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Level crossings
Summary of findings and key human factors issues

Prepared by **Davis Associates Limited**
for the Health and Safety Executive 2005

RESEARCH REPORT 359

HSE
Health & Safety Executive

Level crossings
Summary of findings and key human factors issues

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Level crossings currently present the largest risk of a multi-fatality incident on the railway network. Her Majesty's Railway Inspectorate (HMRI), a division of the Health and Safety Executive (HSE), has a role in the approval, inspection and investigation of incidents involving level crossings. To ensure risks are better controlled, HMRI are seeking to develop their understanding of human factors issues at level crossings.

This report is the first of three reports being produced by Davis Associates for HMRI's project, 'Level crossings: Future Human Factors Priorities, new technologies and tools for inspectors'.

This report summarises the findings from a literature review, site visits, interviews with stakeholders and a validation exercise. The findings and key human factors issues are presented in a database format for ease of use and searching using keywords. It also provides a traceable source of information for the development of Inspectors' tools and approaches.

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Executive Summary

Level crossings currently present the largest risk of a multi-fatality incident on the railway network. Her Majesty's Railway Inspectorate (HMRI), a division of the Health and Safety Executive (HSE), has a role in the approval, inspection and investigation of incidents involving level crossings. To ensure risks are better controlled, HMRI are seeking to develop their understanding of human factors issues at level crossings.

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A summary of the findings are:

- To date, 104 human factors issues have been defined.
- 94 human factors issues relate to protected level crossings.
- 51 issues relate to unprotected crossings.
- The signaller is referred to within 6 of the issues, with regard to communication, contacting, detection of objects and track-side workers, camera angle and signal sections.
- Groups of level crossing users have been identified as impacting on 5 of the human factors issues. These refer to groups in general, position of safety, pedestrians on vehicular crossings, passenger compliance with MWL, trespassers and walkers in groups.
- Of particular note, pedestrian users are affected by only 49 issues, while vehicle drivers (cars, vans, HGVs & motorcyclists) are affected by 80 human factors issues.
- 52 human factors issues relate to user-worked crossings, including those with telephones or miniature warning lights.
- Automatic open level crossings are affected by 73 of the human factors issues.

Contents

Acknowledgements

The authors would like to acknowledge the following people and organisations for their support and co-operation during the development of this report. (Presented in alphabetical order).

Organisation	Name	Job title	Interviewed
Arriva	Keith Stephenson	Section Manager	✔
Arthur Mellows College	Fred Mann	Warden	✔
Automobile Association (AA)	Andrew Howard	Head of Road Safety	✔
British Transport Police	Becky Jackson	Acting Sergeant	
British Transport Police	Dave Robertson	Police Constable	✔
British Transport Police	John Thompson	Chief Inspector	✔
Delaine Buses	Anthony Delaine-Smith	Managing Director	
Delaine Buses	Mark Delaine-Smith	Manager	✔
Health and Safety Laboratory (HSL)	Mary Miller	Higher Ergonomist	✔
Health and Safety Laboratory (HSL)	Mike Gray	Head of Ergonomics Section	
Helpston Parish Council	Joe Dobson	Councillor	✔
Helpston Parish Council	Kathie Rowbotham	Parish Clerk	
Her Majesty's Railway Inspectorate (HMRI)	Andrew Harvey	HM Inspector of Railways (Level Crossing section)	
Her Majesty's Railway Inspectorate	Darren Anderson		
Her Majesty's Railway Inspectorate	John Cullen		
Her Majesty's Railway Inspectorate	John Tilly	HM Principal Inspector of Railways	✔
Her Majesty's Railway Inspectorate	Keith Shepherd	HM Inspector of Railways	
Her Majesty's Railway Inspectorate	Paul Wilkinson	Operations Intelligence Manager	
Her Majesty's Railway Inspectorate	Robert Beveridge	Railway Inspectorate Contact Officer (RICO)	✔
Her Majesty's Railway Inspectorate	Simon Smith		
Her Majesty's Railway Inspectorate	Sue Johnston		

Her Majesty's Railway Inspectorate	Mark Whitham	Inspector	
Human Engineering Ltd	Claire Turner	Senior Ergonomist	
Network Rail	Bill Dillarstone	Signaller, Helpston signal box	✔
Network Rail	David Jones	Level Crossing Engineer	✔
Network Rail	Emma Lowe	Human Factors Advisor	
Network Rail	Gaynor Farrington	Level Crossing Risk Manager	✔
Network Rail	Gilbert Fraser	SPAD Strategy Manager	✔
Network Rail	John Whitehead	Level Crossing Risk Control Co-ordinator	✔
Network Rail	Martin Shore	Signaller, Helpston signal box	✔
Network Rail	Robert Havercroft	Level Crossing Risk Control Co-ordinator	✔
Network Rail	Steve Ray	Assistant Signaller Manager (Peterborough Signal Box)	
Northamptonshire County Council (represents Traffic and Safety Working Group)	Robin Hodsdon	Traffic Engineer	✔
Rail Passengers Council (North West England)	Ian Watson	Safety Task Force member	✔
Rail Passengers Council (Scotland)	James King	Safety Task Force member	✔
Rail Passengers Council (East of England)	John Hawkins	Safety Task Force member	✔
Rail Passengers Council	Shelley Gould	Safety Task Team Co-ordinator	
Rail Safety and Standards Board (National Level Crossing Safety Group)	Alan Davies	Project Manager (National Level Crossing Safety Group - Secretary)	
Rail Safety and Standards Board	Dr. Ann Mills	Principal Human Factors	
Rail Safety and Standards Board	Michael Woods	Head of Operations Research	
Retired (Network Rail)	Harry Tabaert	Ex-Level Crossing Strategy Manager	✔

Abbreviations

AA	Automobile Association (UK)
Accom.	Accommodation level crossing (User worked crossing)
AHB	Automatic half barrier
ABCL	Automatic barrier crossing locally monitored
AOCL	Automatic open crossing locally monitored
AOCR	Automatic open crossing remotely monitored
BS	British Standard
BTP	British Transport Police
BW	Bridleway crossing
CIRAS	Confidential Incident Reporting and Analysis System
CCTV	Closed Circuit Television
DA	Davis Associates Limited
DfT	Department for Transport (UK)
DOT	Department of Transport (USA)
DTLR	Department for Transport, Local Government and the Regions (UK)
FC	Footpath crossing
FRA	Federal Railroad Administration
HA	Highways Agency
HF	Human Factors
HGV	Heavy goods vehicle
HMSO	Her Majesty's Stationery Office (UK)
HMRI	Her Majesty's Railway Inspectorate (UK)
NR	Network Rail (UK)
HSE	Health and Safety Executive (UK)
HSL	Health and Safety Laboratories
LC	Level crossing
MCG	Manually controlled gate
MCB	Manually controlled barrier (worked from adjacent cabin/signal box)
MCB+CCTV	Manually controlled barrier protected by closed circuit television
MWL	Miniature warning lights
NRCI	Network Rail Controlled Infrastructure
OC	Open crossing
Occup.	Occupation level crossing (User worked crossing)
RPC	Rail Passenger Council
RGS	Railway Group Standard
RIDDOR	Reporting of injuries, diseases and dangerous occurrences regulations

RSC	Railway Safety Case
RSSB	Rail Safety and Standards Board
SFX	Station foot crossing
SMIS	Safety Management Information System
TRL	Transport Research Laboratory
UK	United Kingdom (of Great Britain)
USA	United States of America
UWC	User worked crossing
UWC+T	User worked crossing with telephone
UWC+MWL	User worked crossing with miniature warning lights
www	World Wide Web

Definitions

Term	Definition	Source
Accommodation level crossing	A private vehicular level crossing connecting land in the same ownership separated by a railway line. Most commonly refered to as 'User Worked'.	RGS, GK/ GN0802, 2004
Active warning	A device which warns users of the imminent arrival of a train. Such devices may be either visible or audible.	RGS GI/RT7011, 2002
Automatic crossing	A level crossing where the protective equipment (e.g., barriers and active warnings) is automatically activated by the approaching train	RGS, 2002
Barrier	Any element…permanent or temporary, intended to prevent people from falling, and to retain, stop or guide people.	DCMS, 1998
Behaviour	A manner of behaving or the response of an organism to a stimulus.	Collins dictionary
Blocking-back	The formation of a stationary or slow-moving queue of road traffic over a level crossing causing obstruction of the line.	RGS, 2002
Closure sequence	The sequence of events, initiated by the signaller, crossing keeper or the approach of a train (automatically), which applies the protection to the level crossing to prevent users from crossing the railway.	RGS, 2004
Communication	The imparting or exchange of information.	Collins dictionary
Crossing	Used in level crossing documentation to mean 'level crossing', where the continued use of 'level crossing' becomes repetitive and laboured.	RGS, 2002
Crossing abuse	Any deliberate activity by a user at a level crossing which differs from the correct procedure for using the crossing	RGS, 2002
Crossing keeper	A person appointed at a permanent gate box to carry out the normal operating procedure of a level crossing.	RGS, 2002
Crossing time	The time taken for a user to transverse the crossing from the decision point to a position of safety on the other side of the railway lines. Crossing time includes time taken for the user to make a decision to cross.	RGS, 2002
Decision point	The point at which a level crossing user makes a decision to cross or wait.	RGS, 2002

Emergency	An unforeseen or sudden occurrence, especially of danger, demanding immediate action.	Collins Dictionary
Level crossing	An intersection at the same level of a road, footpath or bridleway and one or more railway tracks	RGS, 2002
Occupation level crossing	A private level crossing which gives access between premises and a public highway. Most commonly refered to as 'User Worked'.	RGS, GK/ GN0802, 2004 HMRI, 2004
Opening sequence	The sequence of events, initiated by the signaller or crossing keeper or the train clearing the crossing, which withdraws the level crossing protection , allowing users to cross the railway.	RGS, 2004
Phonetic Alphabet	A list of words used in communications to represent the letters of the alphabet, as in E for Echo and T for Tango.	Collins English Dictionary
Protected (LC)	Having gates or barriers or having road traffic signals or miniature red/green lights giving a positive warning of the approach of trains.	HSE, 2003
Rush-hour	A period at the beginning and end of the working day when large numbers of people are travelling to or from work.	Collins English Dictionary
Signaller	A competent person responsible for the operation of the signalling system, to safely control the passage and regulation of trains, usually located in a signal box.	RGS, 2004
Traffic calming system	Road junction(s) strategically positioned to encourage slower and safer driving speeds by vehicle drivers.	nationmaster.com
Type (of level crossing)	A recognised combination of control measures used at level crossings, appropriate to particular circumstances.	RGS, 2002
Wig-wag light	1. A colloquial term for road traffic signals. 2. Light signals for the control of traffic at level crossings. The sequence for illumination.....a) a single steady amber light, b) two intermittent red lights.	1. RGS, 2004 2. The Traffic Sign Regulations & General Directions, 2002
Zigzagging	Sharp angular movements from one side to another. In the case of level crossings, to move around the barriers at a half barrier crossing to avoid having to wait.	DA, 2004

1 Introduction

1.1 Background

Davis Associates Limited (DA) has prepared this document for Her Majesty's Railway Inspectorate (HMRI). This report represents the first of three deliverables to be produced by DA as part of the HMRI project ***'Level crossings: Future human factors priorities, new technologies and tools for inspectors'.***

DA proposed the following scope of work to be delivered, broken down into a number of tasks. This deliverable is highlighted in orange (figure 1).

