OFFICE OF RAIL AND ROAD

UK NSA Annual Safety Report 2014

September 2015

Contents

A. Introduction

A.1. The purpose, scope and other addressees of the report

1. The purpose of this Report is to comply with Article 18 of the Railway Safety Directive. This requires all National Safety Authorities (NSAs) to publish an annual safety report. The report covers the UK NSA's activities from 1 January to 31 December, 2014.

2. In the UK, the role of NSA is shared between the Office of Rail and Road (ORR) and the Department for Regional Development in Northern Ireland (DRDNI). ORR is responsible for England, Scotland and Wales, collectively known as Great Britain (GB). DRDNI is responsible for Northern Ireland (NI). ORR represents DRDNI in relations with the European Railway Agency (ERA), so this report covers the UK as a whole. There is a separate section covering DRDNI's activities in Northern Ireland within this report (See section H). The Common Safety Indicator (CSI) data has been aggregated at UK level and includes data for the mainline network in Great Britain and Northern Ireland.

3. As well as being the UK NSA, ORR is also the economic regulatory body and competition authority for the mainline infrastructure manager, Network Rail. Additionally, it is the licencing authority for track access on the rail network for service providers, known as Train Operating Companies (TOCs) for passenger services, and Freight Operating Companies (FOCs) for freight services.

4. The scope of this report is the entire UK mainline railway system, including the high speed line between London St Pancras and the Channel Tunnel (HS1), and covers both 1435mm (GB) and 1600mm (NI) gauge networks. Mirroring the scope of UK implementation of the Railway Safety Directive, the report does not cover metros, tramways and other light rail systems, or infrastructure that is functionally separate from the rest of the UK mainline network.

5. The report does not cover the Channel Tunnel which has a separate NSA known as the Intergovernmental Commission (IGC). The IGC produces a separate annual report to ERA. As of 2014, ORR along with its French counterpart ARAF is responsible for regulating access to the Channel Tunnel.

6. As well as ERA, this report will be made available via ORR's website to the UK Department for Transport (DfT), the Railways Accident Investigation Branch (RAIB)[1], the Railway Safety and Standards Board (RSSB), railway undertakings (RUs), infrastructure managers (IMs), entities in charge of maintenance (ECMs), passenger associations

[1] RAIB is the UK's National Investigation Body (NIB)

(Transport Focus and London Travel Watch) notified bodies (NoBos) and designated bodies (DeBos).

A.2. Possible significant organisational changes affecting the NSA

7. During 2014 there were no significant organisational changes made by ORR as NSA. However, on 1 April 2015, ORR became the Office for Rail and Road and took on new responsibility as the independent monitor of Highways England[2]. The name change has therefore been reflected in this report. There were also no significant legislative or organisational changes externally that significantly impacted upon ORR as NSA.

[2] The name was changed informally on 1 April. It is legally expected to take place sometime in the autumn of 2015.

B. Overall Safety Performance and Strategy

B.1. Main conclusions on the reporting year

8. Three main sets of trajectories and targets are used to measure safety risk:

- The mainline railway industry produces a Strategic Safety Plan 2009-14 (SSP)
- The UK government sets targets for risk reduction in the High-Level Output Specification (HLOS)
- ERA sets National Reference Values (NRVs) in the context of Common Safety Targets (CSTs)

9. The reporting cycle for the UK is dictated by 5-year control periods which are part of the government High-Level Output Specification (HLOS). The last Control Period (CP4) covered 1 April 2009 to 31 March 2014. The current Control Period (CP5) started on 1 April 2014 and runs until 31 March 2019.

10. Unlike in CP4, the UK government has not set targets for risk reduction in CP5. Instead, certain areas have been explicitly funded to achieve further risk reduction, such as level crossings and track worker safety.

Strategic Safety Plan

11. The Strategic Safety Plan (SSP) is a joint statement by UK infrastructure managers and railway undertakings responsible for Britain's mainline rail network, setting out an agreed industry approach to managing safety. The SSP follows the Control Period cycle.

12. In the Plan, fifteen trajectories have been developed which describe the industry's ambitions in nine identified key risk areas and identify actions that are being undertaken to achieve them.

13. The fifteen trajectories are:

1. Passenger slips, trips and falls in stations
2. Train crew injuries on board trains
3. Signals Passed At Danger (SPADs)
4. Risk to infrastructure workers
5. Station staff slips, trips and falls

6. Train accidents due to infrastructure failure
7. Trespass
8. Assaults on passengers
9. Assaults on train crew
10. Assaults on station staff
11. Public behaviour on level crossings
12. Vandalism
13. Passenger injuries on board trains
14. Passenger accidents at the platform-train interface (PTI)
15. Train accidents due to rolling stock failure

14. For all 15 categories, the risks meet/comply with the trajectory over the 2009-14 Control Period. For passenger accidents at the platform-train interface (category 14), the risk from the category as a whole is within the trajectory. However the risk from boarding/alighting events – a subset of the platform-train interface category – I s above the expected level.

National Reference Values (NRVs) and Common Safety Targets (CSTs)

15. The Railway Safety Directive states the requirement for Member States to ensure that safety is generally maintained and, where reasonably practicable, continuously improved. ERA has developed CSTs and NRVs to monitor the safety performance of Member States.

16. Data for 2014, as outlined in this report, indicate that UK's safety performance continues to be at an acceptable level in all measured NRV categories.

High-Level Output Specification

17. In the HLOS period covering 2009-2014, DfT established safety metrics for both passenger risk and workforce risk, specifying a requirement for a 3% reduction in both categories. The safety metrics were monitored using the RSSB Safety Risk Model.

18. The safety metric for passengers at the start of the control period (April 2009) was calculated as 1.070 Fatalities and Weighted Injuries (FWI) per billion passenger kilometres. The target for the end of the control period (March 2014) was 1.038 FWI per billion passenger kilometres.

19. The workforce safety metric at the start of the control period was calculated as 0.134 FWI per billion workforce hours. The target at the end of the control period was 0.130 FWI per million workforce hours.

20. By the end of CP4 (end March 2014), the safety metric for passengers was 3.1% below the baseline metric. The workforce metric was 18.7% below the baseline over the same period.

Significant accidents

21. The UK railway industry uses the RSSB Safety Risk Model to model the risk from Potentially Higher-Risk Train Accidents (PHRTA). PHRTAs comprise the types of train accident that have the greatest potential to result in higher numbers of casualties, although the majority result in few or no injuries.

22. PHRTAs comprise train derailments, train collisions (excluding roll backs), trains striking buffer stops, trains striking road vehicles at level crossings, trains running into road vehicles not at level crossings (with no derailment), train explosions, and trains being struck by large falling objects.

23. In 2014 there were 27 PHRTAs compared to 31 in 2013. Six of these incidents were investigated by the Rail Accident Investigation Body (RAIB). A list of the 27 PHRTAs can be found in Annex B.

Table 1

PHRTA category	Number
Collisions with road vehicles not at level crossings	0
Collisions with road vehicles at level crossings	7
Derailments	15
Buffer stop collisions	1
Collisions between trains	4
Trains struck by large falling objects	0

B.2. National safety strategy, programmes and initiatives

24. The scope of this report is the UK mainline network, focusing on ORR's safety strategy, programmes and initiatives in relation to Network Rail and the mainline freight and passenger railway undertakings.

25. ORR has teams of inspectors allocated to different areas of the railway network:

- The mainline infrastructure manager (Network Rail) and associated suppliers and contractors. Each Network Rail route has a team of inspectors assigned to it. There is also a national team that deals with issues, such as level crossings, that are relevant to all routes.
- Passenger railway undertakings
- Freight railway undertakings, metros, trams and heritage railways
- Transport for London (TfL). This team covers London Underground, the Docklands Light Railway and London Overground
- A central regulation team covering human factors, occupational health & safety and railway safety policy. The team also provides the UK secretariat to the IGC and CTSA which provide support to the head and members of the UK delegations.

26. ORR's key approach is to deliver a safe railway where the health and safety management is cost effective and performance is among the best in the world. ORR's core safety strategy message explaining what is done and why is reproduced at Annex C.

27. ORR's health and safety strategy covers ten key areas:

1. Health and safety management
2. Industry staff competence and human failure
3. Management of change
4. Level crossings
5. Interface system safety
6. Infrastructure asset safety
7. Rolling stock asset management
8. Workforce safety
9. Occupational health
10. Europe

1. Health and safety management

28. A health and safety management system (SMS) is fundamental to the ability of an organisation to meet its legal obligations to identify, eliminate or reduce so far as is reasonably practicable, the risks its activities create.

29. ORR has developed the railway management maturity model (RM3), a tool which describes the components of effective safety management, such as leadership, staff competence, and proper risk management.

30. ORR uses RM3 to assess information gathered from inspections and investigations to develop a comprehensive picture of duty holder health and safety risk management capabilities. Duty holders are encouraged to use RM3 to test and pinpoint where and how to improve their capability to manage risk.

31. ORR's inspectors work directly with duty holders as well as holding workshops to show how best to use RM3 and to share good practice.

2. Industry staff competence and human failure

32. Workforce errors and violation can pose serious risks to railways. However, ORR is satisfied that both railway undertakings and infrastructure managers are taking positive action to sustain and improve staff competence. Human failure is a continuing priority: the potential exists for multi-fatality events if a safety critical worker makes a mistake.

33. ORR encourages and supports infrastructure managers, railway undertakings and other duty holders to embed human factors considerations into their management systems; it also endeavours them to error-proof their operations and equipment designed to prevent human failure contributing to accidents. Critical to achieving this is having a validated competence management system that is proportionate to the risk, targeted to the needs of the organisation and relevant to its medium and long-term development.

34. ORR's priorities for helping duty holders deal with human failure is to focus on ensuring that their SMS reliably identifies and controls risks from:

- Unreliable performance and errors;
- Performance and safety failure due to competence, non-compliant behaviours, distraction or ineffective supervision;
- Safety impact from insufficient human resource; and
- Failures due to poor design of equipment, workplaces or the design of safe systems of work.

3. Management of change

35. Change management processes are the means by which organisations ensure that changes to their structure, functions, procedures or processes are implemented such that the expected outcomes are delivered, and those issues that could have an impact on risk, are subject to rigorous self-assessment.

36. ORR's focus on the UK industry management of change is concerned with duty holders having adequate arrangements to deal with changes to their structure, functions, procedures or processes. To do this, ORR engages with duty holders in the early stages of planning and makes sure that the principles of 'safety by design' are properly adopted.

37. If necessary, further control measures are identified and put in place before the change is implemented. The degree of effort required to manage the change should be proportionate to the extent and complexity of change.

38. ORR has produced guidance for the industry on using the CSM risk assessment as a change management process[3].

4. Level crossings

39. There are approximately 6,500 level crossings in use on the national mainline rail network in Great Britain. The number of unsafe events occurring at level crossings in Great Britain compares favourably with the record of other countries in Europe.

40. ORR has a long-established policy that no new level crossings should be installed unless there are exceptional circumstances.

41. ORR's approach at existing level crossings is to:

- Help closures happen, encouraging all risk assessments of crossings to consider closure first
- Check that people understand the risks and controls
  - Competent people leading risk assessments
  - All parties, such as businesses that use crossings, railway undertakings and users, working together to consider risk and controls;
- Ensure that there is a risk management plan for each crossing
- Encourage innovation and new technologies:
  - In bridging and underpasses
  - In level crossing design and fitment
  - In specific controls at each crossing
- Encourage a move away from a one-size-fits-all 'types' of crossing approach.

[3] ORR CSM risk assessment guidance: http://orr.gov.uk/__data/assets/pdf_file/0006/3867/common_safety_method_guidance.pdf

42. ORR has produced guidance on the management, operation and modification of level crossings[4]. ORR has also worked with Network Rail to produce guidance for members of the public including pedestrians, cyclists, motorists, motor cyclists and horse-riders on how to use level crossings safely[5].

5. Interface system safety

43. Interface system safety risks are those that arise at the interface between parties on the railway, such as between different duty holders or between duty holders and other parties, such as passengers. Analysis shows that interface system safety is the second highest safety risk priority on the railway.

44. For mainline operations, ORR's interface system strategy is focused on the following areas:

- Low adhesion
- Signalling and telecommunications
- Emergency preparedness
- Platform train interface
- Trespass and vandalism including suicides
- Vehicle incursion (not at level crossings)
- Passenger slips, trips and falls
- Station crowding/ control of passenger congestion

45. Where appropriate ORR validates the key elements of a duty holder's SMS to ensure confidence in overall management capability on interface risks.

46. ORR promotes collaborative working between duty holders through industry groups to tackle specific interface risks.

6. Infrastructure asset safety

47. Infrastructure is defined as the fixed assets used for the operation of a transport system. This includes, but is not limited to:

- Track (including switches and crossings);
- Stations;
- Structures, such as bridges, tunnels etc.;

[4] http://orr.gov.uk/__data/assets/pdf_file/0016/2158/level_crossings_guidance.pdf

[5] http://www.networkrail.co.uk/level-crossings/using-level-crossings/

- Signalling equipment; and equipment supplying electricity for operational purposes (e.g. overhead line equipment).

48. The provision and maintenance of infrastructure is a primary element of effective, safe operation of the railway.

49. ORR carries out national inspections on structures management, and follows up local issues through specific inspection activities. ORR works with infrastructure managers, particularly Network Rail, to improve its approach to structures inspection, scheduling, recording, prioritisation and remedial action.

50. ORR also engages with infrastructure managers to ensure new infrastructure is properly designed and built and its maintenance incorporated into the existing management system.

7. Rolling stock asset management

51. Rolling stock has a direct and indirect contribution to risk on the railway. The integrity of the rolling stock is key to reducing direct risk such as brake failure, axle failure or fire resulting in immediate occupant risk and secondary risk from evacuation on live railway.

52. Indirect risks generally relate to the resilience of stock to collision, known as ‘crashworthiness’. Recent serious train accidents, in the UK and elsewhere, have highlighted that crashworthiness significantly influences survival rates.

53. ORR, working with industry stakeholders over a period of time, has developed a number of protocols relating to the management of rolling stock risk, including regulations, guidance and standards. With the introduction of new technologies, material developments and changes in operating practices there is a steady evolution in protocols and practices. The overall risk contribution from rolling stock is historically low and reducing. The introduction of ECMs should further reduce risks associated with maintenance of private wagons.

54. ORR’s strategy for health and safety regulation of rolling stock is focused on management of change, particularly around the introduction of new technology and equipment to extend the life of existing stock.

8. Workforce safety

55. ORR’s corporate vision is zero workforce and industry-caused passenger fatalities, with an ever-decreasing overall safety risk.

56. There has been a steady improvement in the safety of workers in recent years. Working on the railway covers a wide range of occupations and activities such as maintenance/ construction workers, shunters and customer-facing roles including station staff and train crew. Staff in different roles can face a variety of hazards, some of which are particular to the rail industry.

57. ORR addresses workforce safety by influencing each part of the sector to establish a vision for workforce safety that will deliver continuous improvement towards the goal of excellence in health and safety risk management.

58. With regard to construction and maintenance, ORR works with Network Rail and its contractors to reduce the amount of work done adjacent to open lines. We also check that there are robust risk controls associated with working at height, worker/traffic segregation and lifting operations.

59. ORR works with the freight sector and freight wagon suppliers to drive down shunting risks.

60. ORR also takes action across the industry where there is inadequate risk control to reduce the number of slips, trips and falls.

9. Occupational health

70. Occupational or work-related ill health describes those conditions that are caused, or made worse, by work.

71. Occupational health covers many different aspects of workforce well-being. This includes health considerations from:

- Physical work activities such as musculoskeletal disorders arising from manual handling and exposure to hand arm vibration;
- Exposure to hazardous substances; and
- Mental health issues, for example stress.

72. ORR launched its first occupational health programme covering 2010-14 in 2010 with the aim of improving how health is led and managed by organisations in the rail industry. The second occupational health programme was launched in 2014 and runs until 2019.

73. Since the start of its occupational health programme ORR has positively engaged with rail companies, stakeholders and trade groups and has noted that many rail companies are starting to develop proactive management strategies and action plans.

74. ORR continues to pursue an occupational health programme believing that the industry can significantly improve its worker health management performance and secure the economic benefits that arise from better health management.

75. In particular, ORR encourages greater industry leadership and follow-through from middle managers, the sharing of good practice on health, promoting greater awareness on health issues (including the costs); and encouraging a culture of excellence in health risk management.

10. Europe

76. ORR works closely with DfT to ensure that GB has the right legal framework and meets its European obligations.

77. As European policy becomes more influential, the effectiveness of policies and strategy at the domestic level are increasingly determined by the success of ORR's engagement within Europe. Our input and influence within the European framework a key strategic aim for the industry to achieve excellence in health and safety culture, risk control and in asset management.

78. ORR's strategy for engagement within Europe is to influence the development of the safety regulatory regime; ensure that our legislation, guidance and liaison enables the rail industry to comply with European requirements; ensuring that the right arrangements for enforcement of the requirements are in place; and engaging effectively in the development of harmonisation initiatives.

ORR's role as Regulatory Body

79. As well as the National Safety Authority, ORR is the Regulatory Body (RB) for mainline railways in Great Britain. In October 2013, ORR published the 2013 periodic review (PR13), covering the period 1 April 2014 to 31 March 2019. Also known as control period 5 (CP5), it established a final determination of the outputs that Network Rail must deliver, the efficient cost of delivering those outputs, and the access charges the company can levy on train operators for using its network to recover those costs.

80. PR13 also establishes the wider 'regulatory framework' including the incentives that will act on Network Rail, railway undertakings and others in the industry to deliver and outperform ORR's determination.

81. In terms of health and safety, the determination includes a ring-fenced fund for Network Rail to deliver level crossings closures. Funds have also been made available to enable electrical isolations to be taken more safely and quickly and to replace a number of road-rail vehicles.

B.3. Review of the previous year

Overall mainline health and safety risk management maturity

82. ORR's interventions in 2014 found some improvements to level crossings risk management, despite an increase in actual harm to crossing users and improvements to the asset stewardship of earthworks, bridges, tunnels and viaducts.

83. There was an overall 2% reduction in harm to the public from trespass and a 21% reduction in platform-train interface (PTI) harm to passengers, or a 24% risk to decline when normalised by the increase in passenger journeys. However, ORR found insufficiently effective arrangements to manage basic worker construction health and safety risks, such as working with electricity and at height as well as delays to planned safety enhancements.

84. ORR has welcomed Network Rail's recognition of the potential risk from 'change initiative overload' and has pointed out that change must be targeted, managed, supported, realistic and resourced to avoid unintended consequences. Despite this, the industry's pace of change has not been fast enough.

85. The mainline SPAD risk trend remained stable but SPAD numbers increased. There is plenty of scope to further improve earthworks, bridges, tunnels and viaducts, and also to improve the management of passengers at stations, service growth and change management.

86. **ORR's specific targets for 2015 and beyond:** track geometry; managing growth and change safely, including statin safety, driver management and the high SPAD numbers; workforce safety; and occupational health.

Infrastructure manager - Network Rail

Management maturity

87. Network Rail, the infrastructure manager of the mainline network, is the main focus of ORR's safety regulation. Network Rail operates in a high-hazard industry and its health and safety management systems are still developing.

88. ORR scrutinised Network Rail's health and safety management systems (SMS) closely, as it moves from 'ad hoc' and 'standard' to a more 'predictable' level of management maturity. Overall its management maturity improved marginally during 2014.

89. ORR found significant variations across routes, which indicates that Network Rail has not yet implemented its SMS consistently or shared good practice effectively.

90. Successes this year included the continued low level of Potentially High Risk Train Accidents (PHRTAs), which are a credit to Network Rail's maturing leadership and collaboration with train operators and its safety 'deep drive' reviews and audit.

91. ORR found too many significant examples of failures to identify or control risks to the workforce effectively by Network Rail and its contractors, particularly around construction activities.

Level crossings

92. ORR focus on level crossing safety because of the high levels of *potential* harm they present, especially to crossing users. The *actual* harm posed by level crossings however continued to be low, as it has since 2010. Level crossings account for 8% of overall modelled mainline train accident risk.

93. The high level of pedestrian incidents over recent years highlights the need for the industry's focus on enhancing crossing users' intentional or unintentional misunderstanding or misjudgement of crossing risks. There was not enough progress in reducing overall harm, but there was a decline in vehicle collisions with trains at level crossings.

94. It is important that risk reduction momentum is maintained, including the focus on crossing closures, down-gradings and improving users' understanding of the risks. Strategic improvement is driven by DfT's implementation of the Law Commission's level crossing safety report recommendations, originally made in 2013[6].

95. There were 10 level crossing fatalities during 2014, eight involved pedestrians; one was a car occupant and one a motor cyclist. There were six other non-fatal collisions between trains and road vehicles at level crossings. This continues the lower level of incidents involving road vehicles since 2010-11.

96. Reported incidents of near misses between trains and cyclists or pedestrians at level crossings reduced slightly.

97. There was a slight rise in pedestrian fatalities at passive crossings over the last two years and active technologies should help reduce this risk. ORR challenged Network Rail's failure to follow its change management process when altering the specification of new obstacle detector crossings. This resulted in the retention of low-level obstacle detection at crossings.

