheel rim surface showing transverse fractures on several segments**

Hence, it is imperative that the condition of these wheel centres is ascertained given their extensive age and the fact that they have not been subjected to regular monitoring in the area of the inner wheel rim.



**Figure 2 - Close-up view of one of the transverse fractures**

### *Drawhooks*

A heritage operator recently carried out a series of Non Destructive Tests (NDT) on a number of drawhooks used on heritage rail motors and found a high percentage with fractures (refer to Figures 3 & 4). In cases where cracking was evident, the initial fluorescent Magnetic Particle Inspection (MPI) test was followed by a black and white MPI in order to highlight the defects found.

A high percentage of drawhooks were found with fractures (refer to Figures 1 & 2) which led to these drawhooks being replaced.

It is noted that some steam locomotives also use drawhooks (both small and large). A small number of screw link couplings were also tested with no defects found.

Given the age of the drawhooks, the lack of any NDT requirements (as part of a technical maintenance plan) in the past and the findings from a RAIB (UK) report (Locomotive Runaway near East Didsbury on 27 August 2006) relating to a failed drawhook in service, there is a need for relevant rail operators to institute a NDT regime to ensure the structural integrity of these drawhooks on an ongoing basis.



Figure 3 - Two drawhooks showing fractures on the inner contact surface



Figure 4 - Five drawhooks with defects highlighted at various locations

## Action

In view of the above, the Independent Transport Safety and Reliability Regulator (ITSRR) requests that accredited persons and/or rolling stock maintainers in NSW who operate and/or maintain heritage rolling stock develop and implement an appropriate NDT regime to confirm the structural integrity of drawhooks (over the entire length) and spoked wheels (includes the wheel rim, spokes and wheel hub).



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**Chief Executive**