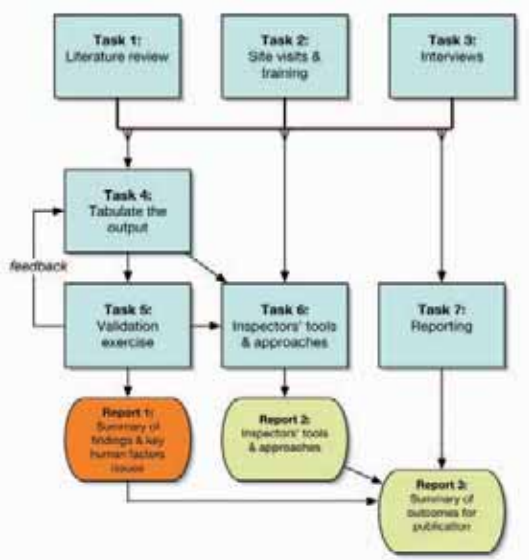


Figure 1
Scope of work divided by tasks and deliverables

1.2 Scope

This report identifies human factors issues at level crossings and summarises the findings of the literature review, site visits and training undertaken by DA and the findings from the interviews with stakeholders. It also includes the results from the validation exercise.

1.3 Objectives

The objectives of this report are to:

- define a list of human factors issues at level crossings.
- summarise the findings from the literature review, sites visits and interviews, which support the identified issues.
- validate a method for assigning HF issues to level crossings.
- capture findings so as to support the development of tools and approaches for Inspectors.

2 Method

2.1 Introduction

The following section briefly describes the methods employed for identifying human factors issues for inclusion within the database.

2.2 Literature review

A review of key literature from rail, road, user risk perception and behaviour was undertaken, using a variety of search methods. These included using the in-house catalogue and journal search facilities of the Transport Research Laboratory and the British Library.

A review of literature was made from the following sources and research areas:

- RSSB research
- HMRI incident reports
- RSSB and Network Rail Standards & Guidance notes
- Ergonomics Information Analysis Centre (EIAC)
- The findings of research commissioned by Network Rail
- The findings of research commissioned by HSE
- The findings of research commissioned by road transport bodies, e.g., TRL
- Human behaviour, e.g. human error, risk taking behaviour, human reliability
- Trespass & vandalism at level crossings
- European and world-wide level crossing research and incidents

2.3 Level crossing visits

To date, a total of 45 site visits to key examples of level crossing types have been undertaken to build a greater understanding of the issues first-hand. Still photographs and video recordings were taken at each of the site visits.

Photographs from each crossing visited can be found in Appendix A.

Table 1
Level crossing visits. Stopping was not possible at all sites and these were viewed via a vehicle 'drive-by'. These are marked with an asterisk (*) in the table.

Nearest Town	Level Crossing Name	Level Crossing Type
Bedford	Kempston Hardwick Station	ABCL
Bedford	Millbrook Station	MCG
Bedford	Stewartby Brickworks	Private Gatekeeper
Bedford	Stewartby Green Lane Station	MCG

Figure 2
Berry Lane user-worked level crossing

Figure 3
Lolham Bridges CCTV level crossing

Figure 4
St. Margarets Station CCTV level crossing

Figure 5
Ware footpath crossing (a)

Nearest Town	Level Crossing Name	Level Crossing Type
Bedford	Wootton Broadmead Station	ABCL
Doncaster	Arksey*	MCB CCTV
Doncaster	Creykes	UWC+MWL
Doncaster	Daw Lane*	MCB CCTV
Doncaster	Dockhills	MCB CCTV
Doncaster	Eggborough Ings	Footpath
Doncaster	Fields Lane	AOCL
Doncaster	Hensall	MCB
Doncaster	Joan Croft*	MCG
Doncaster	Kirton Lane*	MCB CCTV
Doncaster	Marsh Lane	Footpath
Doncaster	Moathills*	MCB CCTV
Doncaster	Snaith Road*	AHB
Doncaster	Snaith Station	AOCL
Doncaster	Snaith & Pontefract	AHB
Doncaster	Stainforth Road	AHB
Doncaster	Thorpe	AOCL
Doncaster	Thorne Moorends*	AHB
Doncaster	Thorpe Road*	AHB
Doncaster	Whitley	MCB CCTV
Hertford	Roydon	MCB CCTV
Hertford	St. Margarets Station (figure 4)	MCB CCTV
Hertford	Ware Station	MCB CCTV
Hertford	Ware (a), (figure 5)	Footpath
Hertford	Ware (b)	Footpath
Middlesbrough	Long Beck	MCB
Middlesbrough	Redcar Lane	MCB CCTV
Middlesbrough	Westside Road	MCB CCTV
Milton Keynes	Berry Lane, (figure 2)	UWC+T
Milton Keynes	Bow Brickhill Station	MCB CCTV
Milton Keynes	Woburn Sands	Footpath
Milton Keynes	Woburn Sands Station	MCB
Milton Keynes	Leighton Buzzard	National Heritage Railway Open Crossing
Peterborough	Bainton Green	AHB
Peterborough	Bainton Village	AHB
Peterborough	Ballast Pits	UWC+T
Peterborough	Fox Covert Road	Footpath
Peterborough	Greatford	MCB CCTV

Peterborough	Helpston	MCB
Peterborough	Lolham Bridges, see figure 3	MCB CCTV
Peterborough	Lolham	Footpath
Peterborough	Maxey	MCB CCTV
Peterborough	Tallington	MCB CCTV
Peterborough	Woodcroft	Manned gates

2.4 Signal box visits

Figure 6
Peterborough signal box. The level crossings control panel is positioned with views of the main panel.

Visits were made to Peterborough and Helpston signal boxes. At each signal box, the process for operating the closing and opening sequence of each crossing was observed for a period of time. In addition to this, a detailed explanation of the process was provided by the signaller as they progressed through the sequence for each crossing.

Signallers were also asked about the effectiveness of the equipment to detect objects on the crossing and their own experiences of the behaviour of different level crossing users.

2.4.1 Peterborough

At Peterborough (figure 6), the panels are arranged to control the movement of trains as well as for monitoring and controlling five local level crossings. Two signallers operate the level crossing control panel at all times, and their position supports communication with and a view of the work of other signallers controlling the movements of trains via the main control panel.

Figure 7
The level crossing control panel mimics the order of the crossings on the rail infrastructure.

Figure 8
Monitors for each crossing are positioned directly above the crossing on the panel.

Figure 9
The order of the closing procedure control buttons require the signaller to double check the crossing is clear prior to completing the closing

Figure 10
Helpston level crossing signal box.

2.4.2 Helpston

Helpston signal box (figure 9) is a dedicated level crossing box. Two signallers control the closing and opening sequence of four CCTV, one manned gate, and the Helpston MCB crossing, positioned on the Stamford and/or East Coast mainline train routes. The control panel mimics the order of the crossings on the rail infrastructure and also shows an additional four crossings, not controlled by the signallers.

Following the signal box visit, brief visits were made to six of the crossings in the Helpston area.

Figure 11
The level crossing control panel mimics the order of the crossings on the rail infrastructure.

Figure 12
The view of the Helpston crossing from the signal box.

Figure 13
The signallers receive calls from crossing users, track-side workers and the crossing keeper at Woodcroft.

2.5 Level crossing training

DA attended the HSE two-day level crossing training course, held in Doncaster in July 2004. The course covered the following level crossing issues:

- Basic legislation
- Network Rail's level crossing risk assessment process
- Level crossing orders
- Normal operation and failure modes
- Investigating level crossing accidents
- HSE level crossing strategy and intervention plan

The two-day training course also included level crossing visits in and around the Doncaster area.

2.6 Interviews

Level crossing stakeholders were interviewed regarding their particular experience and knowledge of crossings and user behaviour. A complete list of all stakeholders interviewed can be found in the 'Acknowledgements' section at the beginning of this report.

Interviews were carried out at the respondent's place of work or over the telephone. Interviews lasted between 1 and 3 hours.

Each interviewee was provided with an agenda and letter of authority prior to the meeting or telephone interview taking place. Each interview agenda followed a similar format, however the questions were tailored to each respondent's area of expertise.

The agenda format was as follows:

- Introduction to project
- Role of Davis Associates
- Aim of project and how outputs from work will be applied
- Personal experiences of observing level crossing users
- Behaviour patterns of level crossing users
- Characteristics of crossings or surrounding environment that do not support or influence the way the user behaves

Documents provided by some of the respondents to support their comments were for internal use only. Therefore these have been referenced as an internal document within the database, however no references to names or locations contained within these documents have been included.

2.6.1 Interview boundaries

To help define a list of suitable stakeholders, both Network Rail and HMRI recommended a cross-section of individuals to support the interview stage of this project. Although there are many more potential stakeholders within the rail industry with extensive knowledge of level crossings, once commonalities of human factors issues were identified between individuals this was taken as the point at which additional stakeholders were not included.

3 Database

3.1 Recording the findings

The findings were recorded in a database, created by DA for the purpose of this project. A database was used as the most efficient way of recording the human factors issues because:

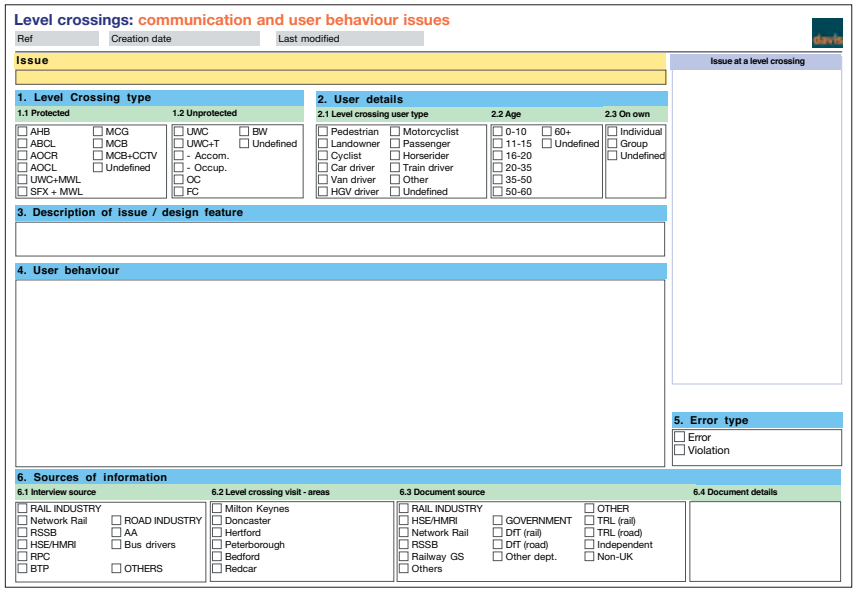
- the findings were not necessarily unique to one piece of research or respondent and the database allowed this to be conveyed easily and without duplication;
- the database allowed identification of many variables associated with a single issue, such as the level crossing type or the specific user;
- the database will be the primary source of information for developing Task 6, 'Inspectors' tools and approaches'. This will allow the developed tools and approaches to be traceable to a source of information; and
- the database allows for easy searches to be made of its contents, by choosing the required data entry fields (e.g., level crossing type or user details) or using keywords for extracting the relevant human factors issues. A listing of identified HF issues by level crossing type has been compiled in Appendix B. This search function will also support the development of Inspectors tools and approaches.