98. Network Rail developed a strategy to improve risk management at level crossings. This includes consideration to make all passive crossings effectively active by enhancing

[6] http://www.publications.parliament.uk/pa/cm201314/cmselect/cmtran/680/680.pdf

them with active risk control. ORR also required Network Rail to improve its process to focus on qualitative risk assessment by its crossing managers.

99. ORR continued to work closely with RSSB by contributing to their research to reduce risks to pedestrians at crossings and to enhance signage and warning systems at private and public crossings.

100. Crossing closures and downgrading form an important part of this on-going risk reduction strategy: 383 are due for renewal and 345 crossings with wig-wag lights will be upgraded to LED lights. In 2014-15, Network Rail closed a total of 118 crossings, of which 25 were closed using the £74m of the ring-fenced CP5 funding. This will achieve 21% of the planned 25% risk reduction. Network Rail plans to close around 250 crossings over CP5 using ring-fenced funding. The remaining funds will be used to commission new technologies at user-worked and footpath crossings.

101. ORR processed 114 level crossing Orders from Network Rail, as crossings were renewed or upgraded during new signalling schemes – this is a high number. These should deliver sustained long term benefits. ORR is in the process of assessing a further 150 crossing Orders.

102. Other effective initiatives included: the introduction of an improved individual crossing risk assessment process and the implementation of new technology; the use of 15 British Transport Police (BTP) operated mobile safety vehicles; the development of red light safety cameras at 10 crossings to deter deliberate crossing misuse; and the installation of audible warnings for pedestrians at more than 100 crossings.

103. Over the rest of Control Period 5 (2014-19), ORR inspections will focus on passive crossings, as these pose the biggest risk to pedestrians. Central to future risk reduction will be the roll out of more cost effective active warning technologies to passive crossings, such as footpath, bridleway and user-worked crossings

Infrastructure risks

104. Some progress was made in 2014 on improving drainage knowledge and in the stewardship of bridge, tunnel and viaduct civil assets, but Network Rail needs to do more to manage track geometry and to ensure the long-term safety and sustainability of all its assets.

Drainage

105. ORR inspections found improving mainline drainage asset knowledge, but the rate has been too slow. There were variations in the approach, quality and completeness of different routes' drainage management plans, which are needed to address the drainage

asset under-investment legacy. Network Rail must do the necessary work to inspect and maintain its drainage assets.

Track

106. Network Rail's current approach is largely based on track renewal and refurbishment work to deliver long-term improvement and reactive routine maintenance work to correct track geometry faults. This needs to be better and more sustainably managed. ORR remains unconvinced that Network Rail has done sufficient analysis of the accuracy of its work banks to enable checking Network Rail has sufficient resource (labour, access, material and equipment) to maintain its asset.

107. However, at this stage ORR is broadly satisfied that immediate safety risks arising from poor track geometry is being controlled, but in an inefficient and largely reactive way that sometimes does not address the underlying causes of faults and misses opportunities to address identified weaknesses. This increased the reliance on routine inspection and reactive maintenance activities to manage risk.

Switches and crossings

108. ORR is monitoring the roll out of Network Rail's new design of tubular stretcher bar, developed as a result of the Grayrigg derailment in 2007, through inspections of employee competence.

109. Future inspections will focus on potentially increased pressures on maintenance delivery units as a result of the under delivery of planned renewals and refurbishment. Attention will also be on shortfalls in mechanised maintenance, such as tamping and stone blowing.

Earthworks

110. Network Rail has refined its contingency arrangements in the event of severe weather, but this is not a sustainable long-term response. There must be an overall improvement in earthwork asset condition.

111. ORR routinely monitors the development of Network Rail's five year activity plan aimed at improving asset management by focusing on risk assessment and reviewing changes to the earthworks management standards.

Structures

112. There is a growing backlog in structures examinations. Network Rail must halt this trend and ensure it is adequately resourced to inspect the condition of its civils portfolio - the physical features, such as bridges, tunnels and earthworks, on which railways are built.

113. In November 2014, a signal fell across the track on the Western route and was struck by a high-speed train but caused no injuries.

114. ORR has also focused on ensuring appropriate risk control measures are put in place to manage known weaknesses in station footbridges.

115. ORR recently looked closely at the management of advertising hoardings attached to structures, the inspection and assessment of operational property, the safety of metallic structures with concrete encased beams and the maintenance of signal posts.

Off-track and vegetation management

116. Network Rail has surveyed vegetation management on all its routes and ORR is awaiting its results. In the interim, ORR has continued to press Network Rail to develop deliverable plans and will monitor its revised business plan for any indications of reversing planned volumes.

117. ORR's inspections found that vegetation conditions and its management varied across routes. Following interventions over 2011-13, ORR found that the impact of the leaf fall season in 2014 had mostly been managed consistently, but has been off the pace in discrete areas.

118. ORR's assessment of the sector's low-adhesion prevention and rail-head enhancement work over autumn 2014 found that vegetation management had improved on previous seasons. It remained an issue in some areas which led to a heightened potential safety risk and knock-on effects on service performance.

Safety-by-design

119. ORR's work in 2014 focused on duty holders' failures to take opportunities to eliminate or reduce risks at the design stage, especially during new-build and refurbishment projects. ORR found evidence in large infrastructure projects of a failure to consider optimal risk reduction, and preferably its elimination, at the design stage.

120. Enforcement actions over 2014 showed the industry remained some way off the pace in applying the safety by design principles.

121. Network Rail's major infrastructure projects present significant opportunities to design out or reduce risks. Some safety enhancements may only be realistic if implemented at the starting point of an infrastructure's life-cycle

122. In April 2014, ORR took an enforcement action on Network Rail as a result of its failure to have suitable and sufficient assessments of the risks to passengers, public and staff at two Western upgrades sub-projects.

Infrastructure worker safety risk

123. Overall workforce harm declined 3%, but when normalised by the 3% decline in workforce hours worked, showed no significant change.

124. There were three workforce fatalities in 2014, the same as the previous year. There were some minor reductions in non-fatal injuries. Of the 175 workers who suffered major injuries, 100 involved infrastructure workers. Of the overall harm to the workforce, 40% involves infrastructure workers who work on or near the running line – a disproportionately high level of harm given the relatively low number of infrastructure workers.

125. The on-going national roll out of the safe work – the new control of work permit procedure and safe work leader – initiatives sets the right ambitions to improve infrastructure worker safety. ORR recognises that this is the solution Network Rail has identified to secure long-term cultural change. A big challenge for the industry is culture and behavioural change for infrastructure workers to help implement planned safety improvement initiatives.

Occupational road safety

126. Network Rail's focus on reducing risks from the operation of its road fleet appeared to show some benefits, with reductions in incidents without injuries and those with injuries or where the emergency services were called.

127. Two infrastructure workers were killed and four received major injuries in occupational road accidents while working. There were 104 minor injuries, of which 24 resulted in staff taking three or more days off from their usual duties. Overall harm reduced 7%. Most occupational road incidents involved Network Rail's infrastructure workers and contractors.

128. There were five occupational road fatalities in the last three years. It is estimated to represent about 4% of the overall harm to the workforce. There were several off-duty fatal road accidents involving railway employees driving home after long shifts, such as two recent multi-fatality traffic accidents in Scotland and Western involving off-duty railway contractor staff.

Occupational health performance

129. Available evidence showed meaningful progress towards worker health being treated on an equal basis with worker safety, but the rail sector is not there yet.

130. Available data suggests the level of occupational ill health in railways is similar to construction – another high risk sector. The sickness absence rate in railways is 4%, compared with 2% in the private sector. Respiratory disease rates in railway workers are relatively high. Musculoskeletal disorders, stress, and hand arm vibration syndrome[7] (HAVS) are also key health issues in the industry.

131. In June 2015, ORR issued its 'better health is happening: ORR assessment of progress on occupational health up to 2014 and priorities to 2019' report[8].

132. In the short term, ORR is targeting its inspection to achieve basic legal compliance with occupational health law. ORR will continue to focus on industry's asbestos management, exposure to silica dust in ballast and management and prevention of HAVs. ORR also continues to proactively monitor the network-wide implementation of Network Rail's 'Transforming Health and Wellbeing strategy'[9], including the appointment of route occupational health managers and the implementation of their route action plans.

Passenger railway undertakings

Management maturity

133. ORR's assessments of safety arrangement maturity found varied performance in employee engagement and consultation, internal communication arrangements, safety culture, change management and proactive indicators.

134. There were two empty passenger train derailments, seven train collisions with vehicles at level crossings (resulting in two fatalities), and two low-speed collisions between passenger trains and empty passenger trains at Glasgow station.

135. ORR continues to encourage more progress on the use of activity-based safety performance indicators and outcomes because evidence shows that these can change behaviours and reduce unsafe acts.

136. ORR's approach is now embedded in most operators' safety management systems and is being used as part of their own auditing arrangements. Train operator staff

[7] http://www.hse.gov.uk/pubns/indg175.pdf
[8] http://orr.gov.uk/news-and-media/press-releases/2015/better-health-is-happening-in-rail
[9] http://www.networkrail.co.uk/browse%20documents/strategicbusinessplan/cp5/supporting%20documents/transforming%20network%20rail/transforming%20safety%20and%20wellbeing.pdf

continued to attend ORR training courses on the occupational health and the Railway Management Maturity Model (RM3) in a manner consistent with our approach.

137. Working with the Association of Train Operating Companies (ATOC), ORR produced a suite of high-level RM3 evidence matrices on key risk topics such as train crew management. ORR intends to extend this to include passenger safety (but not at the platform-train interface), station infrastructure management and workforce safety.

138. ORR's RM3 assessment audit protocols were also updated for inspectors and mainline train operators on evaluating the key risk topics during inspection and audit, to aid consistency of assessment criteria.

139. In December 2014, ORR held its annual RM3 review meeting with 75 industry invitees. It was run jointly with ATOC, hosted by RSSB and with guests from Network Rail and the freight industry. This successful event reviewed TOC performance and looked at integrating and developing their use of RM3.

Train protection and warning system (TPWS)

140. ORR continued to push operators to enhance their Train Warning Protection Systems (TPWS) where reasonably practicable. In 2014 SPADs highlighted some shortcomings with Mark 1 equipment. As a result, Chiltern Railways has introduced a progressive TPWS upgrade plan and c2c plans to upgrade its entire fleet to at least mark 3 TPWS as standard. ORR anticipates further train operator upgrade commitments in 2015.

141. ORR continues to monitor industry plans to roll out the European Train Control System, which includes the European Rail Traffic Management System (ERTMS). However, until ERTMS is fitted network-wide, the residual risk of and from SPADs remains the highest potential catastrophic hazard facing train operators.

142. ORR is monitoring the development of the RSSB-led Strategy Project Group's 10 year SPAD mitigation strategy. Work to examine whether the higher risk SPAD categorisation process - in which we were involved - has amplified the actual risks posed by SPADs continues. There is some anecdotal evidence that SPAD causation categorisation has in the past been too risk averse given the actual circumstances.

143. There were 287 mainline SPADs in 2014, a 4% increase, but overall SPAD risk declined 7% as measured against the September 2006 baseline. SPADs now represent more than 15% of the overall Precursor Indicator Model (PIM) risk, 10% of all train accident risk and 0.6% of total accident system risk. The numbers of multi-SPAD signals, where trains have passed them twice or more in the last five years, increased gradually over recent years. This trend is likely due to a more congested mainline network and drivers facing more red signals.

Driver management

144. ORR continued to focus on improving driver management and maintaining pressure on operators for train protection enhancements. Specific issues included drivers losing concentration and becoming fatigued or distracted. ORR encourages the use of Network Rail's 'VariSPAD' workshops to rectify the causes and impact of high risk SPADs and of on-train data recorder downloads to provide more reliable driver performance assessment data

145. ORR continues to see examples of interruptions in driver's concentration and/or distractions causing, or at least exacerbating, potential safety incidents. ORR looks to the whole industry to identify common patterns, learn lessons and implement appropriate remedies, which may include infrastructure enhancements.

Low adhesion

146. ORR's assessment of the sector's low-adhesion prevention and rail-head enhancement work on the mainline network found vegetation management by train operators remained substandard in some areas, but overall had improved on previous seasons. Leaf fall contributes to rail-head low adhesion by creating slippery leaf mulch on rail-heads. This can lead to trains sliding past signals for a considerable distance even after brakes are applied, or of trains becoming 'invisible' to the signalling system as wheel-to-rail contact is lost.

Station management, train dispatch and the platform train interface

147. Overall harm to passengers and the public at stations increased by 2% compared to 2013-14[10] but reduced 2% when normalised by the 4% increase in passenger journeys (the best available approximation of increases in station usage by passengers and public). ORR's pressure and the industry's own concern means that most operators now have good platform-train interface (PTI) risk management arrangements in place. ORR inspections generally found strong and consistent PTI management processes. Overall mainline PTI harm reduced by 21%, but when normalised by increases in passenger journeys it decreased 24%.

148. ORR found evidence of good performance in safety leadership, risk assessment, worker engagement and safety culture around the management of the PTI. Generally, standards of train dispatch are at satisfactory to good levels, but some station risk assessment issues remain, such as curved platforms, or where platform furniture obscures views during platform-train dispatch

[10] Since some limited key data is collected on a seasonal rather than calendar basis it is necessary to include these in the report.

149. Managing crowd congestion or taking appropriate proactive steps to avoid it continues to be a big challenge across the network. These pressures are due to increases in passenger numbers, service frequency and disruption, including the impact of one-off and everyday rush-hour events, and from station infrastructure enhancement works. ORR saw examples of poor management of station crowding at Birmingham New Street, Finsbury Park and Paddington stations in 2014.

150. Procedures for proactively identifying and dealing with station crowding include having a dedicated control room, automated congestion monitoring with critical levels triggering a proactive response, use of CCTV to better understand passenger behaviour and staff resourcing levels, and the effective control of passenger flows during train dispatch. The industry's people on trains and station risk working groups are seeking to improve crowd management.

151. ORR continued to inspect station passenger management plans to monitor their PTI risk management processes because of the high level of fatality and major injury risk posed. This included periodic visual inspections to ensure proactive management is effective and dynamic. The future passenger crowding challenge means that ORR must keep pushing operators' day-to-day responsiveness to crowding.

152. ORR also focused on the use of engineering solutions to design out risk for new or enhanced infrastructure, stations and rolling stock. This approach will help deliver our longer term asset management work plan, which includes the alignment of relayed track and platforms to reduce PTI gaps. Looking ahead, residual PTI risk will remain a perennial challenge until engineering solutions, such as PTI gap fillers, or platform-edge doors, prohibitively expensive when retrofitted, are installed.

Rolling stock risks

153. ORR found rolling stock maintenance was generally of a very high standard, but there was very little evidence that fleet departments were using the data they collected about rolling stock management to enhance a balanced suite of performance and safety indicators, although they expressed a willingness to do this with their contractors. ORR continued to monitor trends in vehicles returning to service with failures after overhaul or external maintenance, but saw some improvements after the worsening trend during 2013.

154. ORR found evidence of train operators failing to fully recognise the full consequences of introducing new rolling stock. In general, ORR's relationships with train operators and train service providers are open and honest, generating a strong forum to challenge them when necessary.

Freight railway undertakings

155. In 2014, ORR was generally satisfied that freight operators' safety management systems perform at consistently acceptable levels. There were some areas requiring improvement, particularly the rise in rolling stock axles and bearing failures.

156. None of the incidents in 2014 caused catastrophic consequences but all had the potential. They caused damage to the infrastructure and vehicles, but no fatalities or injuries.

157. There were 11 freight train derailments in 2014. SPAD numbers involving freight operators have continued to increase since 2010-11. The trend in SPADs per freight kilometre travelled has increased gradually since 2011. There was a 40% increase in harm to freight workers.

158. ORR's work was focused on analysing the ability of freight operators to deliver excellence in driver management, but more specifically, in key areas of their management maturity in support of driver management techniques.

159. ORR found that most freight operators consistently achieved level 3 'standardised' to level 4 'predictable' score when assessed with RM3. Some operators are now beginning to push towards level 5 'excellence' assessments for a few parts of the RM3 assessment criteria. The RM3 assessment found that freight operators were generally complying with the Railway and Other Guided Transport System (ROGS) Regulations[11].

160. ORR continues to monitor progress closely and to liaise with the industry at its national meetings, including the National Freight Safety Group and Rail Freight Operators Group.

Occupational health: passenger and freight operators

161. ORR saw some evidence of the benefits of robust and proactively applied occupational health strategies. These included better staff attendance, improved health and reduced employee absence costs, but passenger and freight operators have more to do. There are some slight variations between comparable operators' staff sickness absence and overall wellbeing levels.

162. The specific issues ORR looked at are asbestos management, noise at work, managing stress and the control of substances hazardous to worker **health.**

163. ORR found areas of improvement such as safety leadership, the trialling of new technologies and work methods, the provision of safety information to staff, staff engagement and good use of safety targets. ORR will continue to use its RM3

[11] http://orr.gov.uk/__data/assets/pdf_file/0020/2567/rogs-guidance.pdf

assessments of operators' safety management systems to identify weaknesses and target improvement.

164. ORR also found examples of substandard risk assessment, poor provision of personal protective equipment and checks on its use by staff and competence management systems that are not yet good enough. There were insufficient efforts to ensure corrective risk management actions are implemented and a lack of consideration of occupational health issues at the design stage.

165. ORR also worked with the industry to produce a wheelchair good practice guide for staff, managers and users aimed at preventing muscular skeletal injuries to staff. This can present a particular challenge at stations where there are large platform-train stepping distances, as this can pose manual-handling risks when using platform to train ramps. ORR is encouraging duty holders to assess and manage the risk of injury to their staff and ensure that they have adequate provisions in place to safely assist turn-up-and-go wheelchair users.

B4. Focus areas for next year

166. ORR published its focus areas for next year as part of the Health & Safety Report 2014- 15[12].

167. ORR's key strategic health and safety objective as set out in the 2014-15 business plan[13] is:

Drive for a safer railway: *Enforce the law and ensure that the industry delivers continuous improvement in the health and safety of passengers, the workforce and public, by achieving excellence in health and safety culture, management and risk control.*

[12] http://orr.gov.uk/__data/assets/pdf_file/0007/18556/health-safety-report-2015.pdf

[13] http://orr.gov.uk/__data/assets/pdf_file/0013/11731/business-plan-2014-15.pdf

C. Developments in Safety Performance

C.1. Detailed analysis of the latest recorded trends

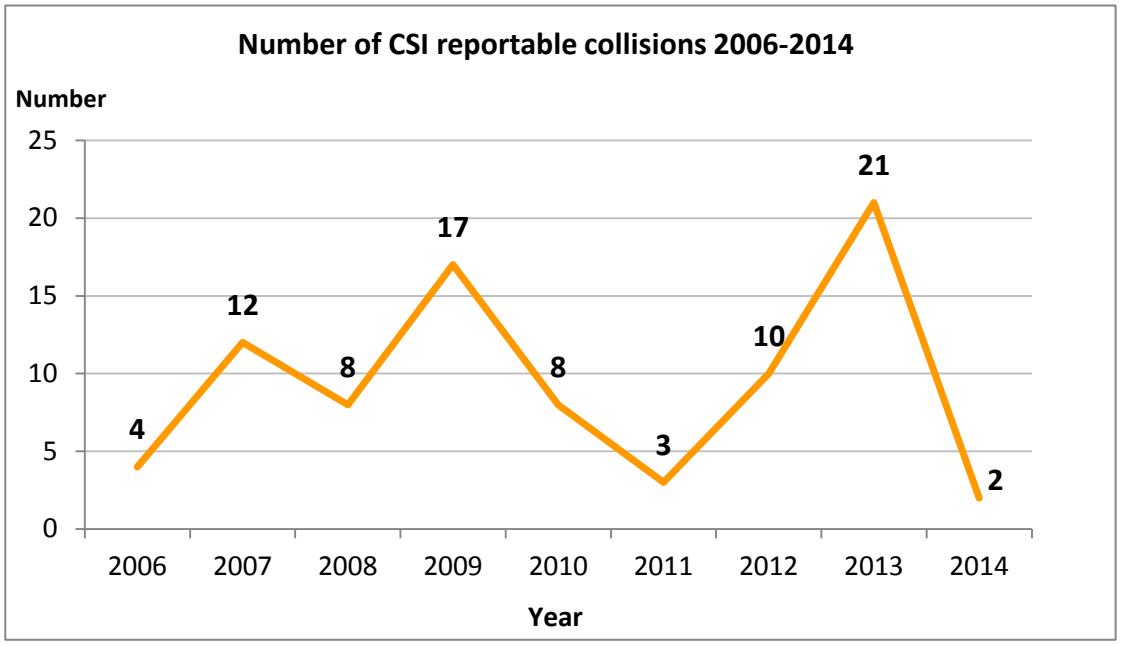
168. CSI data has now been collected for nine years. The scope of the statistics and the data on CSIs can be found in Annex A.

169. In 2014, the total number of CSI reportable accidents was 51, a decline of 33 from 2013 and the lowest number on record.

