



**HMRI's Risk Profile Topic Strategy
for Level Crossings 2007-08 to 2009-10**

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Introduction

1. This document summarises the HM Railway Inspectorate (HMRI) strategy for securing adequate control of safety risks at railway level crossings, within the context of the *ORR Policy Statement on Level Crossings*. Our strategy concentrates on risk at level crossings on the national rail network operated by Network Rail, where line speeds and traffic densities give rise to greatest risk. We will apply the principles described to all level crossing operators.
2. The strategy focuses on catastrophic accident and fatality risks from collisions between road vehicles, or pedestrians, and trains. The risks very often result from deliberate or erroneous misuse of crossings by vehicle drivers and pedestrians. Technical and railway operational failures make a much smaller risk contribution. Crossing design, particularly in the area of human factors, and better user education have important roles to play in reducing risk.
3. Management of road-rail interfaces using level crossings is a legacy from when railways were first authorised. The approach would be little used on new railways today given the high rail and road traffic levels and speeds. The high dependence on correct use by vehicle drivers and pedestrians in securing effective risk control means that elimination through closure must ultimately be the preferred option for a risk reduction strategy.
4. Health and safety law does not require the elimination of risk, only that it is reduced so far as is reasonably practicable. Legal requirements set the context for the safety regulator's strategy for securing risk reduction from duty holders, but taking opportunities to go beyond minimum requirements can bring substantial risk reduction. The high costs of upgrade or replacement by bridges, and difficulties in securing closure of rights of way means that reasonably practicable options are reduced.
5. What constitutes reasonably practicable level crossing risk control evolves over time as influences on risk change. This may be because previous assumptions become no longer valid, as may be the case if user behaviour deteriorates, new controls become available or existing ones get cheaper, or societal expectations change. Therefore what has been acceptable control in the past cannot be guaranteed to meet the 'so far as is reasonably practicable' test in the future. This gives an opportunity to justifiably extend our strategy beyond traditional Inspectorate actions to secure compliance.
6. Britain's level crossing safety record is very good, but every incident has the potential for significant human and economic loss, and political ramifications

stretching beyond the railway industry. Level crossing risk management is not an issue for the industry alone. Many parties have influence and a role to play in reducing risk. The railway industry is carrying out significant work, but their independent efforts are not yet resulting in major reduction in incidents or risk.

7. We aim to contribute to ORR action to challenge current perceptions and influence others, including Government, who may be better placed to make a significant impact on level crossing risk precursors. At the same time we challenge the industry to improve safety.

8. Sources of intelligence from across the railway industry have been used in developing the strategy. Emphasis has been placed on results from detailed risk modelling and accident investigation, incident data, HMRI inspection findings, Rail Accident Investigation Branch (RAIB) investigations, research reports and discussions within ORR and more widely, particularly within the National Level Crossing Safety Group (NLCSG).

9. Detailed descriptions of the scope of the strategy and background information are set out in a supporting document, contact the author for details.

10. The strategy is one of a number of topic areas that have been treated in a similar way. The full context is described in the [introductory document](#)¹.

Nature and extent of the risk and safety performance

11. There are approximately 9 000 level crossings in Britain, with just under 7,700 on the national rail network. Level crossings are the single biggest source of railway catastrophic accident risk, but overall the risks are well managed. The level crossing safety record in Great Britain is among the best in the world.

12. Level crossing risk is affected by many factors. Only some can be directly controlled by the railway industry, and safety is ultimately dependent on crossings being used properly. The greatest contributor to risk is misuse by drivers of road vehicles. Such misuse has led to collisions between road vehicles and trains and catastrophic consequences.

13. The Rail Safety and Standards Board (RSSB) Safety Risk Model (SRM) calculates the **total** level crossing risk at 12.5 fatalities and weighted injuries (FWI) per year², and their figures emphasise that injury accidents at level crossings are generally fatal. The risk is almost exclusively borne by the user of the level crossing, whether in a road vehicle or on foot.

¹ *Topic Strategy Introductory Document* .

² *Risk Profile Bulletin*, Version 5, RSSB, August 2006.

