



**HMRI's Risk Profile Topic Strategy for Structures 2006-07 to 2008-09**

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## 1 INTRODUCTION

This document sets out HMRI's overall policy and strategy for securing adequate control of risk from structures, on railways in England, Scotland and Wales<sup>1</sup>. This includes:

- The national rail network;
- The underground and metro systems;
- Tramways;
- CTRL; and
- Heritage / private railways

Also relevant are the significant number of civil structures, which interact with the railways but are not owned or controlled by railway industry players. The strategy applies primarily to the activities of infrastructure controllers but extends to others involved in the management of risk throughout the lifespan of structures, from design, through construction, inspection, maintenance, replacement and decommissioning.

Further details of the scope and the context for HMRI's strategic approach, including the relative priority afforded to structures by application of the HMRI Risk Profile Topic Planning process and the proposed work streams for developing and delivering this strategy, are set out in a supporting document. Contact the author for further details.

## 2 OVERVIEW OF CURRENT POSITION ON STRUCTURES

In considering structures risks and associated accident precursors on the national network, HMRI have used information from the RSSB Safety Risk Model (SRM) and associated Risk Profile Bulletin (RPB) updates. This shows structural failure contributing less than 1% of the total equivalent fatality risk and 2% of the total fatality risk. Analysis of the contributors to these risks, provided in the supporting document to this overview, identifies the following catastrophic accident risk precursors which will be used as a focus within this strategy:

- Bridges integrity – Rail Bridge failure or collapse; debris from over bridges: bridge bashes (Approximately 40%);
- Earthworks, principally Embankments and Cuttings integrity: Train derailment by running into landslip, or train derailment due to track being affected by subsidence or landslip (approximately 40%); and
- Tunnels and other structures (Retaining walls, culverts, Sea defences, stations structures including platforms and large roofs, signal gantries, OLE masts): Train derailment due to running into debris in tunnel, structural collapse at station, debris from line side structures, collapse tunnel, drainage culvert / pipe work collapse (approximately 20%).

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<sup>1</sup> For which ORR have enforcement responsibility under the Health and Safety (Enforcing Authority For Railways And Other Guided Transport Systems) Regulations 2006.

Network Rail set out their Asset Stewardship Strategy for Structures in Section 9 of their 2004 Technical Plan. This identifies adoption of a structures asset policy, determined in conjunction with the economic regulators in ORR, which will see a gradual implementation from 2006-7 of a policy which allows structures to deteriorate until repairs or replacement are essential to maintain operational requirements. Then, at the time of intervention, works that achieve the lowest long-term costs for the structure are completed. HMRI will monitor the implications of this strategy against the legal requirement to manage risks to ALARP.

London Underground's Quantified Risk Assessment update for 2003 (latest available) provides the following information. Direct structural failure contributes 0.2% to LUL's overall risk profile, which equates to 0.03 fatalities per year. The following scenarios contribute to the overall risk level for structural failure:

Non-vehicle bridges	36%
Stations	27%
Tunnels	24%
Bridges	12%
Shafts	1%

Derailment risk on LUL accounts for 18.5% of overall risk (2.9 fatalities/year), of which 20% is contributed by 'structural failure related faults'. Earthworks integrity is believed to contribute a significant proportion of this risk.

LUL's approach to managing structures is closely related to PPP contractual requirements and mechanisms. These require the infracos to hand back the assets in 27 years time in as good as or better condition than they are now. Consequently, LUL has a very clear picture of asset condition, and appears to have very robust mechanisms for maintaining this knowledge.

Despite the different characteristics and risk profile of the LUL system, the significant structures risk accident precursors are considered to be the same as those described for the national network.

Other railway infrastructures on CTRL, Metro systems, light rail and Minor Railways will similarly share the same accident risk precursors but with different risk profiles. Further work is proposed to further HMRI's understanding of structures risks on these railways.

### **3 HMRI POLICY ON STRUCTURES**

HMRI's overall policy on structures is:

- To ensure structures risks are being managed within the requirements of the law;
- To provide an effective, fair and independent challenge of the management of catastrophic risk, with work activities prioritised on a risk basis;

- To direct our work activities so that they effectively contribute to continuous improvement, so far as is reasonably practicable, in the management of catastrophic structures risk accident precursors;
- To ensure that our work activities complement and add value to those carried out by legal dutyholders and other stakeholders with an interest in the management of structures risk; and
- To continue developing our understanding of catastrophic accident structures risks and engage with industry dutyholders at appropriate levels, so as to most effectively influence industry priorities according to the profile of risk.

#### **4 STRATEGIC AIMS ON STRUCTURES**

HMRI will seek assurance that catastrophic accident structures risk is being effectively managed on all railway infrastructures and join with the industry in sharing the assurances with the public.

More specifically the following strategic aims have been identified to deliver HMRI's overall policy objectives on structures:

- Ensure catastrophic accident risks from new structures are minimised through appropriate design and installation;
- Ensure catastrophic accident structures risk precursors in existing systems are being adequately controlled;
- Ensure that information and intelligence on structures risk precursors are used effectively to prioritise targeted programmes of work;
- Encourage and engage with the industry to promote suitable research to identify and promulgate best 'world' practice and innovative approaches, to structures accident precursor risk reduction;
- Ensure recommendations relating to the management of structures risks from any Rail Accident Investigation Branch (RAIB) investigations, as well as other HMRI and industry investigations, are satisfactorily addressed;
- Undertake appropriate enforcement action on structures issues in accordance with ORR's Enforcement Policy Statement;
- Ensure that HMRI's management arrangements for gathering information and intelligence, maintaining a competent organisation, planning, implementation, monitoring and review of its own activities, on structures issues, are suitable and effective; and
- To develop this Track Strategy through specific Development Actions.

#### **5 DELIVERING THE STRUCTURES STRATEGY**

HMRI will deliver the structures strategy in a number of ways:

- Initial integrity issues will be delivered through statutory duties under the ROGS and High Speed Interoperability Regulations although there will be a phased change in approach with the advent of The Railways and Other Guided Transport Systems Regulations 2006 which have different requirements of the Safety Authority;

- Proactive inspection programmes, prioritised with a focus on catastrophic accident risk precursors for structures, delivered through individual dutyholder Inspection plans. The inspection programmes will consider structures throughout its life, in large part monitoring the dutyholder's management of risk precursors by ensuring appropriate risk control systems are in place;
- Considering incidents that have occurred, with appropriate RAIB liaison, to identify shortcomings in the management of structures risks and ensure suitable corrective actions are identified and acted upon; and take enforcement action in line with ORR's Enforcement Policy Statement. Also, as the Safety Authority, to monitor implementation of recommendations made by RAIB;
- Continuing current support to the RSSB Vehicle/Structures Systems Interface committee;
- Continuing current support for research activities on light rail systems, through engagement with UK Tram Ltd; and
- Through the work of the HMRI Track Integrity Strategy Group continue to review and develop this strategy.