170. All CSI categories, except derailments, saw the number of incidents decrease. There were three CSI reportable fires in rolling stock; this compares to nine in 2013. A graph and appropriate analysis is included for each of the six CSI categories where incidents were recorded in 2014:

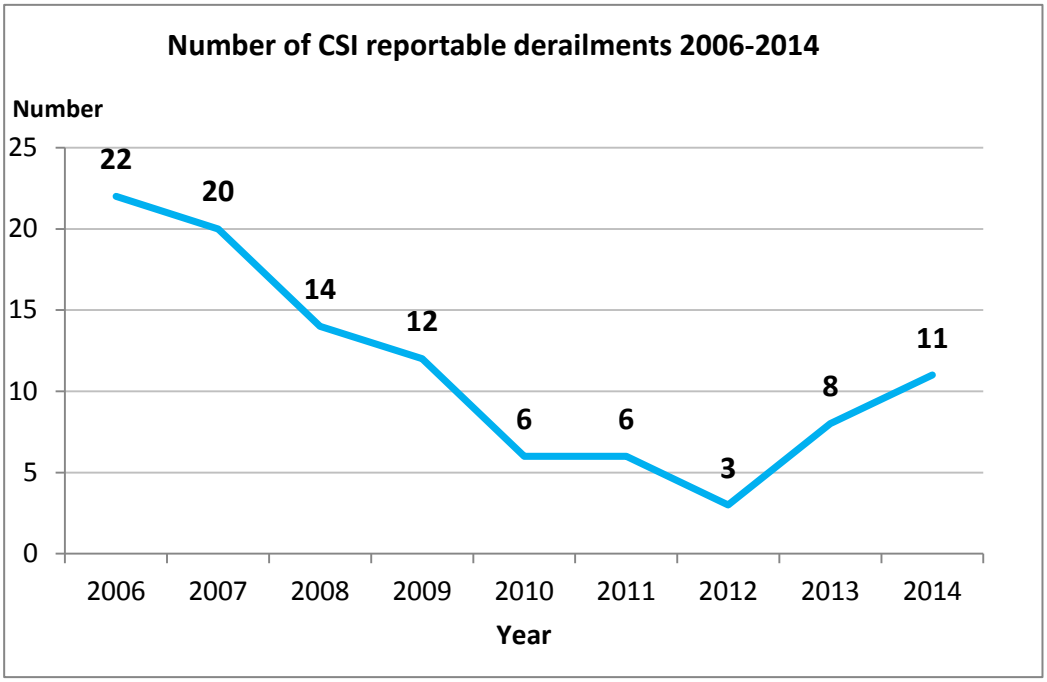
- Collisions
- Derailments
- Level crossing accidents
- Rolling stock in motion accidents
- Broken rails
- SPADs

CSI reportable collisions



171. The number of CSI reportable collisions declined substantially, from 21 in 2013 to 2 in 2014. This is the lowest figure recorded since CSI data has been collected. It was evenly split between collisions with rail vehicles and collisions with obstacles within the clearance gauge.

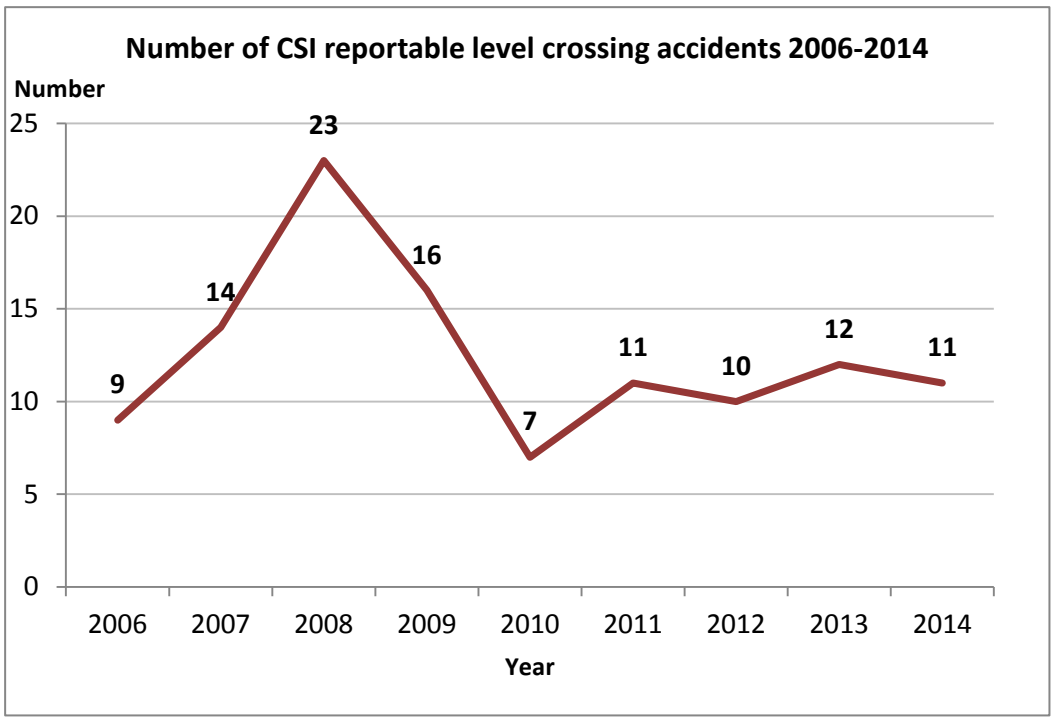
CSI reportable derailments



172. In 2014, the number of derailments recorded increased to 11 from 8 in 2013. This is the second consecutive yearly increase following a continuous trend of improvement over 2006-2012. It is also the highest figure for five years. However, none of the incidents resulted in a fatality or serious injury and the numbers remain low by historical averages: as recently as the late 1990s there were typically 40-50 freight train derailments every year.

173. 10 of the 11 derailments involved freight trains, one of which caused infrastructure damage. Most derailments were track and infrastructure related.

CSI reportable level crossing accidents

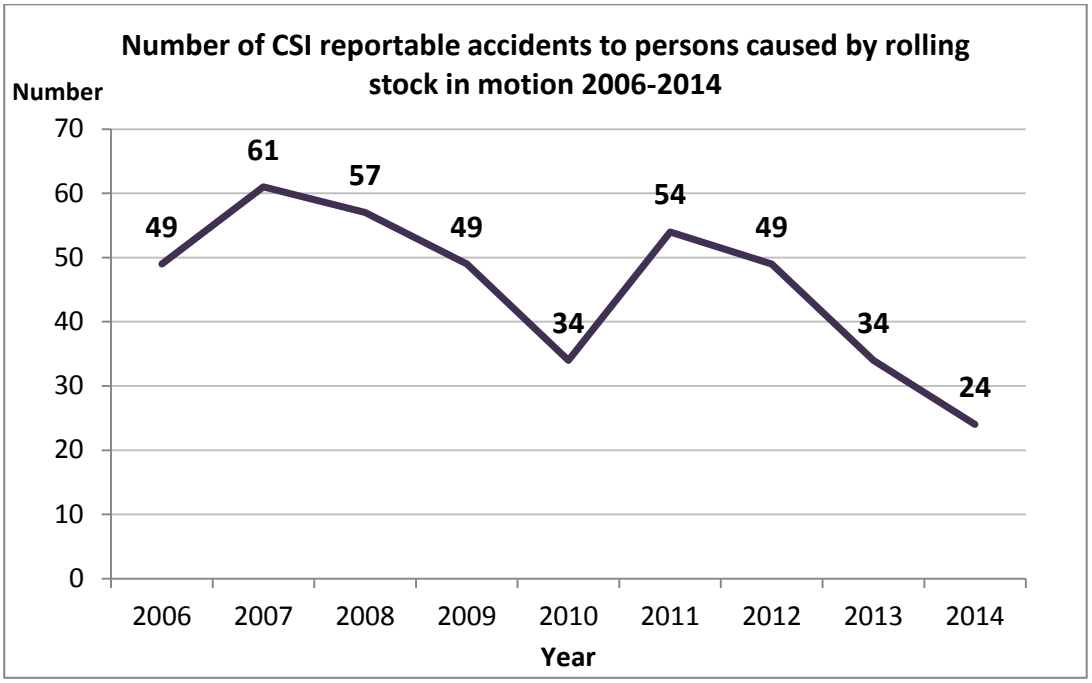


174. The number of reportable level crossing accidents decreased slightly from 12 to 11. This continues a broadly stable trend since 2011. Of the eleven individual events, nine resulted in fatalities; seven of these involved pedestrians; two were collisions with vehicles, which continue to show a decline.

175. ORR remains focused on the continued risk posed by level crossings on the railway. We are conscious that much of the risk is based around user behaviour.

176. See the 'level crossings' section of chapter B3 for more information about ORR and industry strategy to reduce level crossing risk.

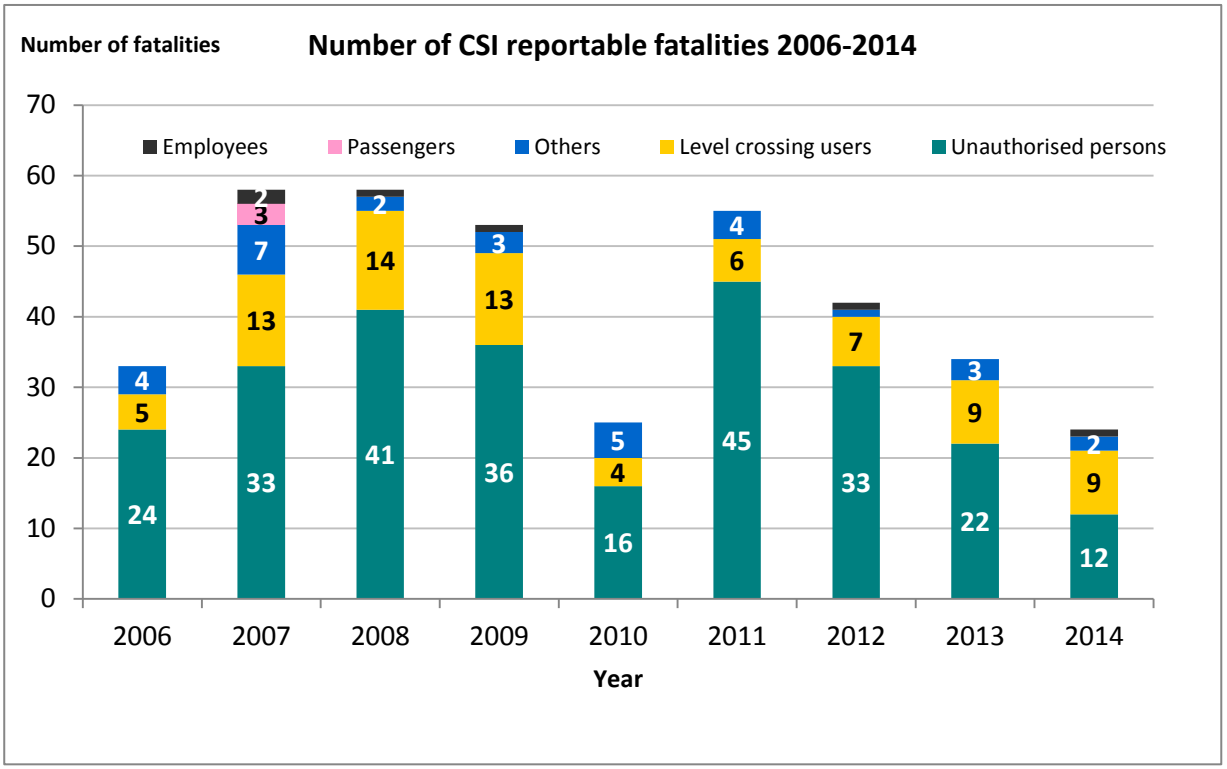
CSI reportable rolling stock in motion accidents



177. The number of rolling stock in motion accidents fell from 34 to 24, the fourth consecutive yearly decrease and the lowest figure since CSI data has been collected. This also forms part of a broader declining trend since 2007, and comes despite significant passenger growth over the past decade.

178. Of the 24 CSI reportable fatalities in 2014 (see next section), 15 were caused by rolling stock in motion. The continuing decline in CSI reportable fatalities involving unauthorised access to the railway is partly reflected in the fall in rolling stock in motion accidents.

CSI reportable fatalities



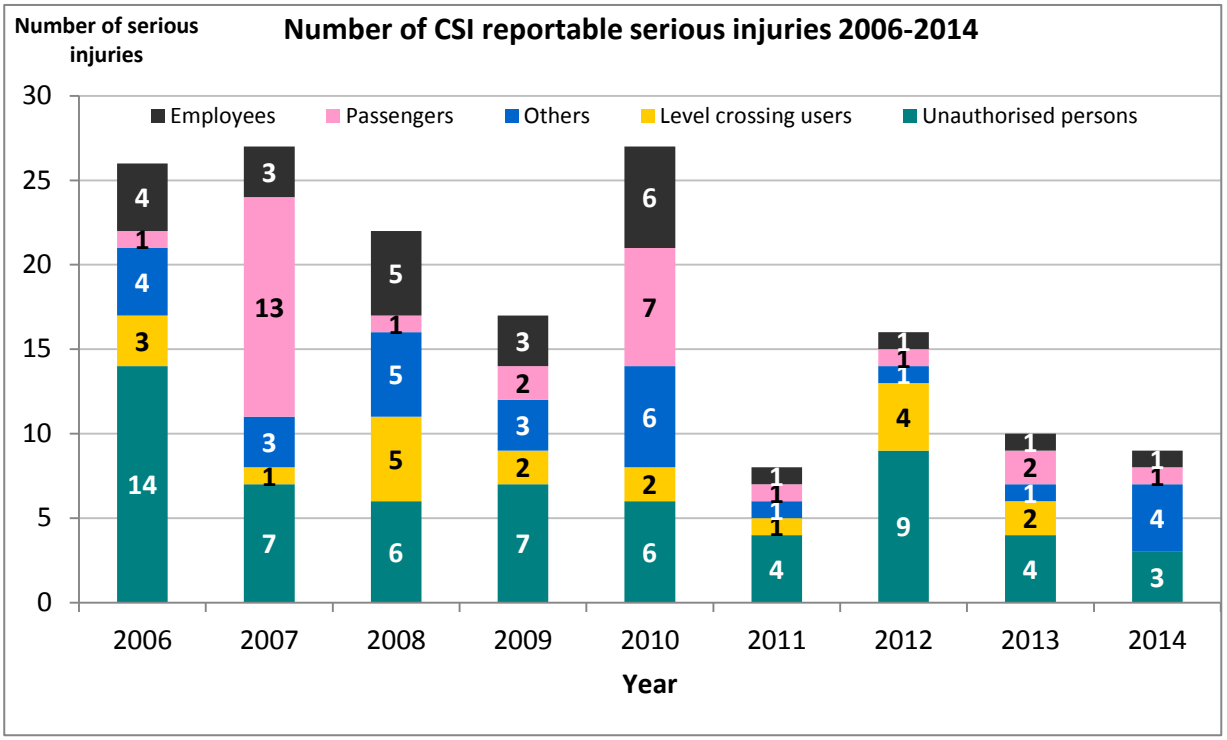
179. In 2014, the number of fatalities fell from 34 to 24, which is the lowest number on record and the fourth consecutive year in which numbers have declined. The majority of CSI reportable fatalities continue to be unauthorised users, and the 12 documented in 2014 was the lowest figure recorded. For the seventh consecutive year there were no CSI reportable passenger fatalities.

180. There were nine fatalities at level crossings, stabilising a four year trend. Seven incidents involved pedestrian users of crossings: one involved a cyclist; four were foot crossing; one involved a collision with a pushbike; and one was a suspected accident.

181. There was one employee fatality, an increase on 2013 but in line with previous years. This continues to illustrate very low levels of worker fatalities across the rail network.

182. The two 'other' incidents all occurred at stations where people were struck by passing trains.

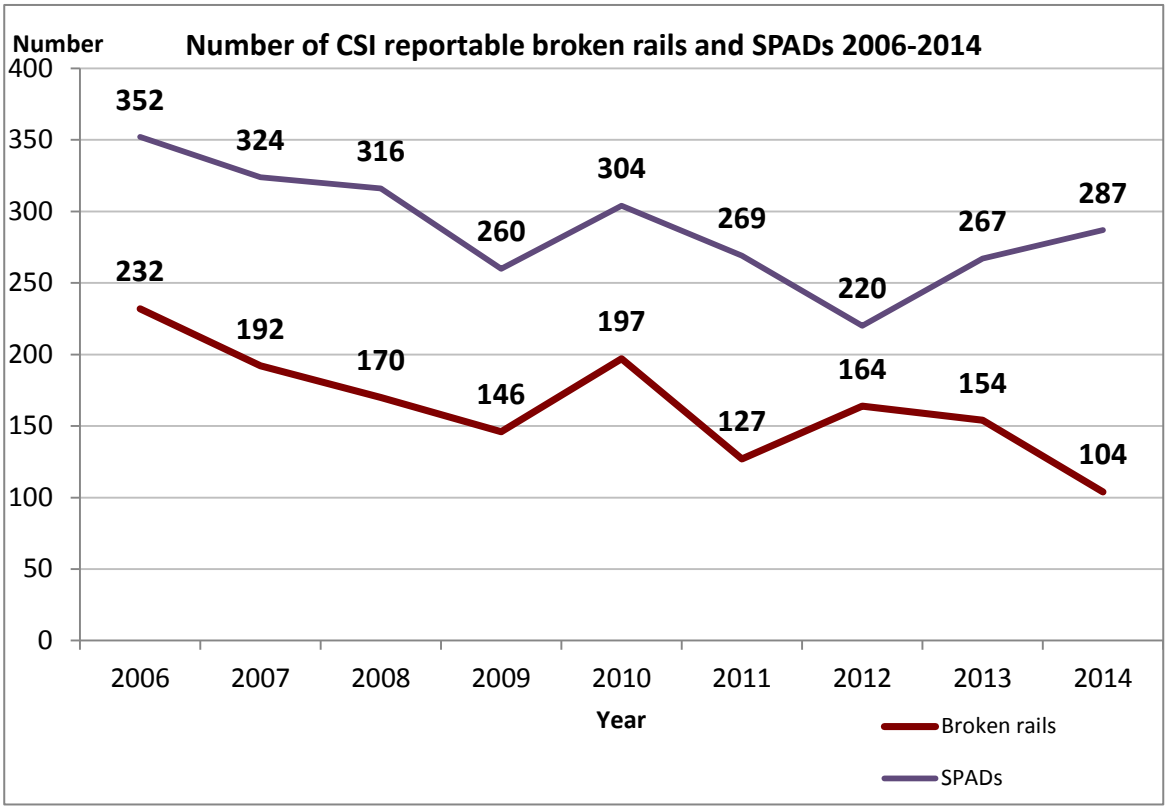
CSI reportable serious injuries



183. There were 9 CSI reportable serious injuries in 2014, one less than in 2014 and the second lowest figure after 2011. Key facts were:

- There was one serious injury to a passenger whilst on a train.
- A track worker was struck by a train at a tunnel exit and seriously injured.
- There were no serious injuries reported at level crossings.
- Three unauthorised users were seriously injured, including a person crossing the track and two whilst at stations.
- There were four serious injuries reported as ‘other’, all involving persons struck by trains.

CSI reportable broken rails and SPADS

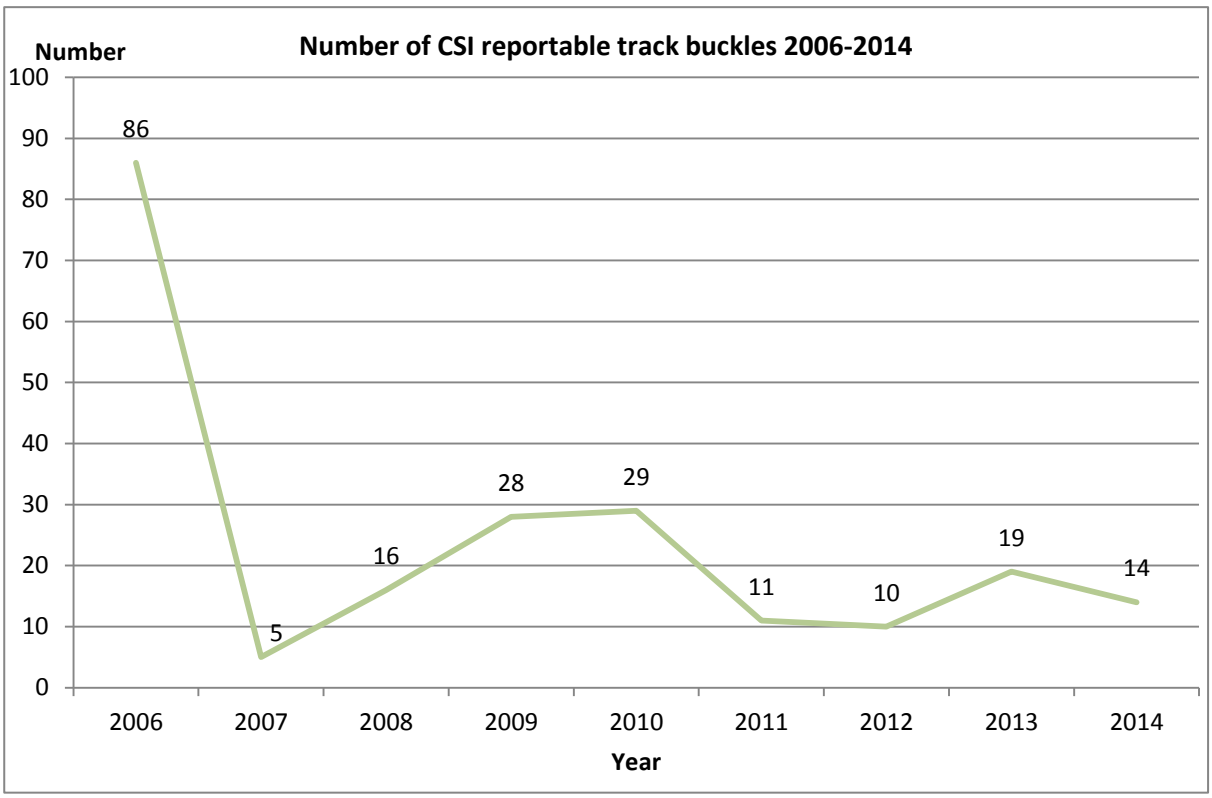


184. There were 104 broken rails in 2014, down considerably from 154 in 2013 and the lowest figure on record. This is partly a reflection of the relatively mild temperatures at both ends of 2014, which compares to a prolonged period of cold temperatures experienced during some previous years, especially in 2010. The figure also forms part of a longer decreasing trend since CSI data was collected.