14. Significant consequences for train crew or passengers are rare and generally result only where the train suffers a major derailment. This **catastrophic** risk contribution comes from collisions at vehicular crossings. The SRM models such risk at 3.52 fatalities per year, which is 36.8% of the train accident risk for the national network as a whole. Even in this category, most of the risk is borne by the road vehicle driver.

15. Each 'standard' crossing type has a particular risk profile. Risk profiling work using SRM data³ shows that risk of collisions between trains and road vehicles is greatest at automatic crossings and user worked crossings, especially those with miniature warning lights. Pedestrian risk is particularly associated with footpath and automatic crossings.

16. The RSSB Precursor Indicator Model (PIM) tracks risk from precursors of low frequency-high consequence train accidents, and is a more restricted indicator of catastrophic risk. In December 2006 the total level crossing contribution, including irregular working at crossings, was 42.8%, with almost 93.5% of it coming from misuse and near misses involving the public. The 2006 data shows the first drop in relative PIM contribution from crossings since 2001, and the absolute figure also dropped by over 25% from the 2005 value.

17. Numbers of accidents at crossings from 1996 to 2006 show variation within generally level trends, but reported cases of misuse and near misses are increasing.

18. In 2005 there were 15 collisions between vehicles and trains, resulting in the death of four vehicle drivers, two cyclists, and the driver of a train at a miniature railway. Typically two or three trains suffer minor derailment in crossing collisions each year, although none was derailed on crossings on the national network in 2005.

19. Eight pedestrians were accidentally (excluding suicide) killed at level crossings in 2005, a figure comparable to previous years (range 2 to 12). The figure includes the death of two teenage girls in a single incident at Elsenham Station foot crossing.

20. Provisional data for 2006 records there were eleven accidental collisions involving road vehicles. None resulted in fatality or derailment, but a train was derailed without injury as a result of striking a misplaced section of crossing decking. There was one suicide where a car was deliberately stopped on a crossing and then struck by a train. Performance for early 2007 has not

³ *Road Vehicle Level Crossings Special Topic Report*, RSSB January 2004

continued the encouraging trends of 2006, with 4 collisions and 3 fatalities in the first two months. The provisional number of accidental pedestrian deaths at crossings in 2006 is ten, again broadly similar with previous years.

21. In recent years there has been evidence of deterioration in crossing user behaviour, evidenced by an increase in the number of reported near misses and cases of misuse, to over 2 800 in total in 2005, from around 1 800 in 2002.

22. During 2005 there were 87 level crossing failures reported under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR). This was an increase on previous years, which had shown a gradual reduction from between 70 and 80 in 2001 and 2002 to just over 40 in 2004. Failures reportable to the SRM, where criteria differ significantly from those for RIDDOR reporting, numbered 2241 in 2005, broadly equivalent to that seen each year since 2002.

Current picture

23. HMRI undertakes statutory work to ensure that level crossings, by their design and operation reduce risk so far as is reasonably practicable. For public road crossings this continues to be done using Orders made under the Level Crossings Act 1983. Until 2006 HMRI Approval was required under the Railways and other Transport Systems (Approval of New Works, Plant and Equipment) Regulations 1994 (ROTS) for other crossings. The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS) remove the requirement for ROTS Approval.

24. Level crossing work has featured strongly in recent HMRI Network Rail intervention and delivery plans. We have inspected risk assessment, maintenance of crossings, user education and the company's compliance with its own strategy. We also work, where possible, to secure proper consideration of level crossing issues in local and transport planning decisions that affect the nature or extent of crossing use.

25. The Health and Safety Executive (HSE) sponsored several items of level crossing research during 2005-06 within the HMRI Rail Delivery Programme. These included projects on risk assessment, the role of current standards and human factors. Some of these led to further research, most notably in human factors and user behaviour, and are informing subsequent work under this strategy.

26. During 2006 Inspectors participated in a series of workshops to inform ORR's contribution to the Department for Transport's (DfT) development of a

High Level Output Specification for the national network. This offered an opportunity to promote level crossing risk reduction measures beyond the limits of reasonable practicability, and a number of suggestions are being taken forward in respect of higher risk crossings.

