Strategy for regulation of health and safety risks - 4: level crossings

ORR's strategy for health and safety regulation of level crossings

ORR's strategy for regulating level crossing safety is informed by analysis of the current situation and our judgment of what we think needs to be achieved. In particular, we want to:

- ensure continued improvement in risk management by developing new guidance for all stakeholders who produce risk assessments. This will aid the design and management of level crossings**;**

- work with all sectors to promote the benefits of good risk assessment to underpin decision-making. Assessments should be drawn up by competent people who have a proper knowledge of the risks and of the application of controls associated with crossings, as well as a good understanding of the behaviour of users and their perception of risk;

- encourage research, innovation and new technologies to improve risk control at level crossings;

- target ORR interventions on the highest risk areas. For the mainline railway (responsible for the majority of crossings), this means passive footpath and user-worked crossings and automatic half-barrier crossings;

- drive the consistent application of Network Rail's level crossing strategy 2019-2029**,** so improvements are targeted in accordance with risk;

- improve the current Level Crossing Order process to streamline and simplify it where possible, to reduce bureaucracy and allow for developments in technology;

- ensure that the closure of level crossings is the first option considered in a risk-control strategy by the duty holder, in line with the principles of prevention. We recognise the need to balance the risk of alternative routes against the safety benefits to the railway of closing crossings, and that others are best placed to make these judgments;

- encourage alternatives to crossings to be fully explored and delivered where reasonably practicable. In principle, we do not support the creation of new level crossings where there is a reasonably practicable alternative;

- work with the Department for Transport, Network Rail and others to introduce updated legislation that improves signage at private user-worked crossings.

Index of issues discussed

Introduction

1.   Level crossing safety is a priority topic for us. It is the area where many members of the public interact with the railway and level crossing use gives rise to significant potential for injury and harm.

2.   Network Rail, operators of heritage and light railways and those who control rail depots, have an explicit legal duty under the Health and Safety at Work etc. Act 1974 (HSWA) to minimise risks arising on their networks, so far as is reasonably practicable.

3.   There are just under 5,800 level crossings in use on the mainline rail network in Great Britain with another estimated 1,500 on heritage and minor railways. There is also a very small number of crossings in rail depots. Britain's mainline railway is amongst the safest in Europe, and level crossing incidents in the UK were well below the European average in the five-year period from 2013-17. This could change with just one major incident, however, and every incident has the potential for significant human and economic loss. Level crossings remain one of the greatest risks to public and passenger safety on the rail network.

4.   Many level crossings connect communities, and people in those communities often want their crossings to remain open, even when a case for closure on railway safety grounds has been made.

5.   Trains are generally now more frequent, quieter and travel at higher speeds than before; the population has increased; there is more road traffic using crossings and bigger farm machinery with better soundproofing for their operators; people live at a faster pace of life and more pedestrians are using electronic equipment that can distract them. Therefore level crossings operate within a system that goes beyond the railway and they have an economic as well as safety impact. For example, barrier down time on public road crossings can have a significant influence on traffic flow.

ORR's role and approach to level crossings

6.   The law requires railway businesses to manage level crossing risk effectively using their own safety management systems. ORR's role is to provide assurance that they are doing so. Our primary interest is to promote and, where necessary, enforce the safe design, management and operation of level crossings to reduce the likelihood of people being harmed and to reduce the number of 'close calls'. We will ensure continued improvement in risk management by developing new guidance for all stakeholders who produce risk assessments; this will aid the design and management of level crossings.

7.   We will work with all sectors to promote the benefits of good risk assessment and the identification of reasonably practicable controls, to underpin decision making. Assessments should be drawn up by competent people who have a proper knowledge of the risks and of the application of controls associated with crossings, as well as a good understanding of the behaviour of users and their perception of risk. We encourage research, innovation and the use of new technologies to widen the options for risk control at level crossings.