185. The continued roll out of automatic ultrasonic inspection by Network Rail has been a key driver in identifying damaged rails before they break.

186. The number of SPADs increased for the second year in a row and has now reversed the trend of decreasing incidents. The rail sector is producing a strategy for reducing SPAD risks as the UK's mainline network moves towards automatic train control (ATC) through the implementation of the European Train Control System (ETCS).

CSI reportable track buckles



187. The number of track buckles decreased form 19 in 2013 to 14 in 2014.

Automatic train protection

188. There are 15,606km route track in the UK.

Table 2

	Not equipped	Warning + stop	Discrete	Continuous	Total
Conventional mainline	1236 Km of route	13880 Km of route	0 Km of route	382 Km of route	**15498 Km of route**
High Speed 1				108 Km	**108 Km**

189. 214 km of railway is fitted with ERTMS.

Level crossings

190. There are approximately 6447 level crossings on the GB mainline.

Table 3

Level crossing type	Number
Active with automatic with user-side warning	293
Active with user-side protection	0
Active with automatic user-side protection and warning	450
Active with automatic user-side protection and warning, and rail-side protection	53
Active with manual user-side warning	0
Active with manual user-side protection	392
Active with manual user-side protection and warning	417
Passive	4842
Total	**6447**

C.2. Results of safety recommendations 2014

191. The Rail Accident Investigation Branch (RAIB) is the UK's National Investigation Body (NIB) for railway incidents, as defined in article 21 of the Railway Safety Directive.

192. RAIB is able to make recommendations to any organisation, whether part of the railway industry or not, that it regards as best placed to implement changes required to address the risks it identifies through its investigations. As National Safety Authority, ORR

is responsible for ensuring that recommendations are properly considered by nominated end implementers and where appropriate acted upon.

193. In 2014, RAIB produced 28 investigation reports containing 99 recommendations. The scope of this report only covers mainline railways, which accounted for 25 investigations containing 85 recommendations. A list of the investigation reports, recommendations, measures taken to address the recommendations and their implementation status is in Annex D.

194. Of the 85 recommendations, 2 were directed to ORR following separate incidents at level crossings.

195. On 21 March 2013 at Athelney in Somerset, a car was driven around the lowered barriers of an Automatic Half Barrier (AHB) level crossing as a train approached. The train collided with the car, fatally injuring the driver. The report was published on 24 February 2014 and made a recommendation to ORR to make changes to its level crossings guidance to reflect the outcome of RSSB research into level crossing signage and emergency communication with signallers. The RSSB research has not yet been completed, so ORR has not yet taken the appropriate action to implement this recommendation.

196. On 14 July 2013 at Woodbridge station in Suffolk, a car was struck by a train at low speed while traversing Jetty Avenue User Worked Crossing (UWC). The train did not derail but the driver of the car suffered minor injuries.

197. The report was published on 15 December 2014 and made a recommendation on ORR to provide enhanced guidance relating to UWCs, including guidance about how the decision point is determined in order that the sighting of approaching trains is measured from an appropriate location. This was in the context of two recommendations made to Network Rail to review the signage, sighting distances and user instructions for UWCs.

198. There are no outstanding recommendations from previous year's reports against ORR.

C.3. Measures Implemented not in relation to Safety Recommendations

199. On 30 September 2014, following a prosecution by ORR, BAM Nuttall Ltd was fined £140,000 and ordered to pay costs of £42,700. The company pleaded guilty to breaching health and safety law in December 2010, during the replacement of a South London railway bridge, and causing a construction worker to suffer life changing injuries.

200. On 9 September 2014, Balfour Beatty Rail Projects Ltd was fined £350,000 and ordered to pay costs of £50,000 by ORR. The company was found guilty of breaching

health and safety law, and causing a rail worker to suffer serious burns after coming into contact with the 25000 volt overhead lines near Cricklewood in March 2011.

D. Supervision

D.1. Strategy and plan(s)

201. ORR has published a strategy for regulation of health and safety risks[14]. This sets out how ORR set its priorities and targets its activities. ORR has a vision of zero workforce and industry-caused passenger fatalities, with an ever decreasing overall safety risk.

202. Since 2010, ORR has planned and delivered NSA work through the following risk priority programmes:

- Health and safety management
- Management of change
- Interface system safety
- Workforce safety
- Occupational health
- Construction design and management
- Management of assets to ensure safety
- Industry staff competence and capability

203. A number of sources of information inform the strategies and plans:

- There was one serious injury to a passenger whilst on a train.
- Mainline accident and incident data collected in the Rail Safety and Standards Board's (RSSB) Safety Management Information System (SMIS) and analysed using the Safety Risk Model (SRM);
- Accident and incident data reported to us under the Reporting of Injuries Diseases and Dangerous Occurrences Regulations (RIDDOR);
- NIB investigation findings;
- Intelligence from our audit, inspection, investigation and enforcement activities;
- Informed peer-reviewed opinion from specialist experts; and
- Intelligence from EU and other international developments.

204. Having identified the main risk areas, ORR considers which should be its priorities – i.e. those on which ORR should focus its attention as an NSA. This does not mean that ORR does nothing with the other risks; ORR will still carry out work on other risks by conducting investigations of incident and complaints, monitoring the risk profile of each sector and will add other areas of risk to its collective inspection programmes if it is warranted.

[14] The latest version is available via ORR's website: http://orr.gov.uk/__data/assets/pdf_file/0018/17019/health-and-safety-regulatory-strategy.pdf

205. It is important to recognise that the risks are prioritised from ORR's perspective as NSA. All risks, irrespective of their priority to ORR as NSA, must be controlled by the companies (whether RU, IM, ECM, suppliers, entities in charge of maintenance etc.) that create them.

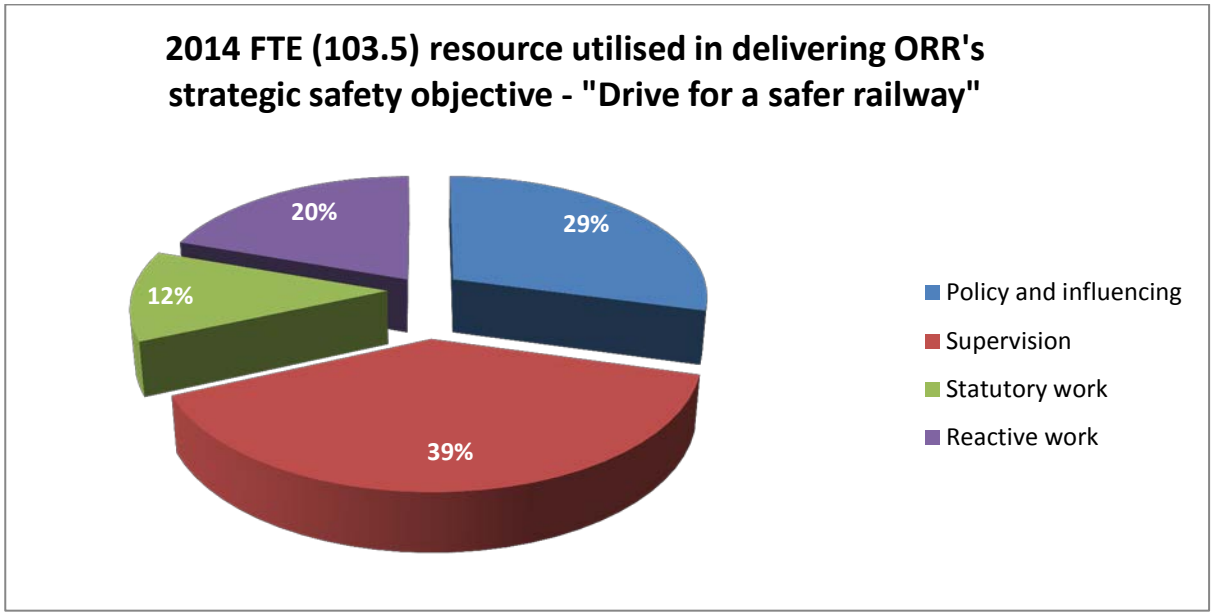
206. An important part of ORR's prioritisation process is to 'horizon-scan' and anticipate new and emerging risks, or existing risks where we can foresee that they may change in their importance.

207. Underpinning ORR's prioritisation is a scorecard that is used to analyse the risks and give some ranking. This approach takes account of a range of issues, such as:

- There was one serious injury to a passenger whilst on a train.
- How well the industry is managing the risk and whether we have confidence that performance will be sustained;
- The enforcement history - i.e. are we intervening more or less over time;
- Likely public, political and media concern; and
- Whether we are best placed to make a difference.

D.2. Human resources

208. ORR directs resources amounting to FTE towards delivering our corporate objective – "Drive for a safer railway". The chart below indicates how this time is used.



209. In 2014, ORR utilised resource amounting to 103.5 FTE to deliver the strategic objective 'Drive for a safer railway'. Of this resource, 39% was dedicated to supervision. A total of 64,761 staff hours of work was classified under this category.

210. Statutory work includes handling NIB recommendations and issuing safety certificates, safety authorisations, level crossing orders and train driver licences. Reactive work includes enforcement.

D.3. Competence

211. In line with the CSM supervision, ORR has an auditable competence management system.

212. The Inspector Competence Management System (CMS) is comprised of the following elements:

- Recruit staff with existing skills or potential to develop them;
- Assess training needs of new starters;
- Deliver training;
- Assess competence;
- Set annual performance and development objectives;
- Monitor performance;
- Continual professional development/refresher training; and
- Audit and review the CMS.

Recruitment

213. ORR recruits trainee inspectors from a number of backgrounds: external recruitment from the railways industry, external recruitment as health and safety professionals or internal recruitment from within ORR. Prospective candidates must show they have the capabilities to achieve the skills and qualities necessary to become an effective inspector.

214. On appointment, the line manager and the technical training manager undertake a learning needs analysis and set a training plan with regular reviews.

215. For basic health and safety regulatory training, ORR collaborate with the Health and Safety Executive (HSE), which is the main regulatory authority in Great Britain for health and safety in the workplace, and sends staff on a bespoke regulators' course leading to a diploma. For railways specific training, ORR has used a modular course delivered by Birmingham University coupled with in-house training delivered by specialist colleagues.

216. When candidates are deemed to be ready, normally about 2 years after appointment, ORR holds an interview panel to assess the trainee inspector's ability to meet the competence framework for promotion to become a full inspector.

Annual performance agreements and development plans

217. The line manager and inspector agree a performance agreement each year which will include objectives to develop expertise. The developmental objectives are underpinned by an online competence assessment tool (ORRdat) which is also used by other regulators. The outputs of the ORRdat self-assessment is discussed with the line manager and fed into the performance agreement and the business' annual training plan where appropriate.

Monitor and assure performance

218. Progress with the objectives in the performance agreement is discussed between the inspector and line manager quarterly. Formal review of the development plan takes place at the half year point.

219. ORR's processes require line managers to monitor and countersign inspectors work in a number of specified situations, for example, an investigation report or enforcement decisions.

220. ORR conducts some sample checks of enforcement notices and also runs peer review sessions on enforcement notices and investigation reports.

Continuing professional development

221. ORR runs a programme of technical training and legal updates based on the outcomes of discussions between inspectors and line managers.

222. To aid their development, inspectors are rotated across teams and short term secondments (internally and with industry) are encouraged, as well as project working with other parts of ORR.

223. All inspectors are eligible for chartered membership status of the Institute of Occupational Safety and Health (IOSH). This brings with it access to health and safety information and updates, and there is a requirement to carry out and record professional development activity.

D.4. Decision-making

224. ORR sets out the decision making criteria used to monitor, promote and enforce compliance with the regulatory framework and the procedure for establishing those criteria

in the Enforcement Policy Statement[15]. ORR inspectors will use their discretion in deciding when to investigate or what enforcement action may be appropriate.

225. This statement sets out how ORR will use its powers under the Health and Safety at Work Act 1974 (HSWA), to enforce compliance with both health and safety law and other relevant non-H&S legislation for which ORR is the enforcing authority, such as interoperability and accessibility. This policy does not deal with the enforcement of licence obligations which is dealt with separately under ORR's economic enforcement policy and penalties statement[16].

226. When carrying out an investigation, ORR will seek to determine:

- Causes;
- Whether there has been a breach of legislation;
- Whether action has been taken or needs to be taken to prevent a recurrence of an incident and / or to secure compliance with the law;
- Lessons to be learnt and whether there is a requirement to influence the law and industry guidance; and
- What response is appropriate to a breach of the law.

227. ORR inspectors have a range of tools at their disposal in seeking to secure compliance with the law and to ensure a proportionate response when carrying out inspections, investigations and when dealing with criminal offences. Inspectors may offer duty holders information and advice, both face to face and in writing. This may include warning a duty holder that in the opinion of the inspector, they are failing to comply with the law.

228. Where there is a choice of remedy or enforcement mechanism available ORR is likely to consider:

- Causes;
- The remedies at its disposal;
- The likely effectiveness of each remedy;
- The speed of resolution;
- Cost; and
- Any other factors relevant to the specific case.

229. ORR uses the HSE Enforcement Management Model when enforcing health and safety breaches, and a separate, supplementary process for other non-risk areas such as interoperability and accessibility.

[15] http://orr.gov.uk/__data/assets/pdf_file/0016/5650/hswa-enforcement-policy-statement.pdf

[16] http://orr.gov.uk/__data/assets/pdf_file/0018/4716/economic-enforcement-statement.pdf

230. ORR has a number of powers available under which it can take enforcement action (including HSWA, Network Rail's network licence, operator licences and specific powers within the relevant non-H&S legislation) and will consider, using the principles of regulatory enforcement set out in the enforcement policy statement, the most effective, efficient and expeditious solution in the light of its legal obligations.

231. The ultimate purpose of ORR's enforcement policy is to ensure that duty holders manage and control risks effectively, thus preventing harm.

D.5. Coordination and cooperation

232. ORR has in place an agreement with the Intergovernmental Commission (IGC), the NSA for the Channel Tunnel, for coordinated activities for inspection and auditing of railway undertakings that operate on both the UK mainline and the Channel Tunnel. The Chunnel Tunnel Safety Authority (CTSA) is the IGC's statutory independent safety advisory body and has all but one of its UK members from ORR.

233. Joint inspections are carried out by inspectors from ORR and the French NSA (EPSF). A contract for reimbursement exists for ORR to charge relevant costs for work done for the CTSA back to Eurotunnel.

234. If an ORR inspector is working for the CTSA, they will make informal contact with the relevant ORR account holder for the railway undertaking operating on the UK mainline.

235. ORR intends to put in place arrangements for coordination with other NSAs in line with Article 8 of the CSM on supervision. Developing these arrangements will take some time.

236. ORR is an active participant in the International Liaison Group of Government Railway Inspectorates (ILGGRI). In 2014, ORR organised and attended a number of supervision workshops for NSAs to discuss legislation, share best practice and discuss cooperation arrangements between NSAs.

237. ORR is also looking to develop its staff and share best practice in supervision through staff exchanges with other NSAs.

D.6. Findings and measures taken

238. In section B of this report we describe the outcomes of our supervision activities targeted at Network Rail and other railway undertakings.

E. Certification and Authorisation

E.1. Guidance

239. ORR produces guidance for the railway industry to the Railway and Other Guided transport Systems (ROGS) regulations which covers the key aspects of the legislation and includes a specific chapter on safety certification and authorisation[17].

240. ORR publishes on its website, the assessment criteria for which safety certificates and authorisations (mainline and non-mainline) are assessed against and also provides details of evidence expected from an applicant which will demonstrate compliance with the criteria. The opening chapters of the assessment criteria publication also explain the permissioning process and timescales for assessment of applications[18].

241. Applicants are encouraged to set out their application in the order of the criteria wherever possible to make it easier for assessment of the application. In addition, ORR publishes its assessment manual of how safety certificates and authorisations are assessed. This provides transparency to the process.

242. ORR welcomes discussions with applicants for safety certificate and authorisation from an early stage (up to 9-12 months before submitting). This enables any concerns or queries to be addressed at the outset and provide additional guidance to an applicant. Generally, these meetings are preferred and strongly recommended by both parties to avoid any confusion and potential rejection of an application upon submission.

243. Applicants for mainline safety certificates are required to complete the ERA application form which is on the ORR website along with our guidance. Applicants may also seek advice from their ORR contact should they encounter any difficulty in completing the form.

E.2. Contacts with other NSAs

244. ORR continued to have a number of informal contacts with other European NSAs throughout the year at meetings and via written exchanges, responding in particular to bespoke questionnaires. In 2014 ORR was not asked about the details of a Part A safety certificate by an NSA in another Member State.

[17] http://orr.gov.uk/__data/assets/pdf_file/0020/2567/rogs-guidance.pdf

[18] http://orr.gov.uk/__data/assets/pdf_file/0020/3593/cert_auth_criteria_mainline.pdf

E.3. Procedural issues

245. The average issuing time for Part A Safety Certificates was within the four month timescale laid down in article 12(1) of the Railway Safety Directive. To facilitate the certificate and authorisation application process ORR provides guidance documents and informal advice to railway undertakings. This helps the applicant submit the correct documentation in the required format, reducing the administrative burdens for both the applicant and ORR.

E.4. Feedback

246. ORR has an appeal process, should applicants be unhappy with ORR's final decision. Details are provided in an assessment manual, the ROGS guidance, on the ORR website[19]. It should be noted that applicants are strongly encouraged to raise any concerns initially through their lead assessor. Depending upon the nature of the applicant's concern, it may be prudent to involve the assessment manager and head of inspection.

247. ORR has changed the processes for issuing safety certificates and authorisations over time to take account of feedback from industry.

[19] http://orr.gov.uk/__data/assets/pdf_file/0020/2567/rogs-guidance.pdf

F. Changes in legislation

F1. Railway Safety Directive

248. Table 3 below illustrates details of legislation transposing the Railway Safety Directive into UK law.

Table 4

Amendments to the Railway Safety Directive	Transposed	Legal reference	Date of entry into force
Directive 2008/57/EC	Yes	The Railways (Interoperability) Regulations 2011 [S.I. 2011/3066]	6 January 2012
Directive 2008/110/EC	Yes	The Railways and Other Guided Transport Systems (Safety) (Amendment) Regulations 2011 [S.I. 2011/1860]	26 August 2011
Directive 2009/149/EC	Yes	The Railways and Other Guided Transport Systems (Safety) (Amendment) Regulations 2011 [S.I. 2011/1860]	26 August 2011

F2. Changes in legislation and regulation

249. There were no changes concerning railway safety legislation in 2014.

G. Application of the CSM on Risk Evaluation and Assessment

G1. NSA experience

Decisions taken by the proposer on the level of significance of a change

250. The GB mainline Infrastructure Manager, Network Rail, makes widespread use of the CSM for risk evaluation and assessment (the CSM), making the question of significance somewhat irrelevant. ORR supports the use of the CSM, even for changes that are not considered to be significant, as it is a legally valid risk assessment process that is acceptable throughout the EU.

251. Use of the CSM is less widespread among railway undertakings, but this appears to be increasing. A number of railway undertakings have said they would be introducing changes in the coming years which could be 'significant' and therefore trigger use of the risk management process of the CSM –for example when introducing new rolling stock.

252. A large number of proposers find ORR's guidance on the application of the CSM[20] useful for determining the level of significance of a change.

Application of the risk management process by the proposers

253. Risk assessment has long been utilised in GB railways, so the introduction of the CSM did not require substantial change to existing processes. Inspection of RU/ IM risk assessment processes is a prioritised area for ORR inspection using the Railway Management Maturity Model (RM3).

254. Network Rail makes an assessment of whether to use the risk management process for all new projects and implements it selectively for existing projects. Using the Network Rail project governance process (GRIP), use of the risk management process is triggered at the stage of single option selection (stage 4). The risk management process may be used earlier if all options under consideration require a risk assessment.