Each database entry has a set of data fields, allowing a range of information to be recorded against each human factors issue. Table 2 describes the type of information recorded in each data entry field.

Table 2
The type of information recorded in each data entry field.

Data entry field	Information recorded
Ref.	A unique number for each database entry.
Creation date & Last Modified date	For effective management of data input and changes.
Issue	Brief title of the human factors issue.
Level crossing type	Identifies the type of level crossing which are relevant to the human factors issue.
User details	Identifies the users which are relevant to the human factors issue.
Issue at a level crossing	An example of the identified issue at a UK level crossing.
Description of issue	A concise description of the human factors issue.
User behaviour	Identifies the behaviour of the level crossing users as a result of the issue.
Sources of information	Identifies the source(s) of information for each issue.
Failure type	Identifies the type of failure committed by the user as a result of the issue. See section 3.2.2 for further clarification.

Figure 14
A blank database entry. Please refer to page 7 for clarification of each abbreviation.



3.2 Database content

3.2.1 Sources of information

Each database entry indicates the sources of the information. Where a reference to a particular piece of research has been made in the 'User behaviour' section, the document code can be found in section '6.4 Document details'. An explanation of how the coding applies and the list of references it refers to are provided on page 91 of this report.

3.2.2 User failure classification

The database has a data entry field for the type of failure committed by the user as a result of the human factors issue. This human failure has been classified into two error modes, 'Error' and 'Violation', [re/hu] & [HSE/re]. Both 'Errors' and 'Violations' are normally subdivided to identify the users preceeding cognitive processess. For the purposes of this report a simple error classification has been used, because it has not been within the scope of the report to analyse the detailed cognitive mechanisms involved in each of the human behaviours for all HF issues.

The human failure types have been defined as follows:

- 'Error' is an unintentional act by a user, however it deviates from the correct user behaviour. For example, poorly written signage information may result in the user misinterpreting the instructions and undertaking the incorrect crossing procedure.
- 'Violation' refers to an intentional act on behalf of the user. The user knowingly undertakes a particular behaviour, that deviates from the correct user behaviour. For example, the user does not want to be held at the crossing and therefore they choose to pass through the activated warning information.

Identifiying the type of user error committed as a result of the HF issue will support the correct application of measures to help control the level of risk at the crossing.

Violation behaviour is addressed through emphasising the consequences, while slips, lapses and mistakes are addressed by designing out the reason for the error.

3.3 Additional information

To maintain a useable database, only information on the user behaviour (i.e., the user's actions) that is a direct result of the identified human factors issue have been included. Detailed findings that describe the underlying theories behind user behaviour and risk perception are recorded separately of the database in section 4.3.

4 Findings

4.1 Summary of key literature information

A total of 105 documents were reviewed as part of Task 1, Literature review. A complete list of these are provided in the references section of this report.

Of particular note are the following documents, which provide an overview of the range of literature reviewed.

- Railway Safety Principles and Guidance, part 2, section E: Guidance on level crossings (HS(G)153/6) [HSE/ra]
The RSPG provides guidance and advice to those persons involved in the provision and maintenance of the protection arrangements at level crossings. It is also a benchmark for compliance by the Inspectorate. The guidance book details the conditions of suitability for particular types of crossings to the general description, method of operation, railway signalling and control for each crossing type. It also provides a diagram showing the typical layout for each crossing type.

- Requirements for level crossings, issue 1 [GI/RT7012]
The Railway Group Standard mandates the requirements for all aspects of level crossings, including the design, construction, inspection, maintenance, operation and decommissioning, for all Railway Group members. This document supercedes 10 separate level crossing RGP documents, and provides a complete listing of the crossing control measures.

- Provision, risk assessment and review of level crossings, issue 1 [GI/RT7011]
- Guidance on provision, risk assessment and review of level crossings [GI/GN7611]
The guidance note for Railway Group Standard GI/RT7011, details factors to be included as part of a level crossing risk assessment. Some of the factors identified are similar to those within the HF issues database, however, they do not detail the behavioural traits of users as a result of the identified factors.

- Determining the final decision point at user worked crossings [hu/de]
- Human Factors assessment of the risks associated with MWL crossings [hu/hu]
This research was carried out by Human Engineering, on behalf of RSSB. The research details user behaviour at user worked crossings, and draws conclusions on risk perception of crossing users and the reasons for user violations. These documents provide a source of information for the types of errors committed by users and may support the appropriate selection of risk control measures.

- Road vehicle level crossings special topic report [rssb/ro]
This report provides a detailed review of the numbers of different level crossing types and the numbers of incidents involving road vehicles and trains at crossings. It also identifies the high level causes of collision risk, of which road vehicle driver error is

the most common cause and violations the second most common. This report differs from the road vehicle report, in that it provides information about detailed human factor issues that can lead to incidents at all types of crossings.

- Reducing error and influencing behaviour [HSE/re]
This document guides those with responsibiliites for workplace health and safety to consider the benefits of human factors. It defines the impact of human error and behaviour on health and safety, the types of human error and methods for reducing them and the improvement of health and safety through appropriate application of tasks, equipment, procedures and warnings.

Many of the documents reviewed provided useful human factors information, yet focus on limited crossing types or users. This report brings together the human factors information from all the references reviewed.

4.2 Summary of main database findings

Below is a summary of the main findings from the database.

- To date, 104 human factors issues have been defined.
- 94 human factors issues relate to protected level crossings.
- 51 issues relate to unprotected crossings.
- The signaller is referred to within 6 of the issues, with regard to; communication (107), contacting (68), detection of objects (101) and track-side workers (9), camera angle (84) and signal sections (68).
- Groups of level crossing users have been identified as impacting on 5 of the human factors issues. These refer to; groups in general (13), position of safety (35), pedestrians on vehicular crossings (76), passenger compliance with MWL (85), trespassers (94) and walkers in groups (100).
- Of particular note, pedestrian users are affected by only 49 issues, while vehicle drivers (cars, vans, HGVs & motorcyclists) are affected by 80 human factors issues.
- 52 human factors issues relate to user-worked crossings, including those with telephones or miniature warning lights.
- Automatic open level crossings are affected by 73 of the human factors issues.

4.3 Recurring HF themes

A range of recurring HF themes have been identified from the database. These themes briefly describe the reasons for user behaviours as a result of the human factors issues.

4.3.1 Competence
Competence theme explains the behaviours of users as a result of the user not being

aware of or failing to fully understand the correct rules and procedures for using level crossings. An example of a database issue which demonstrates this competence theme, is issue 82: Highway Code: the highway code currently contains 275 rules for vehicle drivers. Due to the current method for learning the code and its depth and complexity of legal requirements, not all vehicle drivers are fully aware of the exact procedures for responding correctly to level crossings.

The competence theme differs from compliance, which is addressed fully in section 4.3.4. Compliance is associated with user behaviour that results from being aware of the rules and procedures for correctly using level crossings, however choosing not to comply with these legal requirements for various reasons, for example, passing through the activated warning system so as to avoid having to wait.

4.3.2 Distraction

Distraction has also been identified as a HF theme throughout the database. An example HF issue, 95: Noise: noisy surroundings may impair the peformance of the users to detect trains at level crossings. Noisy surroundings close to the crossing can distract the level crossing user from assessing for the presence of a train.

4.3.3 Inadequate design

In many areas of the UK, level crossings have been established for some time. The development of areas to include more homes and larger road infrastructures has been accommodated through changes to the level of protection at crossings. However, the continued increases in development will mean that at some point the extent of change to level crossing protection is inadequate and unable to keep pace.

The inadequacy of level crossing design is a feature of some of the HF issues. For example, issue 63: Housing developments: increases road traffic and level crossing use.

4.3.4 Behaviour arising from risk

An outline of each type of risk behaviour is provided with a summary of supporting risk perception research, which frames the background to the resultant user behaviours within the database.

The HSE document, ‘Reducing error and influencing behaviour’ [HSE/re] provides practical guidance to many of the following risk themes.

4.3.4.1 Type of risks

Risks can be experienced through a physical or psychological way. A level crossing user may experience a physical risk through the potential of being hit by a train. A psychological risk may be experienced through the potential of being caught by the police for passing through the activated warning lights.

4.3.4.2 Individual perceived control

People adopt their own levels of risk orientation, and these are generally defined by the following factors:

- An individual's own personality characteristics. Those that seek out risk are often referred to as sensation seekers and have a need for much higher levels of stimulation (we/ri & ad/ri).
- The social affect on a person's behaviour, e.g., through approval or disapproval by others.
- Their own locus of control, which determines how in control an individual feels about their own behaviour (bu/ri).

The level of perceived risk can change dependent upon the user's situation. Violations can be explained by an understanding of how people assess the perceived risks. For example, HF issue 43: Time of day: risk-taking behaviour at level crossings increases during rush-hours, at midday and at the beginning and end of the school day. A vehicle driver calculates the perceived risk of crossing illegally when having to wait at the crossing, compared with the risks of other things, such as being late for an appointment. The benefit of crossing illegally is obvious to the driver; not having to wait at the crossing and reaching their desired destination on time. If this risk outweighs their assessment of the potential costs of being hit by train, then the user is likely to cross.

4.3.4.3 Risk compensation

People respond to or compensate for perceived changes in the dangers to which they are exposed, by adapting their behaviour. People adopt cognitive strategies for coping with their behaviour when within risk exposed environments. It is based on a 'risk thermostat' model that defines each of our own level of risk, mainly from one's personality. It must be noted that the risk compensation theory has strong arguments both for and against.

An individual's propensity to take risks is influenced by their own experience and that of others and this model assumes that the degree to which we take risks varies from one individual to another. An individual's target risk level changes dependent upon the positive (i.e. saving in time) or negative (i.e. injury) gains with which risky behaviour achieves. Therefore if a person's target risk level is low and their perception of risk is high, then that person will behave in a cautious manner. However, if the target level remains the same, but the perception of risk is also low, then it is suggested that the person will behave in a more risky manner.

Recent RSSB unprotected crossing research advises against lowering the user's perception of risk at a crossing, without actually increasing the protection at the level crossing. It suggests that this could potentially lead to an increase in accidents (this view could also be applied to protected level crossings), however this recommendation has yet to be validated. HF issue 33: Sighting distance: good sighting distance should indicate the level crossing as high risk, is an example of user risk compensation.