27. In February 2007 ORR published a level crossing policy statement that sets the context for this HMRI strategy. Safety and Economic Policy Directorate (SEPD) is leading work with industry to review the content of Railway Safety Principles and Guidance Part 2 Section E. SEPD have also completed the first stage of a review of the level crossing legislative framework resulting in the adoption of a recommendation that a full review be carried out by the Law Commission. We are making significant operational and technical contributions to these reviews and other policy and legal work.

28. In 2002-03 Network Rail implemented a new level crossing policy & strategy with the aim of reducing risk by 15% within three years. The strategy has led to significant improvements in crossing management. A second phase will build on phase one and use the 4 'E's framework (Education, Engineering, Enabling and Enforcement) to reduce risks as low as reasonably practicable.

29. A major Network Rail media campaign highlighting the dangers of level crossings, with the slogan 'Level Crossings - Don't Run the Risk' was launched in 2006, to educate and improve user behaviour.

30. A new risk management regime, including a revised risk assessment model and risk management toolkit was implemented in 2006, extending quantified risk assessment to all crossing types. The changes addressed shortcomings in previous risk assessment regimes.

31. Network Rail has also worked with the police and local authorities to install red-light cameras at some automatic crossings, and a number of offenders have been successfully prosecuted. We support this and other initiatives to reduce crossing misuse.

32. The NLCSG was set up in 2002 on the initiative of Network Rail, RSSB and HMRI to review level crossing law and encourage closer relationships with stakeholders. After the Ufton crossing accident in November 2004, the NLCSG was confirmed as having a pivotal role in level crossing safety and was tasked by DfT with co-ordinating the industry's response.

33. Level crossing research is co-ordinated by RSSB. Recent and current projects have included improving the understanding of crossing risk and user behaviour, human factors, assessment and trials of new or innovative control

measures, the influence of railway configuration on consequences of collision incidents, and examining the cost of crossing upgrades.

34. Our work has generally confirmed the industry's high priority and active work associated with reducing level crossing risk. The need for formal enforcement on level crossing issues is limited.

ORR Corporate Strategy

35. The Office of Rail Regulation has a long-term vision that includes infrastructure controllers, operators, suppliers and funders working together to deliver a safe, high performing and efficient railway⁴. Over the 2006-2009 period ORR's focus will be on:

- securing continuous and sustained improvement in safety, performance and customer service;
- pursuing relentless improvement in the industry's efficiency and value for money; and
- through these and other actions, enabling the railway to grow and develop to meet the requirements of funders and aspirations of stakeholders.

36. The ORR *Policy Statement on Level Crossings* sets out key principles and expectations for level crossing management. Within that statement ORR commits to producing and developing ways of applying a strategy for level crossings that includes:

- Use of current laws on creating and using level crossings to support good practice;
- Working closely with rail companies to help improve safety at level crossings, and being directly involved in working groups and committees;
- Encouraging rail companies to lead research into safety at level crossings and, where appropriate, arranging research;
- Trying to make sure that financial incentives do not discourage rail companies from taking action to improve safety at level crossings; and
- Using powers to make sure rail companies and other bodies comply with their legal obligations at level crossings.

HMRI's core purpose

37. HMRI's core purpose is to secure the proper control by duty holders of risks to the safety and health of passengers, employees and others who might

⁴ *Corporate Strategy 2006-09 and Business Plan 2006-07*, ORR April 2006 <http://www.rail-reg.gov.uk/upload/pdf/280.pdf>.

be affected by the operation of Britain's railways. This is done in the context of the corporate level crossing policy statement and strategy.

HMRI strategic aims for level crossings

38. For level crossings we aim to ensure that duty holders reduce risks so far as is reasonably practicable, and all parties identify and, where appropriate, exploit opportunities to improve safety beyond legal requirements to achieve continuous and sustained improvement in level crossing safety.