255. The requirements of the risk management process are broadly in line with existing risk assessment processes in use across the GB railway industry, although some documents will need to be amended to bring them into line with the requirements of the 'system definition'. The independent assessment process is similar in nature to the safety verification process in the existing UK Railways and Other Guided Systems legislation.

[20] http://orr.gov.uk/__data/assets/pdf_file/0006/3867/common_safety_method_guidance.pdf

256. Some railway undertakings have so far used the management of change function of their SMS to assess the significance of a proposed change. More however are increasingly making use of ORR's guidance to determine the significance.

Involvement of assessment bodies

257. ORR recommends that an assessment body is involved from the beginning of the project so that it can monitor the development of the hazard record, consider other relevant material (such as a safety plan) and possibly be asked by the applicant to observe tests. The assessment body must ensure that its involvement in these activities does not jeopardise its independence. The assessment body's role in oversight does not remove the responsibility of the proposer for overall safety.

Interface management

258. If the proposer disagrees with the decision of an assessment body it must record this in writing. They are not obliged to share this with ORR, but it may make sense for them to do so.

259. ORR expects that the interface issues in any significant change are adequately dealt with. ORR has made this point to Network Rail in respect of projects such as electrification which are currently being planned and it is reiterated in the Guidance ORR has issued in the UK on the CSM. ORR does not have any evidence at this stage that areas of risk are being missed as a consequence of poor interface management.

G2. Feedback from stakeholders

260. Stakeholders can express their experience of the CSM risk assessment in the annual health and safety report they are required to submit to ORR.

261. Network Rail has widely adopted the risk assessment process of the CSM, also using it for processes not considered to be significant. Network Rail noted the following 'lessons learned' from the use of safety verification:

- Causes;
- Engage with the process early
- Produce good quality scope definitions and verification plans
- Engage in and open and honest dialogue with assessors to allow issues to be quickly identified and addressed
- Manage effective closeout of all issues at each verification stage
- Document assumptions, discussions and agreements

- Engage with all affected project stakeholders at an early stage ('duty of co-operation')
- Advise changes to scope and time-scale to assessor as soon as possible

G3. Revision of NSRs to take into account the EC regulation on CSM on risk evaluations and assessment

262. National Safety Rules require a risk assessment to be done – therefore there is no need to take account of the CSM. ORR's regulatory approach is already aligned with the CSM risk assessment.

263. RSSB is undertaking work to identify key risks and produce guidance.

H. Derogations Regarding ECM Certification Scheme

264. In the UK, no alternative measures through derogations to the ECM certification scheme were needed. By 31 May 2013 deadline, ORR had certified a total of 9 ECMs.

I. Northern Ireland

Introduction

265. This section of the report covers the railway system in Northern Ireland for the period 1 January 2014 to 31 December 2014. The Department for Regional Development (DRDNI) acts as the NSA in Northern Ireland, although ORR represents DRDNI in relations with ERA.

266. DRDNI was established by article 3(1) of the Departments (Northern Ireland) Order 1999.

267. Translink is the brand name of the integrated public transport operation of Northern Ireland Railways (NIR) as well as Citybus, and Ulsterbus.

268. NIR had previously operated a fully integrated system, acting as both infrastructure manager and railway undertaking. Full legal 'vertical' separation took place on 1 April 2014, through the establishment of Northern Ireland (Infrastructure) Ltd and Northern Ireland Railways (Train Operations). DRDNI assist NIR in operating rail services and provides funding to maintain and develop the rail infrastructure and rolling stock.

269. There are no metro, tram or other light rail systems in Northern Ireland, nor is there any privately owned railway infrastructure on which NIR services run.

270. There are a number of heritage and tourist railways in Northern Ireland which are privately owned and run, mainly using dedicated track. They do not provide passenger services for the travelling public and do not receive funding from DRDNI.

271. All railway undertakings in Northern Ireland, including heritage railways, are required to comply with DRDNI safety regulations. In some circumstances heritage railways operating on their own tracks and at a line speed that does not exceed 25mph/40km may be exempted from some regulations where DRDNI is satisfied that the safety of passengers and the general public is not compromised.

The Safety Authority for Northern Ireland

272. In Northern Ireland the Safety Authority for the purpose of implementing the Railway Safety Management Regulations (Northern Ireland) 2006**,** (hereafter known as the "Safety Management Regulations") is DRDNI. The Department's key responsibilities as Safety Authority are:

- To ensure that NIR manages the network efficiently and in a way that meets the needs of its users;
- To encourage continuous improvement in health and safety performance;
- To secure compliance with relevant health and safety law, including taking enforcement action as necessary;

- To develop policy and enhance relevant railway health and safety legislation; and
- To issue or refuse safety certificates to railway operators in accordance with the "Safety Management Regulations".

273. The Safety Authority duties are managed by the Department's Transport Policy, Strategy and Legislation Division. DRDNI's role as NSA for Northern Ireland is to:

- Provide the appropriate regulatory framework so that railway safety is generally maintained and, where reasonably practicable, continuously improved;
- Assess each duty holder's application for safety certificates and authorisations, including their co-operation arrangements;
- Assess whether safety is being achieved by inspecting duty holders' SMS and assessing available safety information and data;
- Authorise the placing into service of structural subsystems in Northern Ireland on the UK trans-European network; and check that they are operated and maintained in accordance with the essential requirements.
- Authorise the placing into service of structural subsystems in Northern Ireland on the UK trans-European network; and check that they are operated and maintained in accordance with the essential requirements.

Development of railway safety in Northern Ireland

274. The purpose of the Railway Safety Management Regulations (Northern Ireland) 2006 was to harmonise safety standards on the NI Railway Network.

275. Part 2 and regulation 18 of the Regulations implement Directive 2004/49/EC on safety on the Community's railways and amending Council Directive 95/18/EC on the licensing of transport undertakings and Directive 2001/14/EC on the allocation of infrastructure capacity and the levying of charges for use of infrastructure and safety certification ("the Railway Safety Directive"), except in relation to access to training facilities, placing in service of in–use rolling stock and accident and incident investigation.

276. Part 2 of the Regulations contains prohibitions in relation to the operation of trains or vehicles on any railways in Northern Ireland and the management and use of infrastructure unless a person has established and is maintaining a safety management system and in specified cases has a safety certificate in relation to the operation of vehicles or a safety authorisation in relation to the management and use of infrastructure. Part 2 also makes provision in relation to the requirements for a safety management system and the issuing, amendment and revocation of safety certificates and authorisations and for the giving of notices to the Department.

277. Part 3 provides for general duties on any railway operators subject to the duties in Part 2 to carry out risk assessment, co–operate with each other and certain other persons and to prepare an annual safety report to the Department. It makes provision in relation to annual reports to the European Railway Agency and for the issuing, keeping and public inspection of documents.

278. Part 4 makes provision in relation to the carrying out of safety critical work on any railways. It imposes obligations on those controlling the carrying out of such work to ensure that it is only carried out by fit and competent persons, and that safety-critical work is not carried out by workers at risk of being fatigued.

279. Part 5 makes provision for appeals in relation to decisions relating to safety certificates and authorisations, for transitional provisions in relation to compliance with the provisions of regulations (3), (1) and (2), for the granting of exemptions and for a defence in relation to the safety verification requirements in regulation 4.

Common Safety Indicators

280. NIR has provided the required CSI data for 2014 as transport operator in NI. The CSI data has been aggregated at a UK level and includes data for both Great Britain and Northern Ireland (see section C and annex A).

Rail Accident Investigation Branch

281. The Rail Accident Investigation Branch (RAIB) established by the Railways and Transport Safety Act 2003 is established on a UK-wide basis.

282. In 2014 RAIB published one report into an incident in Northern Ireland, making three recommendations. Details of the incident are in Annex D.

Safety Authorisations

283. An exemption certificate was issued on 3 July 2014 to NIR to permit the use of Irish Rail Class 22000 intercity rail cars on NIR infrastructure. No further updated, amended or part authorisations were issued in 2014. DRDNI continues to work closely with NIR on the development of their application for authorisation.

Supervision of railway undertakings and infrastructure managers

284. The day to day supervision of the health and safety performance of the railway industry is undertaken through the Railway Safety Management Regulations (Northern Ireland) 2006 where the NSA is the Department.

285. The Department also continues to work closely with its counterpart in the Irish Republic, the Department of Transport and the Railway Safety Commission as well as the two railway operators on the island, NIR and Irish Rail, on all EU issues and mutual railway safety matters as they impact on the shared service between Belfast and Dublin. DRDNI also works closely with the Department for Transport (DfT) in Great Britain and ORR on European issues.

Conclusions

286. Safety performance on the Northern Irish mainline rail network remained at a high standard in 2014. European safety data showing that Northern Ireland has one of the safest railways in Europe.

287. Northern Ireland has historically a low level of serious rail incidents. This situation was maintained during 2014, with no reportable fatalities or serious injuries

Annex A: Common Safety Indicators (CSIs)

Update data

Number of accidents and Train*Km

Year	Type of accident: Collisions	Derailments	Level crossing accidents	Accidents to persons caused by RS in motion	Fires in RS	Others	Total	Train*Km (MLN)
2006	4	22	9	49	0	1	85	536
2007	12	20	14	61	3	0	110	521
2008	8	14	23	57	0	2	104	549
2009	17	12	16	49	6	4	104	569
2010	8	6	7	34	2	5	62	520
2011	3	6	11	54	2	2	78	528
2012	10	3	10	49	0	3	75	536
2013	21	8	12	34	9	0	84	536
2014	2	11	11	24	3	0	51	534
2015								

Number of accidents/Train*Km

Year	Type of accident: Collisions	Derailments	Level crossing accidents	Accidents to persons caused by RS in motion	Fires in RS	Others	Total
2006	7.47E-03	4.11E-02	1.68E-02	9.15E-02	0.00E+00	1.87E-03	1.59E-01
2007	1.51E-02	3.97E-02	2.18E-02	1.04E-01	2.84E-03	9.46E-04	1.84E-01
2008	1.49E-02	3.49E-02	2.88E-02	1.04E-01	1.87E-03	1.87E-03	1.86E-01
2009	1.89E-02	3.13E-02	2.85E-02	9.93E-02	4.14E-03	3.22E-03	1.85E-01
2010	1.82E-02	2.75E-02	2.56E-02	9.28E-02	4.08E-03	4.45E-03	1.73E-01
2011	1.79E-02	2.16E-02	2.64E-02	9.49E-02	4.84E-03	4.84E-03	1.70E-01
2012	1.70E-02	1.52E-02	2.48E-02	8.99E-02	3.70E-03	5.92E-03	1.57E-01
2013	2.19E-02	1.30E-02	2.08E-02	8.18E-02	7.07E-03	5.21E-03	1.50E-01
2014	1.66E-02	1.28E-02	1.92E-02	7.35E-02	6.03E-03	3.77E-03	1.32E-01
2015							

N° of fatalities,Train*Km and Passenger*Km

Year	Category of persons: Passengers	Employees	Level crossing users	Unauthorised persons	Others	Total	Passenger*Km (BLN)	Train*Km (MLN)
2006	0	0	5	24	4	33	50	536
2007	3	2	13	33	7	58	50	521
2008	0	1	14	41	2	58	53	549
2009	0	1	13	36	3	53	53	569
2010	0	0	4	16	5	25	56	520
2011	0	0	6	45	4	55	56	528
2012	0	1	7	33	1	42	59	536
2013	0	0	9	22	3	34	59	536
2014	0	1	9	12	2	24	62	534
2015								

N° of fatalities/Train*Km and Passenger*Km

Year	Category of persons: Passengers	Passengers	Employees	Level crossing users	Unauthorised persons	Others	Total
2006	0.00E+00	0.00E+00	0.00E+00	9.33E-03	4.48E-02	7.47E-03	6.16E-02
2007	2.84E-03	2.99E-02	1.89E-03	1.70E-02	5.39E-02	1.04E-02	8.61E-02
2008	1.87E-03	1.96E-02	1.87E-03	1.99E-02	6.10E-02	8.09E-03	9.28E-02
2009	1.38E-03	1.46E-02	1.84E-03	2.07E-02	6.16E-02	7.36E-03	9.29E-02
2010	1.11E-03	1.15E-02	1.48E-03	1.82E-02	5.57E-02	7.79E-03	8.42E-02
2011	1.12E-03	1.12E-02	1.49E-03	1.86E-02	6.36E-02	7.81E-03	9.27E-02
2012	0.00E+00	0.00E+00	1.11E-03	1.63E-02	6.33E-02	5.55E-03	8.62E-02
2013	0.00E+00	0.00E+00	7.44E-04	1.45E-02	5.65E-02	5.95E-03	7.77E-02
2014	0.00E+00	0.00E+00	7.54E-04	1.32E-02	4.82E-02	5.65E-03	6.78E-02
2015							
	related to Train*Km	related to Passenger*Km	related to Train*Km	related to Train*Km	related to Train*Km	related to Train*Km	related to Train*Km

N° of injures,Train*Km and Passenger*Km

Year	Category of persons: Passengers	Employees	Level crossing users	Unauthorised persons	Others	Total	Passenger*Km (BLN)	Train*Km (MLN)
2006	1	4	3	14	4	26	50	536
2007	13	3	1	7	3	27	50	521
2008	1	5	5	6	5	22	53	549
2009	2	3	2	7	3	17	53	569
2010	7	6	2	6	6	27	56	520
2011	1	1	1	4	1	8	56	528
2012	1	1	4	9	1	16	59	536
2013	2	1	2	4	1	10	59	536
2014	1	1	0	3	4	9	62	534
2015								

N° of injures/Train*Km and Passenger*Km

Year	Category of persons: Passengers	Passengers	Employees	Level crossing users	Unauthorised persons	Others	Total
2006	1.87E-03	2.01E-02	7.47E-03	5.60E-03	2.61E-02	7.47E-03	4.85E-02
2007	1.32E-02	1.40E-01	6.62E-03	3.78E-03	1.99E-02	6.62E-03	5.01E-02
2008	9.34E-03	9.79E-02	7.47E-03	5.60E-03	1.68E-02	7.47E-03	4.67E-02
2009	7.82E-03	8.25E-02	6.90E-03	5.06E-03	1.56E-02	6.90E-03	4.23E-02
2010	8.91E-03	9.17E-02	7.79E-03	4.82E-03	1.48E-02	7.79E-03	4.42E-02
2011	8.93E-03	8.95E-02	6.70E-03	4.09E-03	1.12E-02	6.70E-03	3.76E-02
2012	4.44E-03	4.34E-02	5.92E-03	5.18E-03	1.18E-02	5.92E-03	3.33E-02
2013	4.83E-03	4.59E-02	4.46E-03	4.09E-03	1.12E-02	4.46E-03	2.90E-02
2014	4.52E-03	4.10E-02	3.77E-03	3.39E-03	9.80E-03	4.90E-03	2.64E-02
2015							
	related to Train*Km	related to Passenger*Km	related to Train*Km	related to Train*Km	related to Train*Km	related to Train*Km	related to Train*Km

Number of precursors and Train*Km

Year	Type of accident: Number of broken rails	Number of track buckles	Number of wrong-side signalling failures	Number of signals passed at danger	Number of broken wheels on rolling stock in service	Number of broken axles on rolling stock in service	Total	Train*Km (MLN)
2006	232	86	617	352	0	0	1287	536
2007	192	5	550	324	0	0	1071	521
2008	170	16	901	316	0	0	1403	549
2009	146	28	6	260	0	0	440	569
2010	197	29	10	304	0	1	541	520
2011	127	11	7	269	0	0	414	528
2012	164	10	4	220	0	0	398	536
2013	154	19	0	267	0	0	440	536
2014	104	14	1	287	0	0	406	534
2015								

Number of precursors/Train*Km

Year	Type of accident: Number of broken rails	Number of track buckles	Number of wrong-side signalling failures	Number of signals passed at danger	Number of broken wheels on rolling stock in service	Number of broken axles on rolling stock in service	Total
2006	4.33E-01	1.61E-01	1.15E+00	6.57E-01	0.00E+00	0.00E+00	2.40E+00
2007	4.01E-01	8.61E-02	1.10E+00	6.40E-01	0.00E+00	0.00E+00	2.23E+00
2008	3.70E-01	6.66E-02	1.29E+00	6.18E-01	0.00E+00	0.00E+00	2.34E+00
2009	3.40E-01	6.21E-02	9.54E-01	5.76E-01	0.00E+00	0.00E+00	1.93E+00
2010	3.48E-01	6.09E-02	7.73E-01	5.77E-01	0.00E+00	3.71E-04	1.76E+00
2011	3.10E-01	3.31E-02	5.48E-01	5.48E-01	0.00E+00	3.72E-04	1.44E+00
2012	2.98E-01	3.48E-02	3.43E-01	5.07E-01	0.00E+00	3.70E-04	1.18E+00
2013	2.93E-01	3.61E-02	1.00E-02	4.91E-01	0.00E+00	3.72E-04	8.30E-01
2014	2.81E-01	3.13E-02	8.29E-03	5.08E-01	0.00E+00	3.77E-04	8.29E-01
2015							

Cost of all accidents, safety hours

Year	Type of accident: Costs of deaths in MLN €	Costs of injuries in MLN €	Costs of replacement or repair of damaged rolling stock and railway installations in MLN €	Costs of delays, disturbances and re-routing of traffic, including extra costs for staff and loss of future revenue in MLN €	Total costs in MLN €	Total number of working hours of staff and contractors lost as a consequence of accidents	Total number of working hours	Train*Km (MLN)
2006	80643600	5600250	16071468	17951385	120266703	33470	########	536
2007	129925800	6944310	44406218	8404773	189681101	21349	188624	521
2008	114448875	4073604	6228951	4505253	129256683	38115	235796	549
2009	91355000	2325400	5420412	160800824	259901636	n/a	n/a	569
2010	47322306	5106894	12774044	152056448	217259693	n/a	n/a	520
2011	96965000	1586700	3935000	5737719	108224419	n/a	n/a	528
2012	85752833	3881035	12812419		102446287	n/a	n/a	536
2013								536
2014								534
2015								

Cost of all accidents, safety hours: indicators

Year	Type of accident: Costs of deaths in MLN €	Costs of injuries in MLN €	Costs of replacement or repair of damaged rolling stock and railway installations in MLN €	Costs of delays, disturbances and re-routing of traffic, including extra costs for staff and loss of future revenue in MLN €	Total costs in MLN €	N°of working hours (MLN) of staff and contractors lost as a consequence of accidents/N°of working hours (MLN) of staff and contractors
2006	1.51E+05	1.05E+04	3.00E+04	3.35E+04	2.24E+05	0.02%
2007	1.99E+05	1.19E+04	5.72E+04	2.49E+04	2.93E+05	0.03%
2008	2.02E+05	1.03E+04	4.15E+04	1.92E+04	2.73E+05	0.05%
2009	1.91E+05	8.71E+03	3.32E+04	8.81E+04	3.21E+05	0.05%
2010	1.72E+05	8.93E+03	3.15E+04	1.28E+05	3.40E+05	0.05%
2011	1.79E+05	7.46E+03	2.71E+04	1.23E+05	3.37E+05	14.01%
2012	1.61E+05	6.28E+03	1.52E+04		3.02E+05	16.16%
2013						
2014						
2015						
	related to Train*Km					

Technical safety of infrastructure and its implementation, management of safety

Year	Type of accident: Percentage of tracks with Automatic Train Protection (ATP) in operation	Percentage of Train*Km using operational ATP systems	Total number of level crossings	Number of track Km (double track lines are to be counted twice)	Total number of level crossings per track Km	Percentage of level crossings with automatic or manual protection	N°of audits accomplished / N° of audits required (and/or planned)
2006	4.28%	3.03%	7211	31594	2.28E-01	23.41%	93.20%
2007	4.24%	3.01%	7456	31515	2.37E-01	24.14%	97.60%
2008	4.24%	3.01%	6680	31534	2.12E-01	24.60%	102.00%
2009	4.24%	3.01%	6802	31571	2.15E-01	23.57%	83.48%
2010	4.24%	3.01%	6647	31631	2.10E-01	24.97%	88.29%
2011	4.24%	3.01%	6647	31448	2.11E-01	24.75%	90.80%
2012	4.24%	3.01%	6617	31534	2.10E-01	25.22%	89.00%
2013	4.24%	3.01%	6542	31075	2.11E-01	24.30%	90.76%
2014		28.82%	5960	31120	1.92E-01	26.24%	99.52%
2015							

Technical safety of infrastructure and its implementation, management of safety

Year	Type of accident: Percentage of tracks with Automatic Train Protection (ATP) in operation	Percentage of Train*Km using operational ATP systems	Total number of level crossings	Number of track Km (double track lines are to be counted twice)	Total number of level crossings per track Km	Percentage of level crossings with automatic or manual protection	N°of audits accomplished / N° of audits required (and/or planned)
2006	4.28%	3.03%	7211	31594	2.28E-01	23.41%	93.20%
2007	4.26%	3.02%	7334	31555	2.32E-01	23.78%	95.40%
2008	4.25%	3.02%	7116	31548	2.26E-01	24.05%	97.60%
2009	4.25%	3.02%	7037	31554	2.23E-01	23.93%	94.07%
2010	4.25%	3.01%	6959	31569	2.20E-01	24.14%	92.91%
2011	4.24%	3.01%	6846	31540	2.17E-01	24.41%	92.43%
2012	4.24%	3.01%	6679	31543	2.12E-01	24.62%	90.71%
2013	4.24%	3.01%	6651	31452	2.11E-01	24.56%	88.47%
2014		8.17%	6483	31361	2.07E-01	25.10%	91.67%
2015							

Annex B: Potential High-Risk Train Accidents

The events coloured in red are those the UK NIB is investigating, or for which it has published a report.