4.3.4.4 Familiarity

A person's familiarity with a task can also affect their behaviour. Habits form over a period of time to help people cope with regular situations and environments, through

applying behaviours that require minimal ‘thinking’. The resultant behaviour in a known situation (which will ultimately be influenced by one’s personality) will be as an “implementation intention” (bu/ri), where an action is carried out in response to a situation. This enables people to undertake particular tasks (and many tasks at once) without having to concern themselves with the finer details of how that task is actually formed, thus allowing them to concentrate less.

The finer details that people gradually fail to take into account when undertaking a regular task can be explained as all the information presented to us from the environment, which we process to determine the most suitable behavioural response.

However, by not thinking about these finer details of a task, users tend to miss the “external cues” from the environment that would normally inform them whether the behaviour they are undertaking is appropriate (bu/ri).

For example, HF issue 85: Passenger compliance with MWL: the red light of a MWL is associated with the train passengers have alighted from. A passenger using a station foot crossing with miniature warning lights, on a regular basis, may exhibit this familiarity behaviour. They may cross against a red light, unaware of the information requesting them to stop, because the situation has triggered an habitual response. They have failed to take into account the situational and environmental information before they have acted.

Familiarity also presents other problems. Continued implementation of a task, which does not present dangers on a regular basis can lead a user to think they are never going to be exposed to the risk, therefore they behave less cautiously in these circumstances. For example, HF issue 05: Frequency of trains: crossings with low frequency of trains are likely to increase the risk-taking behaviour of regular users. A vehicle driver using a crossing that has only a few trains passing each day may reduce their level of caution. The combination of continued use and only ever seeing a few or possibly no trains duirng this period of time, removes the individuals “ability to think logically and rationally about their behaviour” (bu/ri).

4.3.4.5 Complacency

It could be suggested that users take a “it won’t happen to me” approach while crossing. Known as the “influence of attributional biases on people’s comparative risk evaluation” (we/ri), people will perceive to be at a lesser risk than others, often related to judging themselves as being more skilled, and therefore leading to reduced levels of caution.

RSSB research identified a weak correlation between a users’ perception of how risky a situation was and their knowledge of level crossings with previous near-misses or accidents. It points out how this complacency of crossing users is in contrast to the road safety ‘black-spot’ theory used by the Government, to identify to vehicle drivers previous areas of high accidents, therefore drivers adjusting their behaviour to reduce risk to themselves. In some of the cases observed, users that confirmed they knew of a previous incident, continued to leave gates open at a footpath crossing.

4.3.4.6 Mental Models

Users form mental models of situations to help them make sense of and put structure into the world around them. However, if the model does not contain all the correct information or they have misrepresentations of the environment, the user may perceive themselves as safe when undertaking tasks, when in fact they are exposing themselves to danger (we/ri).

In the context of level crossings, users often have an incorrect mental model of train speed and distance. HF issue 25: User perception of train speed and distance: train speed and distance is underestimated by users, which may result in increased decision making errors by level crossing users. Their model is based upon road vehicle speed, which exposes them to increased risk when judging train movement.

4.4 Addressing HF issues

The database has identified the type of user failure as a result of each HF issue. The type of failure committed by a user will determine the appropriate risk control measure to be implemented to ensure the risk is as low as reasonably practicable.

How HMRI address these issues, in terms of ensuring the appropriate risk control measures are in place, is dependent upon knowing the type of failure committed by the user. The human failure types have been simplified for the purposes of this work, into the following categories:

- Violation behaviour is a deliberate deviation from the correct procedure. The user perceives the benefits (i.e., saving time) of undertaking the violation outweighs those risks of committing it (i.e., risk of being hit by a train). This type of behaviour is most appropriately dealt with through emphasising the consequences.
- Error behaviour is an unintentional behaviour that deviates from the correct procedure. The user carries out a task (i.e., crossing the railway) but fails to take account of the correct crossing procedure (i.e., does not comprehend change in audible warning tone). These are better addressed through the application of appropriate measures which design out the error.

4.4.1 Issues beyond HSE control

It is recognised that some of the identified issues are outside the control of the railway industry and fall under the responsibility of other organisations. However, they have been maintained within the database as they continue to impact on the behaviour of level crossing users.

Co-ordination with these outside organisations may support the development of measures to deal with some of the HF issues, for example, collaboration with Highway Authorities to drive changes in signage design, to address the error behaviour of users.

HF issues such as these may present an opportunity for review by the HSE's Railways Policy Team. But limitations are again recognised where the level of risk control is benchmarked by established rules and principles, such as the Highway Code.

4.5 Moving forward to tools and approaches for Inspectors

Applying the human factors issues during the inspection process, for defining what should be expected at a particular crossing type, to ensure any risk is controlled, will be covered as part of the development of tools and approaches.

4.6 Database of human factors issues

The following pages contain the 104 human factors issues. Two issues are presented per page, in numerical order using the reference numbers.

Level crossings: communication and user behaviour issues

Ref 01 | Creation date 06.06.2004 | Last modified 02.02.2005

Issue

Phone cabinet instructions

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☒ UWC/T
- ☐ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☐ Pedestrian
- ☒ Farmer
- ☐ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☒ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Unclear phone instructions provided within phone cabinets at UWC may result in users failing to communicate with the signaller.

4. User behaviour

Information should be provided within telephones cabinets at UWC, giving details to the user of how to call the signaller and information regarding the location of the crossing. However, any information not clearly conveying the correct procedure nor the necessary details required by the signaller to ascertain the location of the level crossing, may reduce the user's willingness to carry out the required phone call.

Superfluous information, not required by the level crossing user, may also hinder the communication between the signaller and user. For example, the phonetic alphabet appears at some UWC+T. It forms part of the railway industry training to help convey safety critical information, but is not required to be learnt by UWC users.

Issue at a level crossing

Berry Lane UWC: general wear and tear have made the phone box instructions at this crossing difficult to read.

5. Error type

- ☒ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☐ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☒ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☒ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

bi/hu
th/er

Level crossings: communication and user behaviour issues

Ref 02 | Creation date 06.06.2004 | Last modified 02.02.2005

Issue

Driver distractions

1. Level Crossing type

1.1 Protected

- ☒ AOCL
- ☒ AOCR
- ☒ ABCL
- ☒ AHB
- ☐ MG
- ☒ MCB
- ☒ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☐ UWC/T
- ☒ UWC/MWL
- ☐ OC
- ☒ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☐ Pedestrian
- ☐ Farmer
- ☐ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☒ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☒ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Distractions on the approach to a level crossing may impair the performance of both vehicle and train drivers.

4. User behaviour

The attention of vehicle drivers when approaching the level crossing may be diverted because of visual distractions at the side of the road. Distractions may be seasonal, such as fun fairs or other similar events that may be held only once a year. Therefore visits to a crossing only a few times a year may not always identify these particular events.

Distractions at the side of the rail line may also impact on the attention of the train driver to observe the crossing.

Issue at a level crossing

5. Error type

- ☒ Error
- ☐ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☒ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☒ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☒ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

GI/GN7611

Level crossings: communication and user behaviour issues

Ref 03 | Creation date 10.06.2004 | Last modified 02.02.2005

Issue

Weather: Ice

Issue at a level crossing

Helpston: ice on the road has previously caused a vehicle driver to slide through the barriers onto the level crossing.

Lolham, Greatford, Maxey: crossings are all on 'B' roads and are not gritted during icy weather conditions. However, they are all used as shortcuts by local vehicle drivers during rush-hours.

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [x] UWC
- [x] UWC/T
- [x] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [x] Farmer
- [x] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [x] Passenger
- [x] Horserider
- [ ] Train driver
- [x] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Icy weather conditions on the approach, exit and on the crossing affects the behaviour of crossing users.

4. User behaviour

Icy weather conditions may affect the capability of vehicles to stop when required at the crossing. The effect on vehicle driver behaviour may also be affected by the presence of ice, such as not wanting to stop for the initial warning activation when they are close to the train line because of the risk of sliding forward onto the tracks.

Level crossings on 'B' roads may not be gritted during icy weather conditions and these may present a driving hazard to level crossing users.

The risks to users on foot when walking over the level crossing may also be increased, resulting in slips and falls.

5. Error type

- [x] Error
- [ ] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [x] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

mp/001

Level crossings: communication and user behaviour issues

Ref 04 | Creation date 10.06.2004 | Last modified 02.02.2005

Issue

Users familiarity with a crossing

Issue at a level crossing

Maxey CCTV: People living very close to the crossing often walk very slowly across, knowing that the signallers will have to wait for them. They also raise their hand to the CCTV cameras as a gesture of defiance.

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [x] UWC
- [x] UWC/T
- [x] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [x] Farmer
- [x] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [x] Passenger
- [x] Horserider
- [ ] Train driver
- [x] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Regular users and those living close to level crossings are more likely to undertake risk taking behaviour when using the crossing.

4. User behaviour

When people continually encounter circumstances which they recognise, such as using a level crossing, they generalise the circumstances in which they are within and miss the external cues from the surrounding environment. Level crossing users that live or work in close proximity to a crossing can become familiar with the crossing attributes and user procedures required for crossing. Their behaviour can become habitual, resulting in users failing to look for unexpected information, leaving them open to making errors of judgment.

Regular users are also likely to lower their perceived level of risk and commit a violation. Vehicle driver behaviour research at crossings showed 53% of red light runners at a range of testing locations used the crossings at least once a day.

Locals living close to a level crossing (often in old the railway cottages), may undertake risky behaviour when using the crossing. Some locals disregard crossing procedures because they feel aggrieved at having to wait for trains to pass. Locals also raise many complaints regarding the reliability and level of safety measures used at the crossings. These are more prevalent when a near miss between a vehicle and train has recently occurred at a local crossing.

5. Error type

- [x] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [x] RAIL INDUSTRY
- [x] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [x] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [x] Non-UK

6.4 Document details

bu/ri
tr/ah
pi/ve
we/ri
HMRI internal report

Level crossings: communication and user behaviour issues

Ref 05 | Creation date 10.06.2004 | Last modified 02.02.2005

Issue

Frequency of trains

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☒ AOCL
- ☒ AOCR
- ☒ ABCL
- ☒ AHB
- ☒ MG
- ☒ MCB
- ☒ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☒ UWC
- ☒ UWC/T
- ☒ UWC/MWL
- ☒ OC
- ☒ FP/MWL
- ☒ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☒ Farmer
- ☒ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☒ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Crossings with a low frequency of trains are likely to increase the risk taking behaviour of regular users.

4. User behaviour

The risk compensation behaviour of users explains that users will behave less cautiously when they have a low perception of risk. User risk perception tends to be low where there are infrequent trains. A regular user's expectations of not seeing a train are reinforced every time they use the crossing and a train does not pass, perceiving there to be a low chance of a train passing the next time they cross. This results in the user adapting their behaviour to this condition, such as behaving less cautiously.