8.   We support the closure of level crossings and this should be the first option considered in a risk-control strategy by the duty holder, in line with the principles of prevention set out in the Management of Health and Safety at Work Regulations 1999. The closure of level crossings requires attention to many factors – including the practicalities of replacing them with bridges or underpasses; the legal arrangements for closing rights of way; the need to minimise the possible transfer of risk to other crossings; and the possibility of importing new dangers, such as increasing the likelihood of trespass. We recognise the need to balance the risk of alternative routes against the safety benefits to the railway of closing crossings, and that others are best placed to make these judgments.

9.   ORR does not approve or grant permission for new or reinstated level crossings, but we will normally submit an opinion on a proposal for a new level crossing as part of the Transport and Works Act 1992 (TWA) or Transport and Works (Scotland) Act 2007 (TWAS) Order process. We follow an internal ORR process in these cases to ensure a consistent approach. Early engagement with proposers of new level crossings is therefore important, so that we can work with the proposer and encourage alternatives to crossings to be fully explored, and delivered where reasonably practicable. In principle, we do not support the creation of new level crossings where there is a reasonably practicable alternative because they introduce particular risks to the railway and those using the crossing. We are receiving an increasing number of proposed cases for new level crossings or for the reinstatement of crossings. In light of this, we will review our process to ensure our approach is proportionate and robust.

10.   ORR makes Level Crossing Orders (on behalf of the Secretary of State for Transport), and then inspects level crossings to ensure that the measures set out in the Order are in place and being complied with. ORR usually makes Orders for public vehicular road crossings.

11.   ORR is reviewing the Level Crossing Order process. We aim to streamline and simplify it, where possible, in order to reduce bureaucracy and allow for developments in technology. We also plan to review our guidance on level crossings to ensure it encourages a sound risk-based approach to managing level crossing risk.

12.   Through accident and incident investigations, it was identified that signage at private user-worked crossings could be improved so that it more effectively informs users how to cross safely. We are working with the Department for Transport, Network Rail and others to introduce updated legislation that improves signage at these crossings.

Safety risks

13.   Responsibility for controlling level crossing risk is primarily with the railway infrastructure manager (such as Network Rail) working with the train operating companies, local authorities, highways agencies and users of the crossing. Effective co-operation and collaboration between these parties is critical and each has a role to play, although the contribution of each party to risk control will vary.

14.   At level crossings, users are assisted to cross safely by the layout of the crossing and equipment such as gates, barriers, warning lights, alarms and signs. These arrangements must be kept under review, through a regular reassessment of risks by the crossing operator, and they may need to be changed if the risk profile at the crossing alters. For example, if there are changed traffic levels (either of road vehicles, pedestrians and/or trains), a different mix of users, a new school or housing development is built nearby, or if different user behaviours are observed - such as motorists 'zig-zagging' around barriers.

15.   Regular reassessment of risks should also revisit consideration of closing the crossing, or its replacement with an alternative method of crossing the railway. Options for installing new protection arrangements that reduce risk should also be considered, particularly given that technological developments are increasing the range and affordability of options available.

16.   In the following pages we consider the mainline railway in detail because it is where the vast majority of level crossings are found. We also describe our objectives for the Heritage sector – reflecting the significant but subtly different challenges to be found on these railways. These two sectors are the focus for ORR's targeted proactive activity; work with other parts of the industry will primarily be reactive.

Mainline railway

17.   The Railway Safety and Standards Board (RSSB) Safety Risk Model (SRM) v8.5 estimates that 6% of the total accidental mainline risk is from level crossings. The majority of this risk is borne by members of the public using the crossings, with most casualties being pedestrians and road vehicle occupants.

18.   There are several types of level crossing in use on the mainline network. The table below shows level crossing numbers by type:

			Crossing type	Number
Passive		UWC-T	User-worked crossing with telephone	1682
		UWC	User-worked crossing	439
		OC	Open crossing	43
		FP	Footpath crossing	2017
Active	Manual	MCG	Manually controlled gate	120
		MCB	Manually controlled barrier	177
		MCB-OD	Manually controlled barrier with obstacle detection	99
		MCB-CCTV	MCB monitored by closed-circuit television	428
	Automatic	AHB	Automatic half-barrier	423
		AFBCL	Automatic full barrier crossing locally monitored	3
		ABCL	Automatic half barrier crossing locally monitored	60
		AOCL+B	Automatic open crossing locally monitored with barrier	62
		AOCL/R	Automatic open crossing locally or remotely monitored	26
		UWC-MSL	User-worked crossing with miniature stop lights	116
		FP-MSL	Footpath crossing with miniature stop lights	73
Total				5768