Derailments (excluding level crossings) - 15			
Date	**Location**	**Railway Undertaking**	**Description**
03/02/2014	Angerstein Wharf	DB Schenker	A freight locomotive derailed on handpoints whilst entering sidings
18/02/2014	Castle Bromwich	Colas	A train exiting a possession derailed on points due to the route not having been set
25/02/2014	Doncaster Decoy	DB Schenker	A freight train derailed on defective handpoints whilst shunting
09/04/2014	Westbury South	DB Schenker	A freight tran derailed on the Down reception line
26/04/2014	Ripple Lane	Colas	A freight train derailed on the Down goods line due to gauge spread
30/05/2014	Doncaster	DB Schenker	A freight locomotive derailed on trap points after a SPAD
15/07/2014	Brocklesby Jcn	DB Schenker	A freight train ran away, passed a signal at danger and derailed on trap points

23/07/2014	Lostwithiel	DB Schenker	Wagons of a freight train derailed on trap points after running away from locomotive
02/10/2014	Porthkerry No. 2 Tunnel	Db Schenker	Two wagons of a freight train derailed and caused extensive track damage
13/11/2014	Ashburys	DB Schenker	A freight train derailed due to fractured wheel as it departed the sidings
17/11/2014	West Sleekburn	DB Schenker	A freight train derailed on plain line and some of its vehicles slid down an embankment
13/12/2014	Briggs Sidings GF	DB Schenker	A freight locomotive derailed over the ground frame on single line
21/12/2014	Perth TMD/CSD	First ScotRail	An empty coaching stock train passed a signal at danger whilst shunting and derailed
02/04/2014	Angerstein Wharf	Freightliner	A freight train derailed on a single line and caused significant infrastructure damage
23/10/2014	Heworth	Freightliner	A freight train locomotive and 25 empty wagons ran derailed for 2.4km, possibly due to cyclictop

Collisions between trains -4			
12/01/2014	Plumpton (Cumbria)	DB Schenker	A collision, with derailment, between trains in a possession but affecting the adjacent line.
17/01/2014	Harlescott LC	Arriva Trains Wales	A passenger train struck an engineering trolley at high speed
08/05/2014	Glasgow Central High Level	First ScotRail (both)	A low-speed collision between units being uncoupled in the station
12/12/2014	Glasgow Central High Level	First ScotRail (both)	A passenger train coming into the station struck an empty coaching stock train
Buffer stop collisions - 1			
29/03/2014	Speke Jcn	Freightliner	A coal wagon ran away and struck buffer stops, becoming derailed
Trains struck by large falling objects - 0			
Collisions with road vehicles on level crossings - 7			
14/01/2014	Silverdale LC	Direct rail Services	A freight train struck a stranded, unoccupied car on a level crossing

07/05/2014	Ivy Lea Farm		A passenger train struck a car at Lvy Lea Farm user-worked crossing with telephone (UWC-T).
11/05/2014	Frampton Mansell		A passenger train struck a motorcyclist on user-worked crossing with telephone
16/09/2014	Mays (Berkshire)		A road vehicle crashed through the lowered barriers at level crossing, and struck the side of an empty coaching stock train
01/08/2014	Meusydd Mill		A passenger train struck a road vehicleat a user-worked crossing with telephone.
13/11/2014	Downham By-pass		A passenger train struck a lorry with a glancing blow at an automatic half barrier level crossing (AOCL)
25/11/2014	Gwynedd		A passenger train struck a car at a user-worked level crossing with telephone.
Collisions with road vehicles not at level crossings (excluding derailments) - 0			
Total – 27			

Annex C: ORR's core message on its strategy for health and safety regulation on GB railways

ORR as rail industry regulator

We are the economic and safety regulator for the mainline railway industry in mainland Britain. This covers the principal infrastructure manager (Network Rail), their associated contractors and railway undertakings with access agreements to use the network.

Our regulation focuses on business risk, recognising that business risk includes commercial risks and health and safety risks. Health and safety is not an overhead or an optional add-on. It is a fundamental requirement – and it is good for business.

Health and safety regulation

We safeguard the public by challenging the rail industry to improve its health and safety performance and prevent people being killed, injured or made ill as a result of its activities.

What we do

The rail industry in mainland Britain is made up of many businesses. We oversee those businesses and how they work together to keep the rail system safe.

A business will be safe if its people manage risks effectively every day. Our role is to motivate businesses to have excellent health and safety management and to check that they identify and assess risks properly, control them effectively and comply with the law.

We recognise that any business which either creates a risk or is partly responsible for a shared risk, must effectively manage that risk. This is irrespective of that business's profitability, availability of resources, or how long any contract they hold has left to run. Although ORR is also their economic regulator, this applies as much to ORR's dealings with Network Rail and HS1 Ltd as with any other companies. As the economic regulator for Network Rail, we decide what it has to deliver (its outputs) and how much this should cost. When we do this, we take safety into account so that the government's priorities are met. Quite simply, these are:

- A rail industry that maintains a high level of safety
- Controls its costs and delivers both value for money for the taxpayer
- A good service to its customers

Our core focus

We expect businesses to achieve proper control of risks by having an excellent safety management system. We expect leaders in the rail industry to understand their risks and how to measure their performance in controlling these.

Our major concern is to secure high standards of protection from train-crash risk without businesses losing sight of other risks that need to be controlled, such as asbestos or falls from a height.

We look for evidence of what is being done by businesses to control health and safety risks. We actively seek evidence through our inspections, investigations of incidents and permissions for certain activities. And we strike a balance on the resources we allocate to each. At all times, we act fairly and compare evidence against consistent standards of what businesses should be doing. ORR can use its enforcement powers to require improvement if that is needed.

We will not settle for mediocrity or a culture of complacency. We will always ask whether improvement is needed, but we recognise that the law sets minimum standards and that an excellent organisation is one that delivers compliance with the law efficiently and consistently. We encourage excellence, but will not enforce beyond the standard set down in law.

A railway system which is designed with safety in mind from the outset is more likely to deliver a railway that can be operated safely and efficiently for years to come. We expect careful thought during the design process to eliminate risks or reduce them where possible.

We work with other European regulators to help deliver sensible regulation and a common European approach. This is so that trains can run through the Channel Tunnel to British and European destinations safely, and so that trains built in one country can operate in another. Like our European neighbours, we keep the legal framework for safety on the railway under review and can propose changes if necessary. We do this in line with the principles of better regulation, which underpin all that we do.

Annex D: Safety Recommendations

The current implementation status definitions, laid down in the REC handling process, are as follows:

Implemented – where all actions to deliver a recommendation have been completed, even where the associated risk has been addressed by alternative means. If the recommendation has been delivered by alternative means then this should be clearly stated in the ORR Decision section.

Implementation on-going – where ORR is content with the proposed actions to implement the recommendation and the timescale for delivery.

In-Progress – where action is still outstanding to enable ORR to come to a decision on the status of a recommendation. If this status is used then a timescale for completion and update to RAIB must also be provided.

Non-Implementation – where no action is proposed to deliver the recommendation. This status is only used when we are satisfied that:

- It is not appropriate to take any action to deliver the recommendation (including directing it to any person) and ORR can provide, without further dialogue with another party, a full explanation as to why no measures will be taken to implement the recommendation[21];
- ORR has received a full explanation as to why no measures will be taken to implement the recommendation;
- ORR agrees with the reasoning and/or we agree that we are unable to influence adoption of the recommendation; and
- ORR has consulted RAIB on proposed non-implementation, in accordance with the Memorandum of Understanding.

Other Public Body or Authority – where the recommendation is also addressed to another public body or authority

[21] This includes recommendations addressed to ORR for action.

Incident	Safety Recommendation	State of Implementation
Motts Lane crossing	1 The intention of this recommendation is to reduce the risk created by long waiting times by taking action at other locations where this situation may exist. Network Rail should, as soon as possible, review all automatic level crossings (including AHB, ABCL, AOCL and MSL crossings) to identify locations where complex track and signalling layouts, nearby stations and/or railway operations may lead to the red road/pedestrian lights showing for an excessively long time. At each location that is identified, Network Rail should assess the risk from extended closure times, and take action to manage this risk as necessary (paragraph 116a).	**Implementation on-going**
	2 The intention of this recommendation is to reduce the risk that local signalling practices may lead to unnecessarily long waiting times at level crossings. Network Rail should determine, in the light of the risk that arose from the indiscriminate use of the non-stopping setting at Liverpool Street IECC, whether there are any other locations where local instructions/practices may be at risk of introducing unnecessarily long waiting times at automatic crossings, and take appropriate action to correct the situation (paragraph 116b).	**Implementation on-going**
	3 The intention of this recommendation is to reduce the risk that may be created by the interaction of ARS with the controls for level crossings, by reviewing the principles which define the design of such systems. Network Rail should review its processes for designing and implementing ARS where it interacts with level crossing controls, and amend or enhance them as necessary to produce assurance that the design will result in the crossing operating in accordance with relevant standards and guidance (paragraph 116c).	**Implementation on-going**
	4 The intention of this recommendation is to improve the control of risk by establishing appropriate maximum times that red lights should show for, and taking the red light times into account at regular reviews of the safety of level crossings. Network Rail should establish, by carrying out research or otherwise, appropriate maximum time(s) for red lights to be designed to be shown at MSL crossings, and acceptable levels of variability for this time (taking into account factors such as the types of train, and stopping patterns), in view of the risk that users may become intolerant of extended waiting times. Taking account of the results of this work, it should modify its risk management processes for MSL crossings to include consideration of the length of time that the red lights show (paragraph 116c).	**Implementation on-going**

Castle Donington derailment	1 The intent of this recommendation is to reduce the risk of derailment if a stoneblower is unable to complete its planned work in the time available. Network Rail should review, and if necessary improve, the planning of stoneblowing so that: - there is sufficient time allocated within the duration of a possession to complete the work planned to be carried out; and - if the duration of the possession is reduced after the work has first been planned, the implications for the completion of the work are examined, and the work re-planned so that the highest priority locations may be completed in the reduced time available (paragraph 122iii).	**In Progress**
	2 The intent of the recommendation is to reduce the risk of trains colliding with a derailed vehicle. RSSB, in conjunction with the rail industry, should undertake a review of the Rule Book requirements relating to the action to be taken following an abnormal brake application on a freight train and make any changes found to be necessary to reduce the risk of collision with a derailed vehicle. Such a review should consider under what circumstances and how quickly the signaller should be contacted and the actions to be taken, such as cautioning the first train to pass on the adjacent line (paragraph 124).	**Implementation on-going**
Old Street Station	1 The intent of this recommendation is to include Railway Infrastructure Managers in property-related searches, and to provide information for developers to reduce the risk presented to existing railway infrastructure where widely available mapping does not show tunnel alignments, or shows them incorrectly. Publication of accurate alignments is not required if implementers prefer alternative approaches (eg publishing maps showing bands of land encompassing tunnel alignments together with advice that the railway company should be contacted in respect of all proposed developments in these bands). Railway Infrastructure Managers with tunnels and associated subterranean structures which are under urban areas and not shown on Ordnance Survey mapping should implement a process to publish information concerning those areas of land that are in reasonable proximity to this infrastructure. They should then take all reasonable steps to publicise this information, and to ensure that it is available to those providing the legal and ground engineering professions with significant numbers of searches relating to property in Great Britain (paragraphs 97b and 99).	**Implementation on-going**
	2 The intent of this recommendation is to inform Local Planning Authorities so that the planning approval process can reduce the risk to railway tunnels due to construction activities in close proximity. Railway Infrastructure Managers with tunnels and associated subterranean structures which are under urban areas and not shown on Ordnance Survey mapping should provide Local Planning Authorities	**Implementation on-going**

	with the information needed for these authorities to identify when a planning application has the potential to affect this infrastructure (paragraphs 97e and 97f).	
	3 The intent of this recommendation is to encourage Railway Infrastructure Managers to undertake pro-active measures to identify works which could affect the railway. Railway Infrastructure Managers should review, and where appropriate, revise existing arrangements for identifying infrastructure development which could affect tunnels and associated subterranean structures in urban areas. Where not already done, this should include pro-actively searching for planning applications and undertaking visual inspections of the ground surface above tunnels (paragraph 98).	**In Progress**
	4 The intent of this recommendation is for the British Standards Institution to amend British Standard 5930:1999+A2:2010 to clarify that some railway tunnels are not shown on Ordnance Survey mapping. The British Standards Institution should amend British Standard 5930:1999+A2:2010 'Code of practice for site investigations' to make clear (paragraph 100): a. that tunnels used by underground railways and associated subterranean structures may not be shown on Ordnance Survey mapping; and b. that rail infrastructure owners should be contacted during desk studies and utility searches where appropriate.	**Implementation on-going**
	5 The intent of this recommendation is to ensure that the planning approval process reduces the risk to railway infrastructure due to adjacent developments. The Department for Communities and Local Government should introduce a process to ensure that Railway Infrastructure Managers are made aware of all planning applications in the vicinity of railway infrastructure. This process should at least meet the intent of the statutory consultation process (paragraphs 97f and 101).	**Other PB or A**
Athelney level crossing	1 The intent of this recommendation is to reduce the risk resulting from extended waiting times at automatic level crossings, due to delays caused by the controls being 'out of synchronisation', which may encourage motorists to violate warnings. Network Rail should introduce measures to reduce the risk from extended operating times of automatic crossings caused by operation of a strike-in treadle by a train travelling away from the level crossing. This might include issuing suitable operating instructions to signallers for those crossings that might be affected or the installation of directional treadles. An engineered solution should be installed where reasonably practicable (paragraph 85a).	**Implementation on-going**

	2 The intent of this recommendation is to identify how to improve public awareness of the availability of telephones to contact the signaller in non-emergency situations. Network Rail in conjunction with RSSB should review past and current research into level crossing signage and emergency communication with signallers and consider means of improving the presentation of public emergency telephones for non-emergency use at automatic level crossings (paragraph 85c). This might include changes to signage or to the location of telephones, and should take account of Rule 34 of the Highway Code.	**Implemented**
	3 The intent of this recommendation is to improve public awareness of the availability of level crossing telephones for contacting the signaller in non-emergency situations. If the RSSB research into improving the presentation of public emergency telephones for non-emergency use at automatic level crossings (Recommendation 1) identifies that reasonably practicable improvements can be made, the Office of Rail Regulation should incorporate these into the level crossing guidance it publishes.	**Implementation on-going**
	4 The intent of this recommendation is to improve public awareness of the availability of the level crossing telephones at Athelney level crossing. Network Rail Western Route should modify the location of the pedestrian stop lines at Athelney level crossing as required to make these conform to the current guidance published by the Office of Rail Regulation (paragraphs 85c and 86a).	**Implemented**
Buttington Hall UWC	1 The intent of this recommendation is that main line railway infrastructure managers understand the true risk at times of intensive use of user worked crossings. Network Rail and Northern Ireland Railways should review and improve their processes for assessing the risk at user worked crossings so that the increased risk during periods of intensive use (eg during harvest) is properly taken into account. This recommendation may also be applicable to other infrastructure managers.	**Implementation on-going**
	2 The intent of this recommendation is to reduce the risk at user worked crossings during periods of intensive use. Network Rail and Northern Ireland Railways should define one or more safe and practical methods of working that may be adopted at user worked crossings during periods of intensive use; and provide clear information to their staff and authorised users on how and when they should be applied. They should also ensure that any such methods of working are suitably reflected in instructions and training given to railway	**Implementation on-going**

	staff.	
	3 The intent of this recommendation is that the revised method of working devised in response to recommendation 2 is included in the level crossing risk management toolkit8 as a potential mitigation measure. RSSB should review, and improve where appropriate, measures in the level crossing risk management toolkit that are designed to mitigate the risk at user worked crossings at times of intensive use.	**Implementation on-going**
Ordsall Lane Junction	1 The intent of this recommendation is to reduce the risk of derailment on small radius curves by ensuring that non-compliances with currently prescribed requirements for check rails are identified and mitigated. Network Rail should identify all curves that are non-compliant with Railway Group standard GC/RT5021 and Network Rail standard NR/L2/TRK/2102 in respect of the need to fit a check rail. For each identified curve, Network Rail should implement measures to adequately mitigate the risk of derailment. These may include one or both of the following methods, although other means of mitigation may also be appropriate (paragraph 110a, 111a and 111b): - installing a check rail on the curve; and - managing rail lubrication on the curve to a suitable level of availability. Implementation of this recommendation may require Network Rail to review curvature information recorded on track geometry measurement train runs (paragraph 79).	**Implementation on-going**
	2 The intent of this recommendation is that Network Rail should understand any changes that it has introduced to infrastructure management processes that have had a detrimental effect on their ability to control derailment risk on small radius curves (paragraphs 63, 64 and 80 - 89) and take actions to reduce the risk so far as is reasonably practicable. Network Rail should review its approach to managing changes that may affect the friction on small radius curves to understand whether any alterations to infrastructure and/or management arrangements, have resulted in higher levels of friction. At locations where it is considered that the rail friction is greater than that which applied previously, actions should be taken to reduce the corresponding increase in derailment risk so far as is reasonably practicable. These actions may include (paragraph 110a, 111a, 111b and 112a): - improvements to the rail lubrication equipment that is provided and/or the associated management processes; and/or - the provision of a check rail.	**Implementation on-going**

	3 The intent of this recommendation is to improve compliance with current design standards when track renewal or major maintenance work is undertaken. Network Rail should develop and implement (paragraph 110a): - criteria for when it is necessary to formally assess the need to bring existing track assets in line with current design standards; and - a process to record the findings of such assessments.	**In Progress**
NR Landslips 2012/13	1 The intent of this recommendation is that Network Rail revises its processes for managing earthwork and drainage risk associated with neighbouring land so that the processes are accurately documented, proportionate, reflect practical limitations and take account of benefits offered by new technology such as aerial sensing and the use of computers to process large amounts of data. Network Rail should review and improve its processes for managing earthworks related risk arising from neighbouring land, including associated drainage issues. This should provide a documented process which takes account of the extent to which it is practical and proportionate for Network Rail to review and/or rely on land management activities undertaken by neighbours. The new process should, where reasonably practicable: - obtain relevant information from other sources where it cannot be collected by earthwork examiners (eg where examiners are unable to view areas due to access constraints, fences, etc); - take advantage of opportunities offered by current technology to assess areas at risk from ground movement and areas where ground movements are occurring; - provide a robust process for identifying, and responding appropriately, to activities on neighbouring land which have the potential to significantly increase risk to the railway between routine earthwork examinations; and - take advantage of opportunities offered by real-time rainfall monitoring to issue alerts identifying heavy rainfall when this has not been forecast.	**Implementation on-going**
	2 The intent of this recommendation is to ensure that Network Rail takes account of all safety related information contained in reports for slopes that have been categorised as marginal or serviceable by the SSHI and RSHI algorithms (ie reports which, at present, are not necessarily reviewed by Network Rail's geotechnical staff). Network Rail should review and improve its processes so that due consideration is given to all safety related information provided by earthwork examiners and earthwork engineers, including safety related information associated with slopes categorised as marginal or serviceable by the SSHI and RSHI algorithms.	**Implementation on-going**

	3 The intent of this recommendation is to increase the likelihood that appropriate Network Rail staff are aware of landslip risk due to adverse rainfall conditions which have not been forecast or detected by Network Rail's formal rainfall monitoring processes. Network Rail should implement a process for real-time collection (and appropriate use of) intelligence about very unusual rainfall or flooding conditions. Development of this process should take into account the differing risk levels on different parts of the infrastructure and should consider using the following information sources: - emergency service control centres; - other organisations involved in the provision and management of rail and non-rail transport; - reports (encouraged by appropriate railway industry publicity) from on-duty and off-duty railway industry staff including those employed by train operating and maintenance companies; and - rain gauge and other types of weather sensor capable of providing data in real time.	**Implementation on-going**
	4 The intent of this recommendation is for Network Rail to formalise the processes already being developed and introduced with the intent of improving management of earthworks during adverse weather, and for these processes to include timely updating of the 'at risk' register. Network Rail should complete initial development of its modified adverse weather earthwork management system. It should then alter its standards and, if necessary, other formal documentation to reflect the modified system. The updated documentation should include a process for the rapid updating of the 'at risk' register when significant risks become apparent.	**In Progress**
	5 The intent of this recommendation is for Network Rail to formalise the process for dealing with the rare circumstances when the mitigation normally provided in response to a red warning would be inadequate. This requires consideration of additional mitigation for locations on the 'at risk' register and consideration of mitigation for locations which are not normally considered to be at risk during extreme weather conditions. Network Rail should formalise the process for implementing additional mitigation if very extreme rainfall conditions mean that the mitigation normally provided in response to a red warning is inadequate for earthworks on the 'at risk' register and/or there is a significant likelihood of landslips at locations not included on this register.	**In Progress**
Norwich Station Collision	1 The purpose of this recommendation is to improve the safety performance of Greater Anglia's drivers by developing their non-technical skills. Greater Anglia should complete the update of its Competence Management System to include consideration of non-technical skills (paragraph 123b.i). The updated Competence Management System should include:	**Implemented**