UWC's with accident history are associated with train lines that have low train frequencies. For example, at a train line with only two trains per week, the same regular user of the crossing has been hit twice by passing trains.

5. Error type

- ☒ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☒ HSE/HMRI
- ☐ Network Rail
- ☒ RSSB
- ☒ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☒ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☒ Non-UK

6.4 Document details

ar/us
pi/ve
ar/us
ad/ri
GI/RN7611
ra/dr, ab/dr2

Level crossings: communication and user behaviour issues

Ref 06 | Creation date 10.06.2004 | Last modified 02.02.2005

Issue

Road junctions

Issue at a level crossing

Woburn Sands MCB: the road junction close to the crossing is used by local people and commercial traffic.

1. Level Crossing type

1.1 Protected

- ☒ AOCL
- ☒ AOCR
- ☒ ABCL
- ☒ AHB
- ☐ MG
- ☒ MCB
- ☒ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☐ UWC/T
- ☐ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☐ Pedestrian
- ☐ Farmer
- ☐ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☒ Individual
- ☐ Group
- ☐ Undefined

3. Description of issue / design feature

Road junctions close to the level crossing may result in increased decision making and errors by vehicle drivers, and blocking-back over the crossing.

4. User behaviour

Roads that intersect with the vehicle driver's road before or after the level crossing may increase the amount of visual information presented to the vehicle driver and therefore cause distraction. A vehicle driver's primary focus of attention is likely to be on assessing the presence and determining the actions of other road users movement in and around the junctions, and secondly on the decisions and actions required at a level crossing. This reduction in observation of the level crossing and/or the activated warning system to concentrate on other vehicle drivers may increase their decision making errors at the crossing.

Right turns on the exit of the level crossing pose a particular problem for vehicles blocking-back over the crossing, especially at automatic crossings. While a vehicle is waiting to turn across the path of oncoming traffic, waiting traffic behind the turning vehicle, queue over the crossing. Although there are no reasons provided by research for vehicle drivers continuing to cross when there is insufficient clearance on the other-side, it is in our opinion that vehicle drivers are:

Unaware of the dangers posed by waiting on the crossing;

(if immediately after the road has been opened to traffic) The vehicle drivers believe the warning system will not be activated so soon after the previous warning;

Tailgating the vehicle in-front, to ensure they are already on the crossing, to avoid having to wait if the warning system is activated.

5. Error type

- ☒ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☒ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☒ Milton Keynes
- ☐ Doncaster
- ☒ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☒ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☒ Non-UK

6.4 Document details

ntsb/sa
tr/ah
st/au

Level crossings: communication and user behaviour issues

Ref 07 | Creation date 11.06.2004 | Last modified 02.02.2005

Issue

Vehicle approach speed

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

The speed of the road traversing a level crossing is a factor in vehicle driver errors.

4. User behaviour

Road vehicle research has suggested that speed is a factor in road accidents and therefore, speed could also be considered as a contributor to vehicle drivers not stopping at level crossings. With increased speed, vehicle drivers will have less time to react to an activated warning at a level crossing. Greater numbers of red light violations have been recorded at a level crossing with road vehicle drivers passing through at a higher average speed.

Vehicle drivers have responded to red light violations (or provide this reason when questioned to avoid potential prosecution) by stating their concern that stopping when travelling at higher speeds will result in a vehicle-vehicle collision at the level crossing, therefore they continue across the crossing which they perceive at the time to present a lesser risk to themselves.

5. Error type

- [x] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [ ] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [x] ROAD INDUSTRY
- [x] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [x] GOVERNMENT
- [x] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [x] Non-UK

6.4 Document details

vi/re
st/au
wi/an2

Level crossings: communication and user behaviour issues

Ref 08 | Creation date 11.06.2004 | Last modified 02.02.2005

Issue

Age of drivers

Issue at a level crossing

Lincolnshire is a retirement county. They have a high percentage of elderly drivers who drive during the day and at relatively low speeds. However, there are problems with elderly drivers passing through the activated warning system. Recently a elderly driver went through a red light while travelling at only 40mph in a 60mph zone.

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [x] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [ ] Van driver
- [ ] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [x] 20-35
- [ ] 35-50
- [x] 50-60
- [x] 60+
- [ ] Undefined

2.3 On own

- [x] Individual
- [ ] Group
- [ ] Undefined

3. Description of issue / design feature

Violations at level crossings may be influenced by the age of the local population.

4. User behaviour

Local populations with higher numbers of a certain age-group may result in an increased number of violations or errors at level crossings. At a red light camera testing site, a disproportionate number of more elderly people continued to travel past the red warning lights. This behaviour has been associated with lower reaction speed and lack of visual awareness of their immediate surroundings, rather than being assigned to them purposefully crossing the activated warning system.

High numbers of other age-groups within a geographical location may also contribute to increased violations or errors at level crossings.

5. Error type

- [x] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [x] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [x] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

vi/ve
hu/in
dft/in2
aa/re

Level crossings: communication and user behaviour issues

Ref 09 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Signal box: track side workers

Issue at a level crossing

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☐ AOCL	☒ MCBcctv	☐ UWC	☐ Undefined
☐ AOCR	☐ Undefined	☐ UWC/T	
☐ ABCL		☐ UWC/MWL	
☐ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☐ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☐ Car driver	☐ Train driver	☐ 20-35		
☐ Van driver	☒ Other	☐ 35-50		
☐ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

High-visibility clothing appears white on black & white monitors.

4. User behaviour

If track side workers are carrying out duties in the vicinity of a level crossing, they should phone the local signaller and inform them of the type of work being carried out, the area they are working within and for how long.

However, this does not always happen and can create problems for signallers when checking via the CCTV monitors if a level crossing is clear. The high-visibility clothing worn by track-side workers appears white when viewed on black and white monitors. If the signaller has not been made aware of any work being carried out, the signaller assumes the people to be members of the public standing track side.

It is now policy for track-side workers to wear hardhats, which can provide the signaller with an additional visual cue to help identify them from the general public. However, these are not worn consistently by all workers, and this can again create problems for distinguishing between workers and the general public.

Recent research has suggested the use of colour monitors as acceptable for use within signal boxes.

5. Error type

☒ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☐ OTHER	
☒ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☐ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☒ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 10 | Creation date 11.06.2004 | Last modified 02.02.2005

Issue

Representation of HGV users

Issue at a level crossing

Dockhills CCTV level crossing (& Moathills in background): provides access from a lorry park to a main road. The crossings have been reviewed and changes made to accommodate for the large volumes of HGV's that use these on a daily basis.

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☐ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☐ Car driver	☐ Train driver	☐ 20-35		
☐ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

HGV drivers form a disproportionately high number of incidents at level crossings.

4. User behaviour

A higher percentage of HGVs are involved in level crossings incidents than cars (total number of incidents from collisions with both trains and level crossing equipment), when compared with the proportion of cars using level crossings and road miles travelled.

It has been proposed in a report on HGV accidents at level crossings that this may be due to the following.

The size of the vehicles; they have less room for error when compared to cars.

They may not be responding to the activation of the crossing warning system in sufficient time. The HGV study proposed they may attempt to traverse the crossing once the barriers have already started to descend, suggesting that it could be to do with the driver's awareness of their vehicle's poorer braking performance, and therefore considering it safer to continue.

5. Error type

☒ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☐ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☒ OTHER	vi/hg
☐ Network Rail	☐ ROAD INDUSTRY	☒ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☐ HSE/HMRI	☐ Bus drivers	☒ Peterborough	☐ RSSB	☐ DfT (road)	☒ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 11 | Creation date 11.06.2004 | Last modified 02.02.2005

Issue

Pedestrian access

Issue at a level crossing

Roydon CCTV: as the barriers descend, a school boy runs underneath to gain access to the platform at the other side of the crossing. Once across, the school boy realised the train was a through-train and he casually waited for the next train.

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [x] Cyclist
- [ ] Car driver
- [ ] Van driver
- [ ] HGV driver
- [ ] Motorcyclist
- [x] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Pedestrian and passengers are more likely to undertake risky behaviour at vehicular level crossings where bridges are not provided.

4. User behaviour

Vehicular level crossings without pedestrian bridges influences the risk taking behaviour of both pedestrians and train passengers.

It has been observed that pedestrians and passengers approaching the level crossing, on seeing and/or hearing the activation of the level crossing warning system, rush across the crossing to avoid having to wait. Users at crossing without bridges are more likely to commit violations by attempting to run across the crossing, aware that they have no alternative means of crossing during the activated warning. At crossings with bridges, users are able to use an alternative access for crossing the railway lines.

Crossings without bridges, used by train passengers to gain access to other platforms at a nearby station may undertake particularly risky behaviour to avoid missing their train. The activated warning informs the passenger that a train is approaching and they continue to cross to ensure they catch their train.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [ ] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [x] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 12 | Creation date 15.06.2004 | Last modified 02.02.2005

Issue

Regularity of trains

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [ ] ABCL
- [x] AHB
- [x] MG
- [ ] MCB
- [ ] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [x] UWC
- [x] UWC/T
- [x] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [x] Cyclist
- [x] Car driver
- [ ] Van driver
- [ ] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [x] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Variations in train schedules, such as engineering works, unexpected delays to train services, and line speed restrictions etc., all contribute to fluctuations in trains passing a point at a supposedly ‘known’ time.

4. User behaviour

The supposed regularity of trains passing a point at a known time is being used by level crossing users to make judgments of when to cross. Users are assuming trains to pass a crossing at a particular point in time, thus believing the crossing to be safe at certain times. Many users also believe the timetable to be ‘set in stone’, thus allowing them to make an accurate assessment of when they should and should not cross. However, users fail to consider the variations in train schedules and that many trains, such as freight are not scheduled under passenger timetables.

The research refers to a landowner who retains a train timetable within his tractor cab to allow him to make ‘safe’ assessments of when he should cross. Other research also identified 4% of users considered a crossing to be ‘safe’ because they were knowledgeable of the train timetable.

GI/GN7611 indicates that the regularity of trains to be a factor in posing a high risk to users, due to “the rarity of them encountering a train and the reduced vigilance that they may therefore demonstrate in crossing”.

5. Error type

- [x] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [x] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [x] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

ar/us
GI/GN7611

Level crossings: communication and user behaviour issues

Ref 13 | Creation date 15.06.2004 | Last modified 02.02.2005

Issue

Groups

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [x] UWC
- [x] UWC/T
- [x] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [x] Cyclist
- [ ] Car driver
- [ ] Van driver
- [ ] HGV driver
- [ ] Motorcyclist
- [x] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [x] 0-10
- [x] 11-15
- [x] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [ ] Undefined

2.3 On own

- [ ] Individual
- [x] Group
- [ ] Undefined

3. Description of issue / design feature

People in groups may undertake more risky behaviour, than when on their own.

4. User behaviour

The nature of a group of people will mean they look and listen less at their surroundings and be more concerned with the dynamics of the group. This may result in the first few of a groups of walkers crossing carefully, but the remaining group members continuing to progress over the railway line without checking for oncoming trains. This may be a particular problems at footpath and bridleway crossings on routes used often by ramblers.