Source: Network Rail (ALCRM), April 2019

19.   The level of protection afforded to users of the level crossing varies with the type of crossing. Those that provide a higher level of protection do not rely on the user to assess whether it is safe to cross, such as by looking out for an approaching train. Instead warning(s) of an approaching train and/ or barriers are provided. Other factors such as the number of crossing barriers and whether the crossing has railway signals protecting it are also important.

20.   The different types of level crossings can be classified in various ways, the previous table used 'Active, Automatic, Manual and Passive'. It can also be helpful to divide crossings into three principle types: railway-controlled, automatic and passive[1].

21.   Looking at data for the last 10 years (April 2009 to March 2019) there were 72 fatalities to level crossing users (excluding suicides); of these 53 were pedestrians and 19 were road vehicle users. The table below shows the types of crossing where they occurred.

Crossing type	Number of fatalities	Percentage
Footpath	29	40
AHB	15	21
UWC-T	11	15
MCB-CCTV	5	7
Footpath -MSL	5	7
AOCL	3	4
UWC-MSL	2	3
MCB	1	1
UWC	1	1

Source: RSSB, October 2019

22.   The data illustrates that the greatest proportion of fatalities occurred at passive footpath crossings, followed by automatic half-barrier (AHB) and user-worked crossings with a telephone. Footpath crossings account for 35% of the level crossing estate.

23.   The last level crossing incident resulting in train occupant fatalities (as of March 2019) occurred at Ufton Nervet in 2004, when a passenger train derailed after striking a car that had been deliberately parked on the crossing by its driver, as a suicidal act. The train driver and five passengers were killed, in addition to the car driver.

24.   Three accidents at level crossings during the past 10 years (April 2009–March 2019) have resulted in more than one fatality; all of these involved road vehicle occupants. The most recent multi-fatality accident occurred on 17 February 2018 at Barns Green AHB crossing in West Sussex, where a train struck a car killing the two occupants.

25.   Data for the last 10 years (April 2009-March 2019) shows there were 81 vehicular collisions. As the table below shows, AHB crossings were the greatest contributor but account for just 7% of Network Rail's level crossing estate. AHB crossings are very convenient for the user due to their short barrier down time. However, we provide guidance on situations where we consider their application is inappropriate and Network Rail are trialling the use of additional equipment to deter unsafe use (such as weaving the barriers) of these crossings.

---

[1] Source: Evans, A W and P Hughes (2019). Traverses, delays and fatalities at railway level crossings in Great Britain. Accident, Analysis and Prevention, **129**, 66-75.

Crossing type	Number of strikes	Percentage
AHB	30	37
UWC-T	18	22
AOCL	12	15
UWC	8	10
OC	5	6
UWC-MSL	5	6
MCB-CCTV	2	2
MCB	1	1

Source: RSSB, October 2019

26.   As the graphs below illustrate there has been a general rise in the number of collisions between road vehicles and trains at level crossings over the last four years. As mentioned above, active/automatic crossings are the greatest contributor followed by passive crossings. We are encouraging industry to explore new technologies to improve risk control at these crossings.