	- the development and delivery of training on non-technical skills to Greater Anglia's drivers, driver managers and driver instructors by suitably qualified trainers (paragraph 128); - the tools necessary to support its application, including those required to: o identify substandard non-technical skills; o alert a manager to a driver who is found not to be meeting the competence requirements on repeated occasions; and o guide managers on the actions to be taken (paragraphs 123b.ii); -a briefing of those who manage the implementation of the Competence Management System so that procedures are complied with (eg managers know when to refer drivers to safety review panel) (paragraph 123c.ii); and - monitoring of the implementation of the updated Competence Management System to confirm that it delivers the expected improvement in the safety performance of its drivers (paragraph 129).	
	2 The purpose of this recommendation is to improve Greater Anglia's investigations of operational incidents by ensuring that they always consider non-technical skills. Greater Anglia should: - update its accident and incident investigation procedures to include consideration of non-technical skills in the causation of accidents; and - train all its investigators to assess the role of non-technical skills in the causation of accidents (paragraph 123c.i).	**Implemented**
	3 The purpose of this recommendation is to ensure that the implementation of Greater Anglia's internal auditing processes identify non-compliances with its procedures. Greater Anglia should review and make any necessary changes to the application of the audit procedure, including any locally pre-defined question sets, to ensure that it allows for consideration of compliance with all safety related elements of the operational procedures (paragraph 123c.iii).	**Implemented**
	4 The purpose of this recommendation is to improve the safety performance of Greater Anglia's drivers by reducing fatigue when driving. Greater Anglia should complete the review of its fatigue risk management system to identify and implement improvements. Greater Anglia should continue to refer to the Office of Rail Regulation's guidance, dated January 2012 on 'Managing rail staff fatigue' as part of the review (paragraph 125c).	**Implemented**
	5 The purpose of this recommendation is for Network Rail to ensure that the risk associated with permissive moves at Norwich station is acceptably low.	**In Progress**

	Network Rail should assess the risk associated with permissive working at Norwich station. Greater Anglia should support Network Rail by providing an understanding of the current constraints and processes for short-term alterations to platform allocations. Network Rail should take these into account when assessing the risk and determining any necessary risk control measures. Network Rail and Greater Anglia should implement any required risk control measures and brief their staff accordingly (paragraph 125a).	
Llandovery level crossing	1 The intent of this recommendation is to reduce the risk created by having no formal method of work where traincrew have duties to perform, such as token exchange, level crossing operation and train dispatch at unstaffed stations. Arriva Trains Wales should identify all locations where traincrew carry out operational activities such as token exchange and level crossing operation in addition to train dispatch, and develop risk assessed methods of work for each location. The methods of work should be briefed, and trained to all traincrew, incorporated in the performance monitoring systems and be subject to periodic review (paragraphs 106a, 106b and 108a).	**Implemented**
	2 The intent of this recommendation is to improve the arrangements at stations in respect of the positioning of equipment and signage used by traincrew. Arriva Trains Wales should lead a review of the positioning of platform equipment and signage used by traincrew at unmanned stations and, where practicable, arrange with Network Rail for improvements to be made. This should include (paragraphs 106a and 106b): a. identification of the optimum stopping position for trains to enable the best achievable view of signals, stop boards and indicators; and b. an assessment of the positioning of control equipment operated by traincrew (such as level crossing controls).	**Implemented**
	3 The intent of this recommendation is for infrastructure upgrade and improvement projects to include explicit consideration of all reasonable opportunities to improve safety at those locations where work is taking place. Network Rail should make improvements to its processes for the design of new and altered signalling, to require the active consideration of reasonable opportunities to make improvements (for example, the types of measures indicated in NB 130 (paragraph 75)) to the control of risk beyond the immediate scope of the proposed works, including identifying where operator errors, individual or collective, could lead to unsafe conditions (paragraph 106c).	**Implementation on-going**

	4 The intent of this recommendation is for ATW to review and improve its operational risk management arrangements. Arriva Trains Wales should conduct a review of its operational risk management arrangements in the light of the findings from this investigation, and make improvements in accordance with the findings of the review (paragraphs 106a, 106b, 108a and 108b). The scope of the review should include: a. the process for assessing risk associated with station duties on all lines over which its traincrews operate (eg the application of route risk assessments); b. a prioritised plan for the assessment of dispatch risk at unmanned platforms; c. a prioritised plan to formulate, brief and train dispatch plans to traincrew; d. the effectiveness of its methods for checking compliance with its policies and procedures (eg the application of remote booking-on spot checks, out-of-hours checks, and remote monitoring of the use of safety-critical equipment (including the use of OTDR data)); e. the guidance issued by ORR and RSSB about fatigue management, in particular sleep risk assessments when booking-on duty, and a culture of trust and openness in fatigue management; and f. the need for a revision of its training practices and materials for drivers, conductors and controllers to explain the rationale that underpins the rules and to emphasise the benefits of compliance (as well as describing the rules and the consequences of non-compliance).	**Implemented**
	5 The intent of this recommendation is to reduce the risk of error at traincrew operated level crossings by providing positive indications of the status of those crossings. Network Rail should review the current arrangements for providing an indication to the train driver of the status of the crossing at Llandovery. This should include consideration of the practicability of providing an active indication when the crossing is still open to road traffic (eg a flashing red light). This review should then be extended to other traincrew operated level crossings of a similar design (paragraphs 106a, 106b and 107).	**Implementation on-going**
	6 The intent of this recommendation is to control the risk created by traincrew continuing to operate trains in service where there is evidence that their actions contributed to a serious operational incident. Arriva Trains Wales should review and improve the training and guidance given to its duty control managers on the steps to be taken when traincrew are involved in a serious operating incident where their actions directly contributed to it (paragraph 109).	**Implemented**
Butterswood	1 The intent of this recommendation is to provide a positive indication to train drivers when automatic locally monitored level crossings have failed to operate for the approaching train.	**In Progress**

level crossing	Network Rail, in consultation with RSSB, should conduct a human factors and technical review of the indications displayed at driver's crossing indicators provided on the approach to automatic locally monitored level crossings, and evaluate alternative means (eg audible and visual) of indicating to train drivers that the level crossing has not operated as intended. A time-bound plan for improvements arising from the review should be developed using a risk-based approach (paragraph 101a).	
	2 The intent of this recommendation is to improve the reliability of all power supplies (including battery back-up arrangements) at automatic locally monitored level crossings. Network Rail should review the arrangements in place at all types of automatic locally monitored level crossings, and make improvements to the reliability of those crossings. The review, and associated improvements, should include (but not be limited to): a. locations where parallel protective systems exist (such as multiple earthing systems combined with RCD protection) where their presence can lead to unnecessary loss of the main network power supply to the level crossing; b. the plans in place to ensure that UPS systems maintain adequate performance throughout their life (including plans to replace UPS battery systems during the life of the UPS system); and c. understanding the age of UPS systems in use, and the manufacturer's life expectancy of those assets (paragraphs 101b and 102b).	**In Progress**
	3 The intent of this recommendation is for Network Rail to be able to identify level crossings that have suffered a power supply failure so that prompt action can be taken to manage the consequences of the failure including consideration of the benefits of recent technological developments that allow remote condition monitoring at reasonable cost. Network Rail should evaluate the practicality of remote condition monitoring of the power supply system, and key sub-systems whose failure can have the same effect as loss of power supply, at all locally monitored level crossings, so that prompt action can be taken to manage the failure (such as telling train drivers that the crossing has failed and arranging for technical staff to attend the level crossing to investigate the failure) (paragraph 101c).	**In Progress**
	4 The intent of this recommendation is for First TransPennine Express to identify and implement changes where necessary to its briefing methods in order to reduce the risk of drivers making errors at key locations such as locally monitored crossings. First TransPennine Express should review and enhance its briefing techniques and guidance material for train drivers (paragraph 102c): a. to explain the role of the driver at locally monitored crossings; b. to ensure that it properly reflects the operation of key infrastructure assets such as level crossings (including revisions to its description of the arrangements at automatic locally monitored level crossings, beyond	**Implemented**

	the level of detail described in the railway rule book); c. to allow its train drivers to practise dealing with unannounced level crossing failures, including, for example, the use of its train driving simulator or video-based hazard perception exercises; d. by using focused, risk-based, presentation material for briefing operational staff (paragraph 103b); and e. by stating clearly the action drivers should take when passing the special speed restriction board of any locally monitored automatic level crossing, when a flashing red light is visible at the drivers crossing indicator (paragraph 103b).	
Locomotive failure near Winchfield	1 The intent of this recommendation is that the design of the Bulleid small end should be reviewed to establish the benefit or otherwise of using a castellated nut. West Coast Railways, in consultation with the Main Line Steam Locomotive Operators Association, the Bulleid Pacific Locomotive Association and the Heritage Railway Association, should review the design of the small end joint on the Bulleid pacific locomotive to establish the safety benefits, and risk, of using a castellated nut. The results of this review should be shared with other owners of these locomotives (paragraph 119a).	**Implemented**
	2 The intent of this recommendation is that the details of the design of cotters fitted to steam locomotives should be reviewed, to reduce the risk of failure arising from fatigue. The Heritage Railway Association and the Main Line Steam Locomotive Operators Association should prepare guidance for their members on the design and manufacture of split cotters to encourage the use of best engineering practice. This may include considering: - reference to the British Railways drawing SL-DN-K.569; or - other methods of fabrication such as the use of folded strip, welded at the head, which is widely used in the industry. (paragraph 119c)	**Implemented**
	3 The intent of this recommendation is that the maintenance arrangements for steam locomotives operated by West Coast Railway Company should be consistent and in accordance with the provisions of its safety management system. West Coast Railway Company should review and improve its safety management system to take account of the need for assurance that the standards of maintenance work carried out on locomotives owned and/or operated by the company are adequate, consistent and subject to monitoring and supervision independent of those doing the work (paragraph 121a).	**Implementation on-going**

	4 The intent of this recommendation is that restorers of steam locomotives should be made aware of the need to thoroughly evaluate and risk assess design changes proposed or made during the restoration process, or subsequently. The Heritage Railway Association and the Main Line Steam Locomotive Operators Association should bring this report to the attention of their members and invite them to consider thoroughly evaluating and risk assessing changes to the design of steam locomotives that are made during restoration, overhaul or maintenance. The following should be considered: - whether the purpose and function of the original design, and the reasons for making the change are fully understood; - whether any additional risk will be introduced by the change; and - any measures that may be needed (during overhaul, operation or maintenance) to reduce the risk associated with the change, and to assess its impact. (paragraph 119b)	**Implemented**
Glasgow Queen Street	1 The intention of this recommendation is to ensure that Rexquote adopts a formalised approach to managing the quality of equipment that it manufactures or converts. Rexquote should implement a quality assurance process commensurate with good practice in engineering safety management. Development of the process should include, but not be limited to, consideration of the following measures: - undertaking peer review or checking of design assumptions and design calculations; - ensuring that the intended design performance of equipment is used as the basis for assessing the results of design validation testing; - ensuring that maintenance procedures and the associated tests are consistent with the intended design performance of equipment; - ensuring that the design of safety related systems, such as brakes, and of any associated maintenance processes, takes account of foreseeable degradation mechanisms, such as brake pad wear, the need for adjustments and environmental conditions; and - formal certification by an external body. (paragraphs 154e, 154f, 155 and 156a)	**Implemented**
	2 The intention of this recommendation is to extend an existing RAIB recommendation relating to adequate quality assurance processes so that it covers all suppliers of rail plant used on Network Rail infrastructure, not only those who supply directly to Network Rail. Network Rail should extend its process for auditing the engineering management system of rail plant suppliers (linked to Bradford Interchange Recommendation 4; paragraph 160) so that it includes auditing the engineering safety management processes of all organisations manufacturing and/or converting rail plant likely to be used on Network Rail infrastructure (paragraphs 155 and 156a).	**Implemented**

	3 The intention of this recommendation is to prevent RRVs running away with no lighting illuminated. Network Rail, in conjunction with RSSB, should review the requirements for RRV lighting in standard RIS-1530-PLT, with the objective of reducing the risk of RRVs running away without active lights. This should include consideration of: - requiring rail mode lighting to be activated when rail wheels start to be deployed (when on-tracking is taking place); and - requiring all illuminated lights to remain lit on activation of engine stop or emergency stop controls. (paragraph 157a)	**Implemented**
	4 The intention of this recommendation is to reduce the likelihood of RRV parking brakes being inadequate by improving the quality of RRV parking brake tests. Network Rail, in conjunction with the M&EE Networking Group, should review and improve the requirements and guidance for testing of RRV parking brakes so that such tests reliably demonstrate that the brake will be effective in all foreseeable operating conditions. The review should include, but not be limited to, consideration of: - demonstrating sufficient safety margins (including any related to uncertainties in the testing method); - allowing for foreseeable degradation, such as brake pad wear; - allowing for varying environmental conditions, including variations in contamination at the brake/wheel interface; - ensuring that test methods used are repeatable and consistent; and - testing to be carried out by RRV suppliers, users and maintainers. (paragraph 154g)	**In Progress**
Aspatria road vehicle collision	1 The intent of the recommendation is to reduce road vehicle incursion risk by ensuring that the risk of vehicles from side roads, including running downhill onto the railway, is properly taken into account when sites are risk ranked. The Department for Transport, in liaison with highway authorities and railway infrastructure managers, should review and amend the current guidance 'Managing the accidental obstruction of the railway by road vehicles' published in 2003 so that it adequately takes into account in the risk ranking process for neighbouring sites the risk of road vehicles on side roads, including those that are unattended, running downhill onto a railway. The guidance, when amended, should clearly describe how this risk should be derived and included in the overall risk ranking score (paragraph 62).	**Other PB or A**
	2 The intent of the recommendation is to provide additional mitigation against road vehicle incursions from side roads, including where vehicles may run downhill onto the railway. Following the completion of Recommendation 1 above, railway infrastructure managers, with highway authorities, should use the new	**Open**

	guidance to implement a time-bound plan to review the risk ranking scores for sites where there is a significant risk from side roads, in particular with respect to road vehicles running downhill onto a railway. Additional risk mitigation measures justified by increased risk ranking scores should be considered and implemented (paragraph 62).	
Southend Station & Whyteleaf Station	1 The intention of this recommendation is to reduce the risk of pushchairs and wheelchairs rolling off platforms. Network Rail and Station Facility Operators should implement processes for managing the risk of wheelchairs and pushchairs rolling onto the track. These should include: - the inclusion of platform slopes as a factor to be considered when assessing the risk to passengers on platforms; - guidance to risk assessors on factors likely to exacerbate any risk of roll away (such as the presence of ticket machines, help points and shops/kiosks where people are more likely to release their hold on pushchairs and wheelchairs); - consideration of measures to manage the risk (taking account of the work arising from the implementation of recommendation 3 in the short-term and recommendation 2 in the longer term); - specific consideration of the impact on platform slopes of any works that are to take place at the station and methods of ensuring that those works will, as a minimum, not worsen the slope (and reduce or eliminate it if reasonably practicable to do so); and - the sharing of information concerning any residual risk at the conclusion of works (paragraphs 73a and 75c).	**Open**
	2 The intention of this recommendation is for the rail industry to understand the point at which a slope becomes sufficiently steep for it to be more likely than not that an occupied wheelchair or pushchair without a brake applied would roll away. The work should consider the most appropriate methods of influencing the behaviour of passengers to minimise the risk. Network Rail in consultation with the Association of Train Operating Companies, RSSB and the Department for Transport, should (as part of the national strategy for managing the platform train interface risk) arrange for work to be undertaken to determine when a slope towards the railway could become a significant hazard, and ways of mitigating the risk. The scope of the exercise should consider: - all slopes on platforms including those that have been installed intentionally (for example to accommodate changes in level along the platform length); - at what point a slope towards the railway makes it more likely than not that a wheelchair or pushchair without brakes applied could roll away, taking account of modern designs of such equipment; and - other factors such as how individuals perceive a slope hazard, the most appropriate way to highlight the hazard, appropriate methods to influence public behaviour, and other ways of mitigating the risk. Once the work is complete the industry should publish appropriate guidance, including consideration of standardisation in the contents of	**Open**

	signage, announcements, etc (paragraphs 73b and 73c).	
	3 The intention of this recommendation is for the Association of Train Operating Companies to consider the most appropriate ways of influencing the behaviour of passengers travelling with a wheelchair or pushchair, pending the outcome from recommendation 2. As an interim measure, pending the outcome of the research identified in recommendation 2, the Association of Train Operating Companies should, in consultation with passenger groups including those representing the interest of disabled passengers, review the findings of this report and seek to understand the ways in which the risk of wheelchairs and pushchairs rolling onto the track can be more effectively managed by operators. This review should include consideration of: - locations where passengers may need to remove both their hands from a pushchair or wheelchair because of the nature of another task to be performed (eg at a ticket machine or shop/kiosk); - reference to any existing good practice in this area; and -measures that could most effectively influence the behaviour of passengers using wheelchairs and pushchairs on station platforms. The output of the review should be consolidated into suitable guidance for train operators (paragraphs 73b, 73c and 75c).	**Open**
	4 The intention of this recommendation is for the rail industry to capture, share and use information relating to roll-off events with a particular emphasis on identifying where platform slopes were a causal factor so that it has a better understanding of the causes of roll-off events and the associated risk. Network Rail, in consultation with Station Facility Operators and RSSB, should implement a process to improve the investigation and recording of roll-off incidents and the way in which data is shared. Particular attention should be paid to the following areas: - improvements in capturing and recording incidents involving roll-off type events, including the identification of the key factors that caused the roll-off such as the presence of a slope towards the railway on the platform; - a review of previous roll-off incidents and accidents (covering at least the last five years) to identify those that may have been solely attributed to 'user error' or 'trespass', including establishing whether there may have been other causal factors such as a slope at the location concerned; and - a review of how intelligence on roll-off incidents should be shared within and between SFOs and Network Rail as an input to decisions on the nature and content of improvement works at stations (recommendation 1 also refers) (paragraphs 73b and 74).	**Open**
Barratt's Lane No.2 footpath	No recommendations in report.	**N/A**

crossing		
Newcastle Central Station	1 The intent of this recommendation is to reduce the risk to passengers due to trapping and dragging incidents by taking into account the learning from this accident. Operators of Siemens UK Desiro trains fitted with electrically operated sensitive edges should re-assess the risk of injuries and fatalities due to a trapping and dragging incident in light of failures identified in this report and take appropriate action to reduce the risk. This should take account of historical data, the incidents highlighted in this report and precursor events to trapping and dragging. This risk assessment should take into account observed passenger behaviour (eg by monitoring passenger attempts to reopen closing doors) and estimated human error rates within the dispatch process (paragraph 143b).	**Open**
	2 The intent of this recommendation is to reduce the risk to passengers due to trapping and dragging incidents by modification of future door designs. Siemens should redesign the doors, as used on the Class 185 and other similar units, for future vehicles supplied to the UK, to reduce the probability of a passenger being trapped in them but not detected by the door control system. This could be achieved by redesigning the sensitive edges or by other means (paragraph 143b).	**Open**
	3 The intent of this recommendation is to reduce the risk to passengers due to hazards from trains supplied by Siemens which are either discovered at the design stage, or that subsequently emerge during service. Siemens should review and, where appropriate, improve their design processes to ensure that they fully identify record and assess hazards associated with the design of their trains. The train operator, or those with operational experience, should be involved in the hazard identification and review process to ensure that this is considered in any design decisions. Any hazards identified following the design phase should be fully assessed, including consideration of the potential for redesign to manage the residual risk. Where this is not practicable, the operator of the train and/or the maintainer should be made aware of the hazard and the residual risk so that suitable mitigation measures and monitoring arrangements can be put in place. Siemens should also seek to ensure that it is kept aware of problems that emerge during service so that the need for subsequent design modifications can be assessed as necessary (paragraph 99).	**Open**

