

RAILTRACK

*Safety & Standards***SAFETY JUSTIFICATION****ISSUE: 2****DOCUMENT INFORMATION**

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PART 1 – SCOPE OF SAFETY JUSTIFICATION

GE/RT8014 is a new document, based primarily on measures transferred from five other standards. A new RACoP, referenced GE/RC8514, has been produced to support the standard. The aim of the documents is to provide concise instruction and guidance on the detection of axle bearing failures.

GE/RT8014 contains measures currently mandated within GM/RT2242, GM/RT2243, GM/TT0142, GO/RT3207 and GO/OP0006; all of which will be withdrawn upon issue of the new standard.

Changes to the rulebook are also necessary, but are being undertaken separately, as part of the remit of the Trains in Service Working Group.

PART 2 – RISKS BEING CONTROLLED

The risks to be controlled by GE/RT8014 are those associated with the failure of axle bearings and the consequential hazards imposed on the infrastructure and its users.

Specifically, the risk relates to:

- **Fire**
Owing to the ignition of oil and grease from the high temperatures generated in the early stages of bearing failure. This could endanger persons using or working on the infrastructure, for example persons at stations and occupants of trains. Equipment and property alongside the track would also be at risk;
- **Derailment**
Should a bearing mechanically fail, there is a strong likelihood that one or more wheelsets will derail, as either a direct or indirect result of the axle failure.

Overall, the likelihood of axle bearing failure is low, however the consequences are potentially serious. For this reason the early detection of failure is important as it contributes to the mitigation of catastrophic risk.

PART 3 SUMMARY OF CONTROLS

This standard consolidates existing measures from the following standards:

- GM/RT2242 - Risk Management of Rail Vehicle Axle Bearings
- GM/RT2243 - Parameters for Hot Axlebox Detection Equipment
- GM/TT0142 - Hot Axlebox Detectors Mechanical Alignment and Alarm Settings
- GO/RT3207 - Hot Axlebox Detectors – Siting
- GO/OP0006 - Hot Axlebox Detectors – Action in the Event of an Alarm

The scope of the new standard and RACoP includes all rail vehicles that operate on Railtrack Controlled Infrastructure, except for rail-mounted maintenance machines and road-rail vehicles that are permitted to operate in possessions only. The scope is limited to the railway routes within Railtrack Controlled Infrastructure.

There are five primary sets of requirements mandated by the standard:

- requirements for on-vehicle detection equipment and vehicle design
- criteria for the provision and technical acceptance of lineside HABDs
- requirements for the response to alarm activation
- requirements for incident recording
- requirements for change control and system integrity.

The most significant new measure mandates the fitting of on-vehicle hot axle bearing detection equipment under two sets of conditions. Firstly, where vehicle design prevents the detection of an overheated axle bearing by lineside HABDs and secondly, where vehicles operate at speeds in excess of 125mph.

A further significant new measure, which was added following the formal consultation process, is the requirement for lineside HABDs to be fitted network-wide at a maximum spacing of 50km. There was no previous mandatory requirement to fit.

PART 4 – COSTS AND BENEFITS

The implementation of this standard has the potential to impose additional cost in two areas:

- the mandatory fitting of on-vehicle detectors to those vehicles where their design precludes detection by lineside HABDs
- the retrospective fitting of lineside HABDs to routes where no coverage currently exists, or where spacing of HABDs exceeds 50km.

In both of these cases it is contended that the additional cost is justified through a predicted reduction in serious incidents and performance delays. This is because the implementation of these requirements will result in the network-wide ability to detect failing axle bearings. There are numerous examples of incidents resulting from vehicle bearing failure on existing routes where currently neither on-vehicle or lineside detection is available, and it is incidents such as this that have been targeted in this standard for risk mitigation.

In order to minimise the financial impact of this standard, the compliance requirements have been carefully drawn-up to ensure that a realistic programme of fitment is mandated.

The benefits accrued through the changes mandated by this standard extend beyond those gained by the ability to detect hot axle bearings network-wide. It is believed that the effectiveness of management systems designed to aid hot axle bearing detection through monitoring of trends will benefit from the consolidation and simplification of the existing standards.

These changes are summarised as:

- the clarification of the responsibilities of train operators and the infrastructure controller
- the removal of conflicting, out of scope and inappropriate measures
- the requirement for a consistent information collection regime.

Any improvement in the effectiveness of management systems is likely to result in more timely intervention to prevent bearing failures, greater reliability of the systems in place and better forward planning. Together these improvements should instil greater workforce confidence in hot axle bearing detection systems. Furthermore, reliable and consistent reporting of alarm activation will provide detailed and accurate knowledge for the targeting of future mitigation measures.

PART 5- CONCLUSIONS

Hot axle bearing detection rates are historically low, however these will be improved by the mandating of widespread hot axle bearing monitoring, the increased use of on-vehicle monitoring, and the clarification of HABD design criteria, setting and siting requirements.

Specifically, the production of GE/RT8014 is viewed as justified for the following reasons:

- significant safety benefit will accrue through the improved detection of hot axle bearing failures
- the responsibilities of train operators and the infrastructure controller are clarified
- the standard will focus purely on the detection of hot axle bearings and replaces five existing standards containing duplicate and sometimes conflicting measures
- the collection of thorough and consistent records of activation will enable the construction of better historical model of such incidents and should facilitate improved forward planning for design operation and maintenance.

The changes outlined should be achieved without disproportionate additional cost to industry. Where additional costs are imposed, it is considered that these are justified through the mitigation of risk, in particular the catastrophic risk associated with bearing failure.