Collisions with road vehicles at level crossings
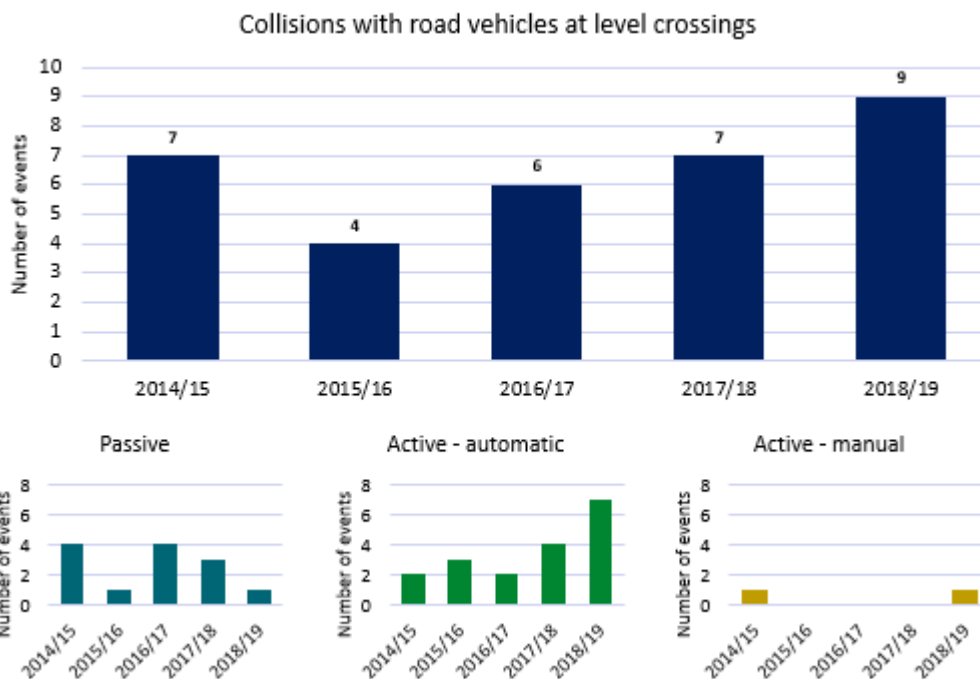
Source: RSSB, October 2019

27.   Each crossing type has a different risk profile. The RSSB SRM models this risk by considering factors such as: level crossing protection; road and rail traffic over the crossing; and train speed. The results show that:

(a)   the risk of collisions between trains and road vehicles is greatest at AHB crossings and variations of UWCs, user-worked crossings with telephone (UWC-T) and user-worked crossings with miniature stop lights (UWC-MSL);

(b)   the greatest proportion of the risk to pedestrians is at footpath crossings rather than from pedestrian use of any other type of crossing.

28. Recent analysis[2], normalising fatality data by comparing it with level crossing traverses, has shown the group with the highest estimated fatality rate is pedestrians at passive crossings. Their estimated fatality rate is about three orders of magnitude greater than that of the group with the lowest rate, which is occupants of road vehicles (ORVs) at railway controlled crossings. The results of the analysis are presented in the table below, which shows fatalities per billion traverses by user type and crossing type, with the fatality rates plotted on a logarithmic scale.
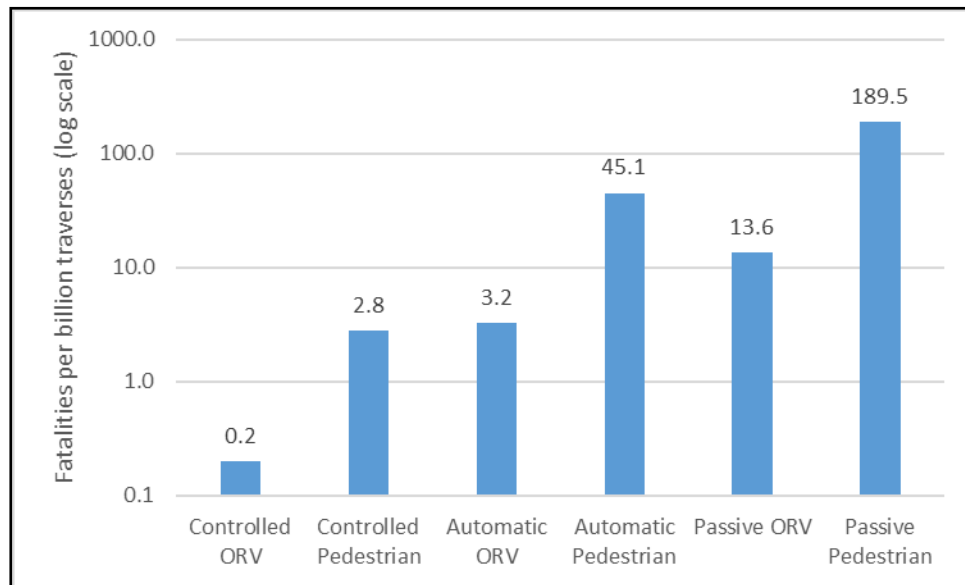
Source: Evans and Hughes (2019).