39. We seek to achieve these aims by:

- targeting our resources on areas which give rise to greatest risk, or greatest potential for improved risk control;
- promoting and supporting closure or replacement of high risk level crossings;
- securing a legislative and consultative framework that involves all necessary parties and facilitates closure and proper risk control;
- promoting modern standards for level crossing design, based on best practice, intelligence and latest research;
- ensuring safety through design by meeting our statutory obligations for new and altered crossings;
- carrying out risk and evidence based interventions examining safety management arrangements and crossing condition;
- ensuring recommendations arising from RAIB investigations, HMRI and industry investigations are satisfactorily addressed;
- working with, and supporting duty holders and others, including European partners, in their actions to drive down level crossing risk, including research and the promotion and encouragement of improved risk awareness and user behaviour;
- making decisions based on well managed and best available information and intelligence, taking due account of Common Safety Targets; and
- being suitably resourced and competent to achieve our core purpose in relation to level crossings.

Delivery

40. We are pursuing the following workstreams in order to deliver the strategic aims. They identify broad themes or categories of work, each of which

comprises one or more work activities to be carried out during the life of the topic strategy.

- **Engagement** in multi-party activities coordinated by safety policy or industry, including work to:
 - review and revise/replace RSPG 2E;
 - establish the suitability of the legislative and consultative regime for achieving efficient level crossing risk control and make any necessary changes;
 - ensure proper consideration of level crossing risk during the development and implementation of wider government planning processes and target setting; and
 - establish clear expectations for level crossing risk control, promoting closure as the preferred option.
- **Statutory work** arising from the Level Crossing Act 1983, and ROGS, including transitional provisions relating to ROTS Approvals.
- **Statutory work** arising from the Railways (Accident Investigation and Reporting) Regulations 2005.
- **Inspection** of the management systems and risk assessment arrangements duty holders have in place for the reduction of level crossing risk, from design through to commissioning and ongoing risk management and review.
- **Inspection** of level crossings, including suitability and ongoing maintenance of crossing, highway and associated signalling and telecommunications equipment.
- **Liaison** (technical and operational) at the appropriate levels, with duty holders, and with stakeholders through the National Level Crossing Safety Group on both general and specific level crossing issues.
- **Investigation** of level crossing incidents and complaints, to determine root causes, and gather intelligence for securing continual improvement in crossing standards.
- **Promotional and educational** activities, in partnership with duty holders and others to raise the awareness of level crossing risks and secure correct use of level crossings.

- **Enforcement** action in accordance with the ORR Enforcement Policy Statement.
- **Research** contributions, and monitoring research carried out by the industry and its implementation, with promotion of additional research where needed to achieve the strategic aims.
- **Topic and ORR Level Crossing Working Group** activities monitoring developments in level crossing safety, producing guidance, identifying resource needs and promoting consistent regulation.
- Development of **information management** systems to improve the efficiency of our work in relation to level crossings.

Evaluation

41. Measurement of the effectiveness of this strategy is difficult, particularly quantitatively. Our actions are only one of the influences on those directly responsible for the management of level crossing risk, and the strategy seeks not only to prompt particular work, but also to support the industry in its own initiatives. As such success in achieving many of the strategic aims is the sum of the actions of all.

42. The strategy will be deemed to be a success if:

- level crossing safety becomes an integral part of government transport and land use planning processes such that developments do not increase risk and where appropriate secure level crossing risk reduction;
- an efficient, modern legislative and statutory consultative regime is in place that facilitates a reduction of risk and the demands on regulator and dutyholder resources;
- industry best practice, as outlined in updated guidance and by operational experience, is confirmed as the 'norm' by intervention reports;
- duty holder level crossing policies, strategies, management arrangements and actions are effective in controlling risk and result in, as compared to baselines of performance at the end of 2005:
 - A (significant) reduction in the number of high risk level crossings and in absolute level crossing risk as measured by industry indicators (SRM/RPB and PIM);

- A reduction in the number of incidents of level crossing misuse and near misses (as recorded by RSSB and BTP), and;
- A reduction in level crossing failures and wrong side failures of signalling equipment associated with level crossings.
- Our action in relation to level crossing safety is based on best available data and intelligence and is accepted by industry as being proportionate and transparent.