	4 The intent of this recommendation is to reduce the risk to passengers due to hazards from trains operated by First TransPennine Express by implementing a process for the logging of hazards and the management of risk associated with each. It is also intended that the recording of hazards should be sufficiently visible to its staff so that awareness of them is maintained, possible precursors established (eg near-misses) and monitored and regularly re-assessed. First TransPennine Express should continue to review and, where appropriate, improve its safety management processes to ensure that it has a system for the identification and recording of hazards, assessment of the risk associated with each, and management of the implementation of any necessary control measures. By means of these processes, FPTE should: a) manage risk associated with the original design features of the trains it operates, and those that emerge during operations, inspections and maintenance, or when changes are made to equipment and operational practice (paragraph 110); b) develop a time bound programme for the implementation of control measures that have been identified; and c) track the implementation of any control measures, including those identified during its station risk assessments (paragraph 150). This recommendation may be applicable to other train operating companies.	**Open**
	5 The intent of this recommendation is to reduce the risk to passengers due to trapping and dragging incidents by ensuring that door obstruction detection systems on new trains, both in the UK and Europe, cannot be readily overcome. RSSB should recommend to the British Standards Institution (BSI) that in the forthcoming BS EN version of the European standard (EN 14752 Railway applications - Bodyside Entrance Systems for rolling stock) the UK National Foreword informs readers of the possibility of entrapment even on correctly adjusted doors that comply with the specified obstruction tests (paragraph 161). Additionally, RSSB should recommend to the BSI that in the formal vote on this emerging European standard, it includes a request to review the obstruction test requirementsto reduce the probability of trapping and dragging and to make reference to either this investigation report, or the urgent safety advice issued by the RAIB to the European Rail Agency (ERA) on 24 October 2013, reference 665/02 on ERA's Safety Information System (paragraph 154).	**Open**
	6 The intent of this recommendation is for RSSB to consider what additional data needs to be captured within its Safety Management Information System (SMIS) to allow a more complete evaluation of the risk of trapping and dragging events on the national network. RSSB should identify any additional data that should be captured within SMIS from incidents of persons trapped by train doors, who are outside the train which subsequently moves, whether this results in injury or not.	**Open**

	This data should be collected and used by railway undertakings to monitor such events and inform decisions to reduce this risk (paragraph 130).	
Gloucester derailment	1 The intent of the recommendation is to reduce the possibility of new track defects developing due to the installed drainage not preventing water ingress from the local water table, which could give rise to a risk of derailment. Network Rail should review the effectiveness of the drainage in the area where the train derailed (between 118 miles 60 chains and 118 miles 40 chains on the up main line between Lydney and Gloucester) to confirm if the work that was undertaken to improve the drainage, when the track was renewed in March 2014, will control the risk of water from the local water table affecting the track's vertical geometry and the recurrence of a cyclic top track defect (paragraphs 194a.i and 195a).	**Open**
	2 The intent of the recommendation is to reduce the risk of derailment from cyclic top track defects. Network Rail should revise its processes for the management of cyclic top track defects. It should: a) review the requirement that immediate action cyclic top track defects must be repaired within 36 hours to understand if it is feasible for an effective repair to be made in this timescale, and if not, mandate the actions that must be taken to mitigate the risk due to the cyclic top track defect until an effective repair can be planned and made (paragraph 194a.iv); b) provide guidance, which is briefed out to its track maintenance staff, on how to make effective repairs to cyclic top track defects. This guidance should tell track maintenance staff not to carry out manual repair work that is only aimed at breaking the cyclic top track defect into sections of track with poor vertical track geometry, unless the risk presented by the residual poor vertical track geometry is assessed and mitigating actions taken (such as the imposition of a speed restriction) (paragraph 194a.iv); c) review the adequacy of its processes for imposing and removing emergency speed restrictions applied for cyclic top track defects. This is to assure itself that there are adequate controls in place for the removal of cyclic top related speed restrictions. Such controls could include an assessment of the track's vertical geometry, carried out after trains have run over the repaired track, but before line speed is restored (paragraphs 194a.iv and 195b); and d) have a process in place that raises the visibility of repetitive cyclic top track defects, so that senior management responsible for the local maintenance team are made aware of it and can monitor the actions being taken to address the cyclic top (paragraphs 195b and 207).	**Open**
	3 The intent of the recommendation is to enable maintenance staff to know if their repair work has been sufficiently effective to correct the reported track geometry defect.	**Open**

	Network Rail should provide its maintenance staff with a method of measuring repairs to vertical track geometry which provides early confirmation that the repairs undertaken have been effective (paragraph 194a.iii).	
	4 The intent of the recommendation is to provide maintenance staff with a way of making effective repairs to vertical track geometry faults on steel sleeper track. Network Rail should investigate methods of making more effective repairs to vertical track geometry faults on steel sleeper track, especially if the underlying formation is poor or the ballast is contaminated. Any methods that are identified by this work should then be incorporated into procedures and Track Work Information Sheets, and briefed out to its track maintenance staff (paragraph 194a.ii)	**Open**
	5 The intent of the recommendation is to ensure that when a vehicle's dynamic behaviour is assessed to identify whether its ride performance is compatible with the railway infrastructure in Great Britain (this may include infrastructure that does not comply with Technical Specifications for Interoperability), the susceptibility of its ride performance to track geometry with cyclic top is included in this assessment. RSSB, in conjunction with Rolling Stock Standards Committee, should carry out a review to identify how a vehicle's response to regular changes in vertical track geometry should be assessed (ie a cyclic top assessment). RSSB should then propose changes to the standards which are used assess the compatibility of vehicle's ride performance with the railway infrastructure in Great Britain (at present this is Railway Group Standard GM/RT2141), which will implement the cyclic top assessment identified by the review. The proposed changes to the standards, as agreed by Rolling Stock Standards Committee, should then be implemented by RSSB by means of a time bound programme (paragraphs 194b.i, 194b.ii and 195c).	**Open**
	6 The intent of the recommendation is to remove or reduce the susceptibility of the IDA wagon's ride performance to dips in the track when in its tare or a partially laden condition. Direct Rail Services should implement measures to reduce the susceptibility of the IDA wagon's ride performance to changes in vertical track geometry when in tare or a partially laden condition. This could be by means of either the introduction of operating restrictions or modifications to the wagon's suspension (paragraph 194b).	**Open**
	7 The intent of the recommendation is to highlight the risk that a wagon may be susceptible to riding problems if it is designed with a bogie centre spacing distance that is the same as a wavelength commonly associated with cyclic top track defects. RSSB, in conjunction with Rolling Stock Standards Committee, should propose that guidance on the design of freight wagons in document	**Open**

	GM/GN2688 is amended, to explain that as well as two-axle wagons, if a wagon is designed with a bogie centre spacing that matches a wavelength commonly associated with cyclic top, it may be susceptible to poor ride on jointed track and cyclic top (paragraph 196c).	
Primrose Hill/Camden Road Junction	1 The intent of this recommendation is to reduce the probability of track geometry defects remaining undetected in the event that operation of a track geometry measurement train does not take place as scheduled. Network Rail should provide specific guidance to managers with responsibility for track maintenance on the action to be taken to confirm that track quality remains acceptable should a planned run of a track geometry measurement train over a section of line be cancelled (paragraph 128a). This should include the criteria for whether it is necessary to conduct additional track geometry measurements, as well as the timescales for any such measurements to be completed.	**Open**
	2 The intent of this recommendation is for the key stakeholders in the railway industry to work together to assess the risk from asymmetric loading and to identify and adopt reasonably practicable control measures to mitigate that risk. Freightliner and Network Rail should jointly request that RSSB: a) researches the factors that may increase the probability of derailment when container wagons are asymmetrically loaded, and in particular: i. sensitivity to combinations of longitudinal and lateral offsets in loads that can reasonably be encountered in service; ii. the predicted performance of wagons with high torsional stiffness along their length (using the FEA type as an example); and iii. the effect of multiple twist faults, track twist over distances other than 3 metres (as commonly specified and measured by Network Rail) and lateral track irregularities. b) updates and amends as necessary the risk assessment contained within the RSSB and Transport Research Laboratory joint report ('Potential risks to road and rail transport associated with asymmetric loading of containers'); this should take into account the results from the research referred to in a) and additional evidence presented in this investigation report; and c) works with industry stakeholders to use the outputs of a) and b) to identify, evaluate and promote adoption of any additional reasonably practicable mitigations46 capable of reducing the risk from asymmetric loading of wagons (paragraphs 128c, 130a, 130b and 131b).	**Open**
	3 The intent of this recommendation is to clarify the requirements for the design and acceptance of freight wagons, taking account of the possibility of asymmetric loading. RSSB should amend Railway Group Standard 'Resistance of Railway Vehicles to Derailment and Roll-Over', GM/RT2141 to refer specifically to asymmetric loading, including possible combinations of longitudinal and lateral load imbalance (paragraph 131a).	**Open**

Denmark Hill Station	1 Network Rail should carry out a review of the means by which defects identified by the structures examination process are evaluated by asset managers, and repairs actioned. Network Rail should then make the improvements necessary. As a minimum, this review should consider: a. ways of improving the integration of asset management and works delivery management systems (by means of technology and/or improved management arrangements) [underlying factors 3 and 7]; b. the ways in which contractors are remitted to carry out work, particularly for works reliant on the application of judgement, and the degree of supervision that is required [underlying factor 4]; c. the robustness of processes for confirming that works with an impact on safety have been completed in the manner intended by asset managers [underlying factors 5 and 7]; and d. the process for assessing the implications of repeat, or similar, defects at the same location [underlying factor 6].	**Implementation on-going**
East Coast Main Line - Rail Breaks	1 This recommendation is intended to reduce the risk of rail breaks by taking advantage of technological developments in the UK and elsewhere, not restricted to ultrasonic techniques, to allow detection of smaller cracks in rails. Network Rail should undertake or commission research to identify any opportunities for reducing the size of cracks and defects which can be identified in rails in circumstances likely to be associated with rail breaks. The research should be targeted at providing reliable information using equipment capable of operating routinely throughout its infrastructure (paragraph 121d).	**Open**
	2 This recommendation is intended to ensure that all parts of Network Rail obtain the maximum benefit from knowledge gained by work intended to reduce the risk of rail breaks on the East Coast Main Line and is a formalisation of a process which Network Rail states is already in progress. Network Rail should review the actions already being taken to reduce the incidence of rail breaks on the East Coast Main Line (including those described in paragraphs 128 and 129) in order to identify whether similar actions would provide significant safety benefits elsewhere on its infrastructure. If such benefits are identified, Network Rail should modify its processes so that they are applied more widely (paragraph 123).	**Open**
	3 This recommendation is intended to reduce the risk of rail breaks due to the deterioration of rail pads. Network Rail should establish a process throughout its infrastructure for inspecting parts of rail pads beneath rails (on a sample basis) and, if necessary, replacing rail pads outside rail replacement projects in areas where this is justified by benefits, including benefits from reducing rail break risk (paragraph 121b).	**Open**

	4 This recommendation is intended to reduce the risk of rail breaks by improving the ability of existing Ultrasonic Testing Unit (UTU) equipment to detect initiator cracks and other defects in the lower part of the rail. Network Rail should complete the current test programme to establish the practicability of extending current UTU testing and analysis to identify defects throughout the full depth of a rail and/or defects on the underside of a rail. If the test programme shows that this offers a reasonably practicable means of improving the detection of initiator cracks and other defects associated with potential rail breaks, Network Rail should introduce equipment and processes to implement this improved testing and analysis (paragraph 121d).	**Open**
	5 This recommendation is intended to reduce the risk that railway maintenance staff fail to appreciate that an important change has been made to Network Rail standards. Network Rail should modify existing document preparation processes to ensure that markings intended to show changes to standards and other safety critical documents clearly indicate the change that has occurred (paragraph 124c).	**Open**
Bridgeway UWC	1 The intent of this recommendation is to minimise the potential for the SSOWP paperwork to mislead its users into blocking the wrong line when opting to take only one of two parallel line blockages. Network Rail should, as part of its planning and delivering safe work project, take account of the arrangements and associated wording for parallel line blockages in the new permit packs to ensure that: a. presentation of the SSOWP documentation is simple and clear with regard to parallel line blockages, particularly in terms of allowing users to identify which line the work is to take place on; and b. designations of 'working' and 'parallel' blockages are verified during production of the SSOWP as referring respectively to the line on which the work is to take place and the adjacent line(s) (paragraph 95b).	**Open**
	2 The intent of this recommendation is to reduce the risk associated with late notice planning of work and planning to deadlines, which can affect decision-making on site due to the availability of information and perceived pressures of work. Network Rail should review work planning practices and processes at Shrewsbury Maintenance Delivery Unit and optimise the distribution of information for both planners and track workers to carry out their jobs effectively (paragraph 96). This review should consider: a. workload and resourcing to enable more strategic and proactive approaches to work planning; b. information available to the planner and the COSS in producing and checking SSOWP documentation, including details of the work to be undertaken; and c. local practices and assumptions about planning parallel line blockages with respect to national procedures and processes, particularly	**Open**

	concerning the designation of 'working' lines and the inferred level of protection on the part of the planner and the COSS. Network Rail should also determine whether such issues are applicable at other maintenance delivery units and take action as necessary to address any problems identified.	
	3 The intent of this recommendation is to strengthen Network Rail's competence management processes for staff in particular circumstances where potential shortfalls in their competence or knowledge might otherwise go unchecked. Network Rail should, as part of its review of Assessment in The Line: a. clarify the management arrangements for seconded staff so that it is clear which part of the organisation is responsible for each element of an individual's competence and knowledge; and b. revise its criteria for refresher training following periods of extended absence, particularly where significant changes to work patterns, practices or infrastructure arrangements have occurred during the absence (paragraph 97a).	**Open**
Chester Station collision	1 The intent of this recommendation is to reduce the risk associated with low adhesion by extending the fitment of automatic sanders. Operators of class 220 and 221 units should fit sanders to their trains which comply with Group Standard GM/RT2461 and automatically deposit sand on the rail when wheelslide is detected during heavy braking (equivalent to brake step 2 on step braked trains).The mode of operation of this new equipment should take account of recommendation 1 of RAIB report 25 (Part 3)/2006 (paragraph 114).	**Open**
	2 The intent of this recommendation is to reduce the risk associated with trains approaching buffer stops in low adhesion conditions by an extension of existing defensive driving policy. Virgin Trains should amend its defensive driving policy so that the requirement to reduce speed to 10 mph or less at a distance of 200 metres from the signal when approaching a danger signal in low adhesion conditions is also applied when approaching a buffer stop with a train that is not fitted with automatic sanders (paragraph 129). This recommendation may also to apply to other train operators.	**Open**
	3 The intent of this recommendation is that manufacturers of new trains for the UK railway system are made aware of the need for sanders to operate during braking in step 2 (or the equivalent brake handle position for units not fitted with stepped brakes) and above. RSSB should propose and promote an amendment to Railway Group Standard GM/RT2461 to extend the requirement that sanders operate automatically when wheel slip is detected in full service and emergency braking, to braking at lower settings (eg step 2 on units with stepped	**Open**

	brake controllers) (paragraph 152).	
Liverpool Street Sation derailment	1 This recommendation is intended to reduce the risk of derailment arising from the performance of non-standard track assets by establishing an appropriate and independently checked inspection regime. Network Rail should improve its management systems so that both the identification of all non-standard track assets, and the associated inspection regimes intended to manage any enhanced risk of derailment, are recorded and independently checked. The scope of these inspection regimes should include mechanisms for identifying indications of possible gauge widening and, where necessary, assessing dynamic track gauge (paragraphs 159d to 159f).	**Open**
	2 This recommendation is intended to introduce an assessment of staff in track related safety critical roles where the role is reliant on judgements made by that member of staff, to ensure they have the necessary experience and knowledge to perform that role. Network Rail should introduce a timebound programme for assessing (and reassessing at intervals) the competence of its managers with safety critical roles linked to track maintenance (eg section managers [track] and track maintenance engineers), and addressing any shortfalls arising (paragraph 160).	**Open**
	3 This recommendation is intended to establish whether it is appropriate to extend the aims of recommendation 2 beyond the track discipline. Network Rail should introduce a timebound programme for the review of the processes used for assessing (and reassessing at intervals) the competence of managers with safety critical roles linked to the maintenance of assets other than track, and addressing any shortfalls arising (paragraph 160).	**Open**
Jetty Avenue UWC	1 The intent of this recommendation is to reduce the short-term risk associated with inadequate sighting of approaching trains at user worked crossings by checking that sufficient allowance is made for the position of the driver in the types of vehicle likely to use the crossing. This recommendation should be implemented pending the completion of research referred to at Recommendation 2. Network Rail should implement a time-bound plan for the re-assessment of the sighting of approaching trains at all user worked crossings where safe use depends on vehicle drivers sighting approaching trains. The time-bound plan should also cover implementation of any mitigation needed to permit safe use of such crossings. The objective of the re-assessment process shall be to verify that drivers seated in the normal driving position of their vehicle have sufficient sighting of approaching trains when the front of their vehicle is stopped a safe distance clear of the line (paragraphs 103 and 105). In providing guidance to staff,	**Open**

	Network Rail should consider: - the range of vehicle stopping positions; - the types of vehicles likely to use each crossing (particularly the distances of the driver's eyes from the front of the vehicle); and - any effects due to crossing gates being open, including obstruction of sighting by signs on the gate, when vehicle drivers are looking for trains.	
	2 The intent of this recommendation is to identify measures which complement those achieved by Recommendation 1. It is intended to assist risk management until such time as all UWCs are equipped with technology capable of providing reliable advice to crossing users. Network Rail should commission research into measures to improve the safety of UWCs where vehicular users are reliant on sight to detect the approach of trains (paragraph 103). This should utilise and, as necessary, extend existing research findings to include consideration of: l the ways in which the behaviour of vehicle drivers can be influenced by the design of the crossing to use the crossing as intended including stopping and looking for trains at an appropriate location; - use by different types of vehicle, including heavy commercial and agricultural vehicles; - use of the crossing by persons other than those briefed by the authorised user (eg unexpected visitors or delivery vehicles); - instructions and/or guidance given to users, including signs and road markings where appropriate; and - instructions and guidance provided to those assessing, maintaining and modifying UWCs. This research should take into account the safety of pedestrians (including vehicle occupants when opening gates), cyclists and equestrians who may use UWCs. The findings of this research should be used by Network Rail to improve/ clarify existing standards related to the design (including gates, signage and road markings), management of user worked crossings, guidance provided to users and training/briefing to relevant staff. Network Rail should also identify the need for any modification to the legal requirements relating to level crossing signage requirements, and make suitable representations to government that this be done.	**Open**
	3 The intent of this recommendation is for Network Rail to provide those responsible for checking level crossing signage with information in a user-friendly format needed to establish the signage required at each level crossing. Network Rail should review, and if found necessary, modify its processes so that staff checking level crossing signage have a practical and easily used means of establishing the signage required at each crossing they are inspecting (paragraph 107).	**Open**
	4 The intent of this recommendation is for Network Rail to review and update its method of calculating crossing times.	**Open**

	Network Rail should, in consultation with ORR, review and if necessary, amend the criteria used to calculate crossing times with reference to vehicle speed, the time taken to reach a decision when to start crossing and vehicle length (paragraph 107).	
	5 The intent of this recommendation is for the Office of Rail Regulation to provide enhanced guidance relating to user worked crossings, including guidance about how the decision point is determined in order that the sighting of approaching trains is measured from an appropriate location. The Office of Rail Regulation should provide duty holders with enhanced guidance which: - reminds duty holders that, when determining the position of decision points at user worked crossings, they must take due account of the characteristics of vehicles likely to use the crossing and recognise that a minimum dimension of 3 metres from the nearest rail is insufficient for most vehicles; and - takes account of outputs from the research and review undertaken in response to Recommendations 2 and 4. (paragraph 106)	**Open**
Greenford SPAD	1 The intent of this recommendation is that Chiltern Railways should improve the way in which its drivers are trained and managed, to reduce the risk that they will not respond appropriately to unusual events. Chiltern Railways should conduct a review of its driver management processes to confirm that the training and briefing given to drivers is comprehensive as regards the equipment and systems that drivers use, and that assessment of drivers covers the identification of, and response to, TPWS fault warnings as well as drivers' response to other unusual or emergency situations, and make changes in accordance with the findings of the review. As part of its review, Chiltern Railways should consider whether there is a role for more regular use of its driving cab simulator in the assessment of its drivers' competence, to achieve a more systematic approach, and whether it has adequate systems in place for periodically reviewing and revising its competence management processes and training material (paragraphs 124c, 124d, 124e and 126). This recommendation may be applicable to other train operating companies.	**Open**

	2 The intent of this recommendation is that Network Rail should improve the robustness of the GSM-R radio system, in respect of signallers' ability to contact train drivers in an emergency. Network Rail should conduct a review of its implementation of GSM-R, particularly in respect of its configuration where signal boxes which have no GSM-R train describer feed adjoin signal boxes that automatically send train description data to GSM-R, and in areas of enhanced risk such as the entrances to single lines. The review should cover the visibility of trains on signallers' terminals as trains traverse signalling boundaries. Changes should be implemented where necessary so that signallers are able to directly contact all trains that are within, or leaving, their area of control, and are aware that although trains may no longer be shown on the terminal, it may still be possible to contact them by use of a railway emergency call.	**Open**
	3 The intent of this recommendation is that Network Rail should improve the training given to signallers on the use of GSM-R, so that they are able to use it effectively in an emergency situation. Network Rail should review and modify as necessary the training given to signallers in the use of GSM-R, so that signallers are given adequate opportunity to become familiar with the use of railway emergency calls, by practice, simulation or any other appropriate means (paragraph 129b).	**Open**

Use of the name, the Office of Rail and Road, reflects the new highways monitor functions conferred on ORR by the Infrastructure Act 2015. Until this name change is confirmed by legislation, the Office of Rail Regulation will continue to be used in all documents, decisions and matters having legal effects or consequences.

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