> Given the relative risks to users at different types of level crossings on the mainline railway, ORR will target our efforts on promoting improved risk control at footpath crossings, user-worked crossings and AHB crossings.

Heritage railways

29. The majority of heritage railways have level crossings as part of their operation; around half have level crossings that cross public carriageways. Our 2014 survey of level crossing types in the heritage sector found that around 16% of these public carriageway crossings were public open level crossings; half being automatic with lights (Automatic Open Crossings Locally Monitored) (AOCL) and half being crossings with signage only, where the train driver is required to observe that the crossing is clear (Open Crossings) (OC).

30. RIDDOR reportable incidents for the heritage sector show that there have been 12 collisions between trains and vehicles between 2011 and October 2019, with train speed ranging from 2-19mph. None of these resulted in injury to the vehicle or train occupants.

---

[2] Evans, A W and P Hughes (2019). Traverses, delays and fatalities at railway level crossings in Great Britain. Accident Analysis and Prevention, **129**, 66-75.

31.   RAIB, between 2001 and October 2019 investigated six collisions, additional to those that were RIDDOR reported, including with crossing gates. None of the collisions resulted in injury but did result in derailment on one occasion (Dymchurch 2016). In addition, in 2010, RAIB investigated a runaway train, which passed over two Open Crossings (Welshpool and Llanfair).

## Industry activity

Network Rail

32.   Network Rail has achieved considerable success in reducing risk at level crossings during Control Period 4 (CP4) and Control Period 5 (CP5). This is largely attributable to dedicated risk-reduction funds, which have been strongly managed and directed from their Head Office. The challenge will be to maintain good safety management in CP6, when there is no additional funding and where decision-making is devolved to the routes and regions.

33.   Increases in rail and road traffic and increased use of crossings all mean that overall crossing risk might have increased in recent years. In fact, risk (as modelled by Network Rail's Level Crossing Risk Indicator Model) reduced from 18.3 Fatalities and Weighted Injuries (FWI) at the start of CP4 to 11.5 FWI at the end of CP5.

34.   Network Rail set itself a target to reduce risk by 25% over CP5 and achieved this. Over 370 crossings were closed in CP5, bringing the total closed to more than 1170 since the start of CP4. In addition, use has been restricted at nearly 80 crossings, typically to private users.

The graph below shows the general reduction in level crossing risk achieved by Network Rail over CP5:
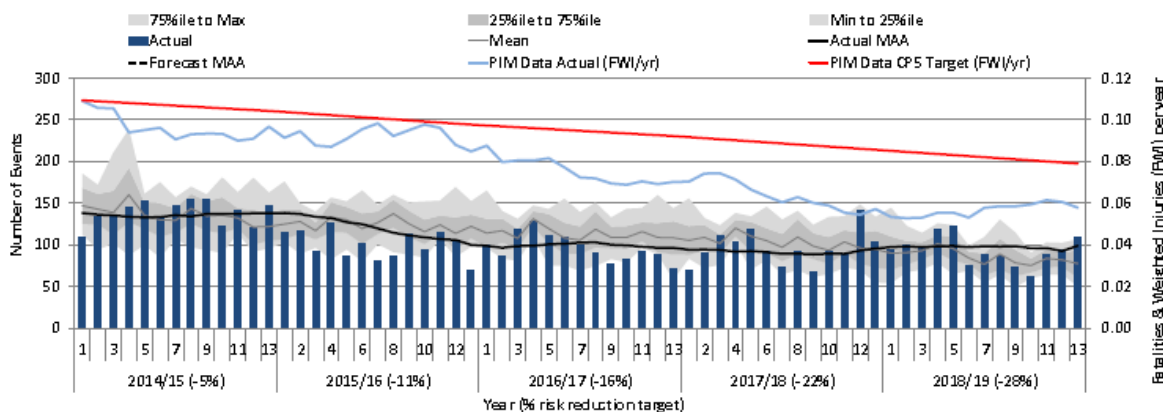
Source: Network Rail May 2019

35.   As well as crossing closures and introduction of new technology, CP5 also saw level crossing managers continuing to lead improvements in level crossing safety, particularly by implementing the findings of suitable and sufficient risk assessment.