Young people in groups also exhibit more risky behaviour. A young person's perception of risk tends to be one of a 'risk adopter', however, although most young people will not engage in extreme danger, their perception of risk is sufficient for them to behave dangerously, especially when provided with opportunities.

Many of the behaviours exhibited by young people are driven by a particular motivation (an opportunity), for example, not being picked upon or to just be accepted by others. When in groups, this type of motivation can further influence young people to undertake very risky behaviours, more so than when on their own.

Issue at a level crossing

Helpston: youngsters use this crossing mainly on bicycles. The signallers at Helpston signal box are aware that a group of youngsters riding bicycles up to the crossing, will probably all attempt to jump the lights if the first youngster does so.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [ ] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [x] Peterborough
- [ ] Bedford
- [x] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 14 | Creation date 15.06.2004 | Last modified 02.02.2005

Issue

Time of day

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [x] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Risk taking at level crossings increases during rush-hours, at midday and at the beginning and end of the school day.

4. User behaviour

Vehicle driver violations may be associated with the time of day. The rate of vehicle incidents increases at crossings during the morning and evening rush-hours. Vehicle drivers needing to arrive somewhere on time (e.g.,meeting) may consider the risks of passing through the activated warning lights to be lower than the perceived risks associated with being late. This may be further compounded with the general increase in road traffic during rush-hours and at the beginning and end of the school day.

Increases in vehicle driver violations were also detected during the later afternoon hours and is suggested as being associated with the school-run (vi/re). Parents on multi-school runs, prior to driving to work is also considered a factor in risk taking behaviour, because of the need to drive to various locations within a short period of time. Crossings used as access routes for the school-run, as well as those in close proximity to the school may have higher number of violations as a result.

Red light violations are also high for some sites at midday. This may be due to people trying to fit in activities within their lunch-hour. Factories and other similar industrial working environments have specific staff working hours, with workers arriving and leaving on-mass. This may result in violations at crossings nearby because of the large volumes of traffic using the crossing at specific times.

Issue at a level crossing

Helpston: 'Parents' have been observed by the signallers at Helpston signal, driving past the activated warning lights, with children in the vehicle.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [x] HSE/HMRI
- [ ] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [x] OTHERS

6.2 Level crossing visit - areas

- [x] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [x] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [x] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [x] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [x] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

pi/ve
vi/re
aa/re

Level crossings: communication and user behaviour issues

Ref 15 | Creation date 15.06.2004 | Last modified 02.02.2005

Issue

Visual clutter

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☐ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☒ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Superfluous information and roadside structures on the approach to the crossing may reduce the user's detection of level crossing information and warning signs.

4. User behaviour

Vehicle drivers approaching the level crossing are presented with an array of standard level crossing information and warning signs. However, superfluous information and roadside structures (both rail and other authorities) in the vehicle driver's visual field may reduce the impact of the level crossing information.

Issue at a level crossing

Tallington CCTV: the approach to this crossing is heavily cluttered with additional information. The branding of the petrol station on the right-hand side is of similar colour to the crossing signs, thus reducing the impact of the sign information on the vehicle driver's attention.

5. Error type

☒ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☐ OTHER	
☐ Network Rail	☒ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☒ HSE/HMRI	☒ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 16 | Creation date 15.06.2004 | Last modified 02.02.2005

Issue

Presence of rail staff

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☒ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☒ UWC/T	
☒ ABCL		☒ UWC/MWL	
☒ AHB		☒ OC	
☒ MG		☒ FP/MWL	
☒ MCB		☒ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☒ Pedestrian	☒ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☒ Passenger	☐ 11-15	☒ Undefined	☐ Group
☒ Cyclist	☒ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☒ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

The presence of rail staff in high-visibility clothing may have an undesirable influence on level crossing user behaviour.

4. User behaviour

Rail staff are required to wear high-visibility clothing when working on or near the railway. Vehicle drivers and pedestrians may misinterpret an activated warning system as 'safe' when rail staff are present at the level crossing. Users often assume or inquire if they can continue to pass through the activated warning as they believe the rail staff are are only testing the equipment or that no trains would be passing if staff are track-side.

Users at unprotected crossings may also interpret the presence of rail staff to mean the line is closed to trains, resulting in users behaving less cautiously when crossing.

Issue at a level crossing

Helpston: has had significant maintenance over the last few years and they often close the main road to all vehicles. However, because people see the staff maintenance cars at the crossing, they still perceive it acceptable to use and since they have made the effort to drive all the way to the crossing, they request permission to cross.

5. Error type

☒ Error
☐ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☒ RAIL INDUSTRY		☐ OTHER	pi/ve
☒ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☒ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☒ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☒ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 17 | Creation date 15.06.2004 | Last modified 02.02.2005

Issue

Understanding of warning lights

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☐ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☒ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

The onset of the amber and proceeding red lights of the activated warning system lead to various vehicle driver behaviours at level crossings.

4. User behaviour

Not all vehicle drivers fully understand the instruction given and the required user behaviour to the onset of an amber light. Users understanding of the steady amber at road traffic lights and at level crossing lights was compared. Higher numbers of users (slightly more for level crossings) interpreted the required action for an amber light incorrectly for both light warning systems.

There is also evidence that some users incorrectly determine the required action upon the onset of the red lights at a level crossing. Just over 50% of users correctly confirmed the required action at the onset of a red light compared to all users for road traffic lights.

The wigwag light system also used at fire stations to stop road traffic and allow the fire pumps to be driven onto the road, are routinely ignored by vehicle drivers.

Issue at a level crossing

Tallington CCTV: vehicle drivers approaching the crossing in a 30mph zone, continue to drive through the amber flashing light on numerous occasions. The approaching vehicle was in a position to stop at the lights, however they continued through the amber light.

5. Error type

☒ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☒ OTHER	pi/ve
☒ Network Rail	☒ ROAD INDUSTRY	☐ Doncaster	☒ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	vi/hg
☐ RSSB	☒ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☒ TRL (road)	
☐ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☒ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 18 | Creation date 15.06.2004 | Last modified 02.02.2005

Issue

Closure time

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☐ MCBcctv	☐ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☒ UWC/MWL	
☒ AHB		☐ OC	
☒ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☒ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☒ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

The amount of time the user expects to wait at the level crossing may influence their risk taking behaviour.

4. User behaviour

Vehicle drivers consider the warning time of the activated system (required to allow for safety margins) to be far too long. Vehicle drivers at automatic crossings also overestimate the time they are required to wait. Over 50% of drivers who traversed a crossing during the activated warning system said they were unwilling to stop. Reasons given for their actions, such as 'having an appointment to make' were time related. The greater the time delay, the more risky behaviour of level crossing users. American research suggests vehicle drivers expect trains to arrive within 20 seconds, but they begin to lose patience after 40 seconds at open crossings and after 60 seconds at barrier crossings.

In particular, this overestimation of waiting time has been found to be a factor in why users cross during the red light phase at UWC/MWL.

Issue at a level crossing

5. Error type

☐ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☐ RAIL INDUSTRY		☐ Milton Keynes	☒ RAIL INDUSTRY		☒ OTHER	pi/ve
☐ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☒ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	gr/lm
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	tr/ah
☐ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☒ RSSB	☐ DfT (road)	☐ Independent	tu/us
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☒ Non-UK	GI/RN7611
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			ab/dr, HMRI internal report

Level crossings: communication and user behaviour issues

Ref 19 | Creation date 15.06.2004 | Last modified 02.02.2005

Issue

Open gates

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☒ UWC
- ☒ UWC/T
- ☒ UWC/MWL
- ☐ OC
- ☒ FP/MWL
- ☒ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☒ Farmer
- ☒ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Open gates increases the risk to approaching users.

4. User behaviour

UWC gates are provided closed across the road and open away from the railway lines. Footpath and Bridleway crossings have a variety of gates fitted that are closed across the paths on the approach to both sides of the crossing.

Gates left open affect the behaviour of users approaching a crossing. It predisposes users to see the crossing as 'safe', and cross without carrying out the required crossing procedure. This is especially relevant in the case of irregular or first time users at UWC. It has been suggested that these types of users may have a mental model of an open gate being similar to an automatic crossing. If the gate is open, then it is safe to cross.

Train drivers often report open gates to the local signaller. This impacts on the running of the trains as the signaller will request train drivers to slow on approach and observe for any level crossing users.

5. Error type

- ☒ Error
- ☐ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☒ HSE/HMRI
- ☐ Network Rail
- ☒ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☐ Non-UK

6.4 Document details

tu/us
ar/us
HMRI internal report
hu/hu

Level crossings: communication and user behaviour issues

Ref 20 | Creation date 15.06.2004 | Last modified 02.02.2005

Issue

Audible alarm

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☒ AOCL
- ☒ AOCR
- ☒ ABCL
- ☒ AHB
- ☐ MG
- ☒ MCB
- ☒ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☐ UWC/T
- ☒ UWC/MWL
- ☐ OC
- ☒ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☒ Farmer
- ☒ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☒ Passenger
- ☒ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Second audible warning tone is not detected and/or understood by level crossing users.

4. User behaviour

When two trains arrive at an automatic vehicular crossing without the minimum road opening time, users are provided with a change in the tone of the audible warning.

Pedestrians waiting at the level crossing for a train to pass, do not detect or understand the continued warning system to apply to another train coming, only to the train just passed. Users have traversed the level crossing while the second tone has been audible.

Human factors research into miniature warning lights at UWC/MWL also highlighted that users poorly understood the meaning of the change of tone associated with a second train approaching. Other users have commented that the change in tone is not distinctive enough.

5. Error type

- ☒ Error
- ☐ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☒ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☒ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☒ Non-UK

6.4 Document details

tr/ah
HSE/ra, section E
tu/us
hu/hu

Level crossings: communication and user behaviour issues

Ref 21 | Creation date 15.06.2004 | Last modified 02.02.2005

Issue

Darkness

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☒ UWC
- ☒ UWC/T
- ☐ UWC/MWL
- ☒ OC
- ☐ FP/MWL
- ☒ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☒ Farmer
- ☒ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☐ Motorcyclist
- ☒ Passenger
- ☒ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Unprotected crossings (without MWL) used during the hours of darkness may lead to increased decision making errors by crossing users.

4. User behaviour

The speed of an object can be judged by assessing the moving object against the background. However, during the hours of darkness, the background is not visible against the moving object and therefore users lose this important visual information cue for assessing speed, resulting in increased decision making errors by level crossing users.

Farmers often continue to use UWC's during the hours of darkness, especially during harvesting time. The context of working during darkness and under tight timescales to transport produce from their farms could impact on the behaviour of the farmer to use the crossing safely.

Issue 25 "Users perception of train speed and distance" addresses the use of an incorrect mental model of train speed and distance as a factor in why level crossing users may cross during an unsafe period of time. The impact of darkness in impairing a user to determine train speed remains a separate issue because it is a result of an environmental effect.

Issue at a level crossing

Fox covert footpath: this crossing is used by local school children as an access point between their homes and the school. During winter months, many children will be using this crossing during the hours of darkness.