36.   We found through proactive inspection, however, that at UWC-Ts, the method of operation of those crossings by signallers did not always match what was described in assessments by local level crossing managers. We made a series of recommendations to Network Rail to secure improvements. It is for Network Rail to ensure that appropriate risk controls, identified using suitable and sufficient risk assessment, are always put in place, and we will hold them to account to achieve this.

37. Network Rail has developed new 'overlay' technologies that will provide an 'active' warning of approaching trains at footpath, bridleway and UWCs. Roll-out of these systems has not yet been as widespread as anticipated, however, in part due to issues with Network Rail's product acceptance process. We will continue to challenge delays in the introduction of new level crossing technology.

38. Network Rail has also developed 'red light enforcement' cameras for use at high-risk AHB crossings and AOCLs, to pursue enforcement against users who pass the road traffic lights at red/stop. The aim is to improve the behaviour of users and reduce near-misses.

39. In CP6 Network Rail does not have additional ring-fenced funds to improve level crossing safety. In line with statutory requirements it will adopt reasonably practicable improvements in risk control. Network Rail will focus on using better techniques and digital technologies to improve the way they maintain and manage their infrastructure and will take steps to further reduce risk to the public at their level crossings. We will monitor progress against targets.

40. Network Rail has produced a level crossings strategy for 2019-2029, which was adopted soon after the start of CP6. It sets out Network Rail's strategy to manage the safety and reliability of level crossings for the next 10 years. This strategy has been produced partly as a result of sustained ORR pressure to set out a structured, prioritised approach to addressing risk at crossings. Our starting point was to secure a more focussed concentration on risk at passive crossings. We wanted to see a targeted plan of actions to improve safety and will drive the consistent application of the strategy.

41. We are pleased that the Network Rail strategy has been widened to take in the whole crossing population. We will be working hard to ensure that its ambitions are not lost during Network Rail's reallocation of roles, responsibilities and accountabilities to the routes and regions.

Heritage railways

42. Heritage railways generally operate at lower speeds not exceeding 25mph (40kmph). When compared to the mainline sector, the lower speed profile changes the level of risk associated with level crossings. However, the risk remains significant and our level crossing strategy remains relevant to the heritage sector. The same legislation applies and we expect the sector to achieve the same legal standard as the mainline sector.

43. Risk at level crossings should be reduced as far as is reasonably practicable. It is therefore important that heritage operators understand the risk profile of all of their level crossings through the production of a suitable and sufficient risk assessment; identifying control measures and ensuring that these control measures are implemented effectively.

44. Risk assessments should be drawn up, and reviewed by suitably competent persons who have knowledge of the risks and controls associated with crossings, taking account of ORR and sector guidance.

45. Level crossings need to be regularly inspected by competent persons to ensure the control measures remain effective. Risk assessments also need to be regularly reviewed and the risks reassessed, and after an incident or when significant change in use is likely or has occurred. Such changes include: changes in train type or operation; user profile; local developments; or infrastructure enhancement/renewal. Reviews may indicate that changes are justified, such as closure, an alternative crossing method, or different type of level crossing.

46.   This regular reassessment of risks may indicate that changes to control measures are now justified, such as closure of the crossing, or its replacement with some other method of crossing the railway. When crossing risks are reassessed, new innovative controls may have become available or existing ones may have become more practical or cheaper to install.

47.   As the heritage sector expands and realises ambitions to extend or reinstate old railway lines, the level of interest in opening new, or reinstating level crossings is increasing. In line with the general principles of prevention, we expect operators to demonstrate that there is no reasonably practicable alternative to the provision of a new or reinstated level crossing; with the analysis based upon a proportionate, but suitable and sufficient, risk assessment. Whilst ORR does not approve or grant permission for new or reinstated level crossings, we will normally submit an opinion on the level crossing proposal as part of the Transport and Works Act 1992 (TWA) or Transport and Works (Scotland) Act 2007 (TWAS) Order process.

Tramways

48.   It is unusual to treat the crossing of roads by tramways as level crossings in the same manner that rail and road crossings are treated. Whilst some examples do exist, conflict points such as intersections between tramways, roadways and footpaths are generally designed and operated along highway principles.

49.   Junctions where roads cross tramways are therefore different from level crossings in that they are designed as road crossings, with the usual highway traffic controls, rather than the specialised flashing lights, audible warnings and barriers seen on mainline railways. The crossings and traffic lights are the responsibility of highway authorities and the police are responsible for investigating incidents.

50.   ORR's 'Strategy for Regulation of Health and Safety Risks – Chapter 14: Tramways' provides further information.

ORR activity

51.   Level crossings on both the mainline and heritage railways remain a high priority for ORR. We have been active for many years, using relevant legal mechanisms to pursue our strategy and so improve the risk profile of level crossings. Our key activities and the outcomes we seek from them are in the table that follows:

ORR activity	The outcome we seek from this activity
Targeting inspection activity for Network Rail on particular aspects of risk management. In CP6 we will prioritise scrutinising arrangements for safer management of crossings that rely on users to decide for themselves when it is safe to cross or where the only information to aid decision-making is from telephoning a signaller. We expect the adoption of new technology to make a significant difference in controlling these risks.	Duty holders demonstrate targeted, risk-based improvements to protect the safety of level crossing users. Increased adoption of technology to inform crossing users when it is safe to cross.

ORR activity	The outcome we seek from this activity
Monitoring Network Rail's delivery of its new level crossing strategy. We will be ensuring that routes and regions of Network Rail exercise devolved decision-making powers to introduce reasonably practicable improvements.	Evidence of consistent and effective application of the Network Rail level crossing strategy, and increasing use of technical solutions leading to improved risk control.
Ensure Network Rail's review of the use of their cost benefit tool results in improved guidance on how to identify reasonably practicable control measures at level crossings.	Evidence of a revised decision-making framework to identify reasonably practicable controls at level crossings, resulting in improved risk control.
We will carry out a thorough review of our published guidance to designers and managers of level crossings, in the light of our ambition to promote high quality risk assessments across the industry as the basis of improved risk control. We will move away from a high level of prescription by crossing type and incorporate the good practice that we explored during our trial of a new way of carrying out level crossing order processing.	Publication of new guidance. This will provide managers and designers of every type of crossing with a structured approach to assessing risks and identifying effective controls of risk. We expect to see improved risk control at crossings arising from better understanding of risk and greater openness to innovative solutions.
We will review the Level Crossing Order process and content to identify opportunities to streamline and simplify it where possible, in order to reduce bureaucracy and allow for developments in technology.	Improvements in the Level Crossing Order process and content.
We will support and encourage duty holders to take a structured approach to level crossing risk assessment. We plan to review our guidance on level crossings to ensure it encourages a sound risk-based approach.	Improvements in level crossing risk assessment supported by appropriate guidance.
Encouraging Network Rail to be innovative in developing new technologies that will reduce risks at crossings with restricted sighting and AHB crossings.	Improved safety for users and train occupants at crossings that rely presently on the users' vigilance alone, or warning from drivers sounding the train horn, by adding a layer of engineered protection from new technologies. Preserving the convenience of AHB crossings but improving risk control by additional measures.
Working with the Department for Transport, Network Rail and others to introduce replacement for the statutory instruction signage in The Private Crossings (Signs and Barriers Regulations) 1996 at UWCs with new wording and pictograms.	The introduction of updated, appropriate signage.