5. Error type

- ☒ Error
- ☐ Violation

6. Sources of information

6.1 Interview source

- ☐ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☒ Non-UK

6.4 Document details

ntsb/na
wa/ac

Level crossings: communication and user behaviour issues

Ref 22 | Creation date 15.06.2004 | Last modified 02.02.2005

Issue

Conspicuity of flashing lights

1. Level Crossing type

1.1 Protected

- ☒ AOCL
- ☒ AOCR
- ☒ ABCL
- ☒ AHB
- ☐ MG
- ☒ MCB
- ☒ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☐ UWC/T
- ☒ UWC/MWL
- ☐ OC
- ☒ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☐ Farmer
- ☒ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

The effectiveness of flashing lights is limited by veiling glare, limited light output and their position.

4. User behaviour

The combined affects of sun reflection and the use of limited light output in the warning lights may contribute to vehicle drivers and other users missing the activated warning system at level crossings. At automatic open crossings, the lack of any barrier dropping means vehicle drivers and others may continue to pass through the lights much later during the activated warning time.

Although it should be noted, of the drivers who stated they were unaware of the crossing when they had run a red light, only 1% gave the sun as a reason for impairing their vision (UK based research). However, in non-UK research the sun as an affect on accidents at crossings is an established cause. In Scotland, the affects of low sun in winter present a particular problem, especially at open crossings. Therefore the issue of the sun and its effect on the flashing warning lights remains a precursor for vehicle drivers unintentionally passing the activated warning system.

The conspicuity of warning lights is improved with the use of the red and white chequered board surround, located behind the lights. The previous grey back boarding remains legal, but replacement back boards are of the new style.

Issue at a level crossing

Folly Bank AHB: on the approach to Glinton Village, the warning lights are difficult to detect due to the low position of the sun behind the crossing.

5. Error type

- ☒ Error
- ☐ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☒ HSE/HMRI
- ☒ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☒ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☒ Peterborough
- ☐ Bedford
- ☒ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☒ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☒ GOVERNMENT
- ☒ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☒ Non-UK

6.4 Document details

st/au
pi/ve
HMRI internal report
tr/ah
vi/ve
te/ca

Level crossings: communication and user behaviour issues

Ref 23 | Creation date 31.08.2004 | Last modified 02.02.2005

Issue

Sunlight strobing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [x] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Sunlight passing through lines of trees positioned on the side of the road imparts a strobing effect on the road which may impair the visibility of vehicle drivers.

4. User behaviour

Trees along the sides of the road, combined with sunlight passing through the trees can provide a strobe lighting affect along the road. A vehicle driver approaching a level crossing is subjected to a broken line of shadow and light, which may affect the vehicle driver's detection of objects ahead of them. This may result in the vehicle driver continuing to cross over a level crossing, including those with activated warning lights. This is a particular problem at open crossings, those with and without activated warning lights because of the lack of any physical barrier across the road to act as a final warning cue of the presence of a crossing.

Issue at a level crossing

Kirknewton crossing: on the approach to this crossing in Scotland, sunlight strobing across the road causes particular problems for road vehicle users.

5. Error type

- [x] Error
- [ ] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [x] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 24 | Creation date 15.06.2004 | Last modified 02.02.2005

Issue

Half barrier

1. Level Crossing type

1.1 Protected

- [ ] AOCL
- [ ] AOCR
- [ ] ABCL
- [x] AHB
- [ ] MG
- [ ] MCB
- [ ] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [x] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Automatic half barriers facilitate vehicle drivers to undertake risk taking behaviour.

4. User behaviour

Automatic half barriers are normally kept in the raised position and when lowered, the barriers extend only across the entrances to the crossing. The exits from the crossing are left clear and therefore allow for vehicle drivers to clear the crossing.

Although half barriers increase the observance by drivers of the automatic warning system, they introduce another undesirable risk taking behaviour, known as zigzagging. The vehicle driver not wanting to wait at the level crossing, weaves around the first barrier onto the other side of the road and exits via the open gate side.

An earlier report stated that half of all accidents at AHB's are due to the drivers violating user procedures and zigzagging around the barriers (pi/re, st/au).

Issue at a level crossing

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [ ] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [x] ROAD INDUSTRY
- [ ] AA
- [x] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [x] RAIL INDUSTRY
- [x] HSE/HMRI
- [ ] Network Rail
- [x] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [x] Non-UK

6.4 Document details

HSE/Ra
vi/re
pi/re
HSE/ra, section E
mo/vi
st/au

Level crossings: communication and user behaviour issues

Ref 25 | Creation date 15.06.2004 | Last modified 02.02.2005

Issue

User perception of train speed & distance

1. Level Crossing type

1.1 Protected	1.2 Unprotected
☒ AOCL ☐ MCBcctv	☒ UWC ☐ Undefined
☒ AOCR ☐ Undefined	☒ UWC/T
☐ ABCL	☒ UWC/MWL
☒ AHB	☒ OC
☐ MG	☒ FP/MWL
☐ MCB	☒ FC

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☒ Pedestrian	☒ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☒ Farmer	☒ Passenger	☐ 11-15	☒ Undefined	☐ Group
☒ Cyclist	☒ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Train speed and distance is underestimated by users, which may result in increased decision making errors by users at level crossings.

4. User behaviour

The speed at which trains travel and how far it takes for a train to stop is vastly underestimated by the general public. There are various perceptual problems that may increase the decision making errors of users at level crossings.
Large objects appear to move more slowly than smaller objects travelling at the same speed.

When looking head-on to an approaching train, the rate of change of the trains size is extremely slow and it is not until the train is much closer that it becomes easier to determine its actual speed and distance.

The public are using an incorrect mental model of road vehicle movement for estimating train speed, distance travelled over time and potential stopping distances. This may increase the decision making errors of users when crossing both protected and unprotected level crossings.

Users in vehicles are to some extent 'shielded' from the senses normally evoked from a high speed passing train. A greater understanding of train speed and its size is enhanced when standing close to a passing train.

Issue at a level crossing

5. Error type

☒ Error
☐ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☒ OTHER	ntsb/sa
☒ Network Rail	☒ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	nu/de
☐ RSSB	☒ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	de/ra
☒ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☒ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☒ Non-UK	
☒ BTP	☒ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 26 | Creation date 16.06.2004 | Last modified 02.02.2005

Issue

Foliage

1. Level Crossing type

1.1 Protected	1.2 Unprotected
☒ AOCL ☒ MCBcctv	☒ UWC ☐ Undefined
☒ AOCR ☐ Undefined	☒ UWC/T
☒ ABCL	☒ UWC/MWL
☒ AHB	☒ OC
☒ MG	☒ FP/MWL
☒ MCB	☒ FC

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☒ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

The effectiveness of information on the approach to and at the level crossing is reduced by overgrown foliage.

4. User behaviour

Foliage that has been left to overgrow on the approach to the level crossing covers the information signs and removes the initial warning cue to vehicle drivers. Vehicle drivers have less time to react and respond accordingly through changing their driving behaviour. This issue is further compounded when the level crossing is positioned on the bend in a road or on a high speed road, as the vehicle driver has even less time to respond to the required change in driving behaviour.

This issue is also applicable to train drivers. Foliage on the lineside may impact on the train driver from obtaining a sufficient view while on the approach to a crossing, of any information, objects or people on the crossing.

Issue at a level crossing

Maxey CCTV: foliage covers the information sign on the left-hand side. The information provided to the vehicle driver is further reduced because a maintenance van has parked in front of the crossing, blocking the view of the warning light.

5. Error type

☒ Error
☐ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☐ OTHER	
☒ Network Rail	☐ ROAD INDUSTRY	☒ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☒ HSE/HMRI	☐ Bus drivers	☒ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 27 | Creation date 16.06.2004 | Last modified 02.02.2005

Issue

Harvesting time

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☒ UWC
- ☒ UWC/T
- ☒ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☒ Farmer
- ☐ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Harvesting time influences the risk taking behaviour of UWC users.

4. User behaviour

Farmers will need to transport produce between fields and storage areas and from their farmland to other sites. The increased frequency of use of UWC's over a short period of time, the time critical factor of harvesting and the lengthy procedure required for crossing the railway line, results in increased risk taking behaviour by farmers.

During harvesting, farmers are more likely to leave the gates open and fail to follow the correct crossing procedure to avoid hindering their work progress.

Farmers may also adopt alternative crossing methods, such as positioning a 'look-out' at the UWC to observe for oncoming trains, allowing the UWC users to cross with minimal disruption.

5. Error type

- ☐ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☒ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☒ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☐ Non-UK

6.4 Document details

hu/hu
HMRI internal report

Level crossings: communication and user behaviour issues

Ref 28 | Creation date 16.06.2004 | Last modified 02.02.2005

Issue

Position of warning lights

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☒ AOCL
- ☒ AOCR
- ☒ ABCL
- ☒ AHB
- ☐ MG
- ☒ MCB
- ☒ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☐ UWC/T
- ☒ UWC/MWL
- ☐ OC
- ☒ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☐ Farmer
- ☐ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☒ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

The effectiveness of warning lights is influenced by their position.

4. User behaviour

If a user is unable to clearly see the warning lights at a level crossing, from either a position of safety at the crossing, or a clear line of sight from their direction of approach, this may result in the user moving into an unsafe area to read the lights or cross without taking account of the warning information.

The 10cm diameter of the red and green miniature warning lights at UWC were found to be of adequate size for being discerned from a distance of up to 15m. However, it was suggested that an 'alternative' to MWL's be considered if they were to positioned on the far side of the tracks and the total distance across the tracks was greater than 15m. There is currently on-going discussions within NWR to address this issue.

The position of road vehicle wigwag lights is also critical for providing sufficient time for approaching vehicle drivers to observe and respond to the lights. Their position should accommodate the approach route of all types of road vehicles and take account of any internal vehicle features that may reduce the vehicle driver's detection of the lights. Poorly positioned lights may reduce the time available for the vehicle driver to respond accordingly.

5. Error type

- ☒ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☐ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☒ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☒ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☐ Non-UK

6.4 Document details

hu/hu

Level crossings: communication and user behaviour issues

Ref 29 | Creation date 17.06.2004 | Last modified 02.02.2005

Issue

Quantity of information

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [x] 16-20
- [x] 20-35
- [x] 35-50
- [x] 50-60
- [x] 60+
- [ ] Undefined

2.3 On own

- [x] Individual
- [ ] Group
- [ ] Undefined

3. Description of issue / design feature

The quantity of signage information that can be read and understood decreases with road speed.

4. User behaviour

A road transport study provided a minimum exposure time required (based upon a simple calculation using the amount of words and driver speed) for drivers of vehicles to register and understand the information provided by a vehicle activated warning system.

Large quantities of information on signs with an inadequate time for users to register and interpret the information may result in two user behaviours:

1. The time it takes the user to read all of the information and respond accordingly to its instructions, they have proceeded past the sign and decide to ignore its requirements and continue across the crossing; or

2. The user does not have sufficient time to comprehend all of the information and makes a judgment that it does not apply to them anyway.