ORR activity	The outcome we seek from this activity
ORR will encourage early engagement with proposers of new level crossings, so that we can work with the proposer and encourage alternatives to crossings to be fully explored and delivered where reasonably practicable. We are receiving an increasing number of proposed cases for new level crossings or for the reinstatement of crossings. In light of this, we will review our process to ensure our approach is proportionate and robust.	ORR will contribute as appropriate to proposals for a new level crossing as part of the Transport and Works Act 1992 (TWA) or Transport and Works (Scotland) Act 2007 (TWAS) Order process. ORR will not support the introduction of new level crossings where there are reasonably practicable alternatives.
Working with heritage operators to improve their Safety Management System by applying Heritage Railway Association guidance.	Improved consistency and maturity in safety management, resulting in improved risk control.
Promoting, within the heritage sector, the installation of LED road traffic light signals where appropriate to control risk, in accordance with duty holders' risk assessment of crossing use and consideration of the current conspicuity of the crossing lights.	More widespread adoption of LED lights and other enhancements to conspicuity of warnings, making it easier to see the lights in a variety of environmental conditions.
Encouraging within the heritage sector, the conversion of open crossings and AOCLs to barrier or gated types where appropriate.	Improved risk control by increase in numbers of crossings protected by barriers or gates.
Encouraging the heritage sector to adopt the innovative technological solutions being brought into operation in the mainline sector, where this is appropriate, to better control risk. For example, through the use of 'overlay' miniature stop light systems in the conversion of passive crossings to active.	Improved risk control arising from increased adoption of innovative active warning techniques at passive crossings.

52.   We have investigated level crossings incidents and taken enforcement action as a result of our findings, including prosecution. Our enforcement notices are published on our website.[3]

Abbreviations and acronyms

ALCRM	All Level Crossing Risk Model
CP	Control Period
FWI	Fatalities and Weighted Injuries
HSWA	Health and Safety at Work etc Act 1974
LED	Light Emitting Diode
ORR	Office of Rail and Road
ORV	Occupants of Road Vehicle
PHRTA	Potentially Higher Risk Train Accidents

---

[3] https://orr.gov.uk/

PIM	Precursor Indicator Model
RAIB	Rail Accident Investigation Branch
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013
RSSB	Rail Safety and Standards Board
SRM	Safety Risk Model
TWA	Transport and Works Act 1992
TWAS	Transport and Works (Scotland) Act 2007

Glossary of terms

Accidental mainline risk	Risk arising from railway operations or maintenance activities, excluding suicides.
Active crossings	Where the level crossing user is warned of the approach of the train through closure of gates or barriers and/or by warning lights and/or alarms.
Automatic crossings	The approaching train activates the closure sequence for the level crossing automatically. There are no protecting signals and the crossing area is not checked to ensure it is clear prior to the arrival of the train (see also manual crossing).
Control Periods	These are the five-year timespans to which Network Rail works for financial and other planning purposes. Each Control Period begins on the 1st April and ends on 31st March to coincide with the financial year. Control Period 4: 2009-14 Control Period 5: 2014-19 Control Period 6: 2019-24
Fatalities and Weighted Injuries	The aggregate amount of safety harm. One FWI is equivalent to: one fatality, or 10 major injuries, or 200 Class 1 minor injuries, or 200 Class 1 shock/trauma events, or 1,000 Class 2 minor injuries, or 1,000 Class 2 shock/trauma events.
Manual crossing	These crossings can also be termed railway-controlled. The crossing area is checked by a signaller/crossing keeper to ensure it is free of people/vehicles etc. before the protecting signals are cleared to allow the train through. This can also be done using technology, which scans the crossing, mimicking the action of the signaller/crossing keeper.
Meerkat	A device to provide active warning of an approaching train, for use at previously passive level crossings, such as footpath and UWCs.
Passive crossings	The onus is on the level crossing user to determine if it is safe to cross. This can be based on sighting alone, or the sound of a train horn in some circumstances or, where a phone is provided, by telephoning the signaller.
Precursor Indicator Model	An RSSB-devised model that measures the underlying risk from train accidents by tracking changes in the occurrence of accident precursors.
Principles of prevention	The Management of Health and Safety at Work Regulations 1999, Schedule 1 sets out the general principles of prevention. Where an employer implements preventative and protective measures he shall do so on the basis of these principles.
Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013	These Regulations require employers, the self-employed and those in control of premises to report specified workplace incidents.
Safety Risk Model	A quantitative representation of the safety risk that can result from the operation and maintenance of the GB rail network.