Issue at a level crossing

Information sign for indicating to drivers of large or slow vehicles to park at the sign and call the signaller from the phone box at crossing, to obtain permission to cross.

The above sign is located on a bend prior to the crossing on a road with a national speed limit.

5. Error type

- [x] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [ ] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [x] Milton Keynes
- [x] Doncaster
- [ ] Hertford
- [x] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [x] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

wi/ve

Level crossings: communication and user behaviour issues

Ref 30 | Creation date 17.06.2004 | Last modified 02.02.2005

Issue

Trespassing on rail structures

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [x] UWC
- [x] UWC/T
- [x] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [ ] Car driver
- [ ] Van driver
- [ ] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [x] 0-10
- [x] 11-15
- [x] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [ ] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Rail structures located at the entrance and exit areas to crossings that appear suitable for climbing may result in undesirable risk taking behaviour by members of the public.

4. User behaviour

Level crossings can be perceived by some people as an accessible point to the railway infrastructure. Objects located at level crossings, that resemble day-to-day objects or create opportunities for use may increase the likelihood of children or young people playing in and around level crossings.

The position of the crossing close to housing areas, schools and other places where children and young people may utilise the crossing, may also contribute to increased trespassing.

Youth perception of risk tends to be one of a 'risk adopter'. Although most young people will not engage in extreme danger, their perception of risk is sufficient for them to behave dangerously, especially when provided with opportunities.

Issue at a level crossing

Woburn Sands: ladder for railway use only, located at the entrance to a footpath level crossing.

The crossing provided access from a large housing area to both a school and a children's playground. The playground provided children with similar looking 'climbing ladders'.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [ ] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [x] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

dr/yo

Level crossings: communication and user behaviour issues

Ref 31 | Creation date 17.06.2004 | Last modified 02.02.2005

Issue

Location near rail stations

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [x] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [x] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [x] Individual
- [ ] Group
- [ ] Undefined

3. Description of issue / design feature

Level crossings adjacent to rail stations influence the risk taking behaviour of vehicle drivers and other users.

4. User behaviour

Level crossings located adjacent to a rail station can increase the length of time the warning system is activated, and therefore require users to wait for longer periods of time at the crossing. This is due to slower trains pulling into and out of the station in close proximity from either direction and the interval between the trains being too short to allow the warning system to be deactivated.

At level crossings located next to a rail station, users estimated their waiting time to be much higher than at crossings not located in the vicinity of a station. It is suggested that users (for example regular, local users who are aware of the increased waiting times) may have been encouraged to violate the warning system because of the potential for a prolonged delay to their journey.

Issue at a level crossing

St.Margarets CCTV: this crossing is positioned next to the station. The barrier downtime is lengthy, especially during the evening rush-hour when there is an increase in train traffic.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [x] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [x] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [x] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [x] Non-UK

6.4 Document details

pi/ve
wi/an2

Level crossings: communication and user behaviour issues

Ref 32 | Creation date 17.06.2004 | Last modified 02.02.2005

Issue

Train speeds

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [x] UWC
- [x] UWC/T
- [x] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [x] Cyclist
- [x] Car driver
- [x] Van driver
- [ ] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Low train speeds may increase the risk taking behaviour of users.

4. User behaviour

Circumstances which present a lower perceived risk, often result in changes to a user's behaviour. It has been established that users perceive UWC and footpath crossings to be safer when trains are slower. In this case, the users are responding to the perceived low level of risk presented by slower trains by behaving less cautiously. For example, users may cross while a train is in view, they may not cross as quickly or they may look less often while crossing.

At open crossings with slow moving trains, vehicle drivers (and pedestrians) may be inclined to think "I can beat the train". By being able to edge forward past a point of safety and look along the railway line, they may believe they have ample time to make a safe crossing in front of a slower train. This behaviour may also be prevalent at half barrier crossings, where users may zigzag around the barrier.

Railway Group Standard GI/GN7611 identifies "maximum train speed" as a factor for consideration within risk assessments at level crossings. However, slow trains speeds are also a factor because of the effect it may have upon the user's perception of risk.

Issue at a level crossing

5. Error type

- [x] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [x] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

ar/us
GI/GN7611

Level crossings: communication and user behaviour issues

Ref 33 | Creation date 18.06.2004 | Last modified 02.02.2005

Issue

Sighting distance

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [ ] MCBcctv
- [x] AOCR
- [ ] Undefined
- [ ] ABCL
- [x] AHB
- [ ] MG
- [ ] MCB

1.2 Unprotected

- [x] UWC
- [ ] Undefined
- [x] UWC/T
- [x] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [x] Motorcyclist
- [x] Farmer
- [ ] Passenger
- [x] Cyclist
- [x] Horserider
- [x] Car driver
- [ ] Train driver
- [x] Van driver
- [ ] Other
- [x] HGV driver
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 60+
- [ ] 11-15
- [x] Undefined
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Good sighting distance should indicate the level crossing as high risk.

4. User behaviour

There is a low occurrence of accidents at UWC and footpath crossings where the sighting distance is poor. This contradicts the established view that good sighting times will always reduce the risk of accidents at unprotected level crossings. Research at UWCs confirmed the issue of risk compensation by users, as discussed in the AD Little report. Level crossing users aware of the poor sight times, perceive the crossing as dangerous and therefore compensate by being extra vigilant. But, where sight times are good, the user perception of risk is low, and they may adapt their behaviour, acting less cautiously, such as failing to look or look less often for approaching trains.

Note: the research does not suggest that poor sighting times should be permitted, however it identifies that those with good sighting times should also be considered as 'high risk'.

Clear sighting distance of a train at AHB, AOCR and AOCL crossings may also provide vehicle drivers with the opportunity to move close to the tracks and check for oncoming trains, thus making a decision of whether to cross, during the activated warning system. Good sighting of the railway line from the road, may also encourage some vehicle drivers to make a judgment that they have sufficient time to move past the activated warning system and cross the railway line.

Issue at a level crossing

Marsh Lane: the sighting distance is good at this footpath level crossing.

5. Error type

- [x] Error
- [ ] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] ROAD INDUSTRY
- [ ] RSSB
- [ ] AA
- [ ] HSE/HMRI
- [ ] Bus drivers
- [ ] RPC
- [x] BTP
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [x] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] GOVERNMENT
- [ ] Network Rail
- [ ] DfT (rail)
- [ ] RSSB
- [ ] DfT (road)
- [ ] Railway GS
- [ ] Other dept.
- [ ] Others
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [x] Non-UK

6.4 Document details

ar/us
me/an

Level crossings: communication and user behaviour issues

Ref 34 | Creation date 18.06.2004 | Last modified 02.02.2005

Issue

Parked cars

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [ ] MCBcctv
- [x] AOCR
- [ ] Undefined
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB

1.2 Unprotected

- [ ] UWC
- [ ] Undefined
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [x] Motorcyclist
- [ ] Farmer
- [ ] Passenger
- [ ] Cyclist
- [ ] Horserider
- [x] Car driver
- [ ] Train driver
- [x] Van driver
- [x] Other
- [x] HGV driver
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 60+
- [ ] 11-15
- [x] Undefined
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Parked cars before and after the level crossing may result in vehicle drivers slowing and stopping while on the level crossing.

4. User behaviour

Parked cars before and after the level crossing affect the flow of traffic approaching and moving over the crossing. As vehicle drivers progress over the crossing, parked cars in the road ahead of them, coupled with oncoming traffic prevents them from moving forwards, resulting in vehicles stopping on the level crossing.

Although users should wait until there is sufficient clearance on the other side, before moving forwards, it has been observed on many occasions that vehicle drivers fail to do this. It is in our opinion that vehicle drivers do this for various reasons:
They fail to comprehend the danger associated with stopping on the crossing;
The are tailgating the car in front to avoid being held at the crossing if the warning system is activated;
They do not expect the level crossing to be activated so soon after the road has just been opened to road traffic again.

In our opinion, parked cars are often a result of home owners that do not have off-street parking, leaving their vehicles on the roadside. Previous railway cottages, now privately owned, are often a source of this problem. Customers of local village or town shops with limited or no parking also park on the approach and exit roads to level crossings.

Issue at a level crossing

St.Margarets CCTV: cars parked on the side of the road affect the flow of traffic over the level crossing. As vehicle drivers continue to drive across, they then stop on the crossing because the cars they are following are prevented from moving forwards.

5. Error type

- [x] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] ROAD INDUSTRY
- [ ] RSSB
- [ ] AA
- [x] HSE/HMRI
- [ ] Bus drivers
- [ ] RPC
- [ ] BTP
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [x] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] GOVERNMENT
- [ ] Network Rail
- [ ] DfT (rail)
- [ ] RSSB
- [ ] DfT (road)
- [ ] Railway GS
- [ ] Other dept.
- [ ] Others
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 35 | Creation date 18.06.2004 | Last modified 02.02.2005

Issue

Position of safety

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☐ UWC/T
- ☐ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☒ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☐ Farmer
- ☒ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☒ Individual
- ☒ Group
- ☐ Undefined

3. Description of issue / design feature

Insufficient space between the trackside gate and rail results in potential obstruction of the track by bicycles and pushchairs.

4. User behaviour

Footpath and bridleway crossings are often used by cyclists and people with pushchairs. These users will need to stand at a trackside position to clearly check for any oncoming trains before moving over the railway line. However, insufficient space trackside (between the railway line and gate they have just moved through) to stand with their bicycle or pushchair and observe along the track may result in users obstructing the railway line with the bicycle or pushchair.

5. Error type

- ☒ Error
- ☐ Violation

6. Sources of information

6.1 Interview source

- ☐ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☒ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☐ Non-UK

6.4 Document details

hu/de
ar/us

Level crossings: communication and user behaviour issues

Ref 36 | Creation date 18.06.2004 | Last modified 02.02.2005

Issue

Telephone use

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☒ UWC/T
- ☐ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☒ Farmer
- ☒ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☒ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Level crossing users failure to use the telephone is a factor in incidents at UWC.

4. User behaviour

Visitors, workers and local people who use a UWC must all follow the required crossing procedures. However, it is apparent that users are not complying with the telephone procedures of calling the signaller to request permission to cross. 17 UWC accidents in the last 10 years are associated with users not using the telephone prior to crossing.

Research has highlighted, for example, a female resident crossing up to three times a day, chose not to use the telephone, because she regarded the crossing as safe due to good sighting distances. It is also common for regular UWC users to call the signaller only at the beginning of the day to inform them they will be using the crossing all day but will not be phoning for each crossing made.

5. Error type

- ☐ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☒ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☐ Non-UK

6.4 Document details

ar/us

Level crossings: communication and user behaviour issues

Ref 37 | Creation date 21.06.2004 | Last modified 02.02.2005

Issue

Traffic moment

Issue at a level crossing

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☐ AOCL	☐ MCBcctv	☒ UWC	☐ Undefined
☐ AOCR	☐ Undefined	☒ UWC/T	
☐ ABCL		☒ UWC/MWL	
☐ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☐ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☐ Car driver	☐ Train driver	☐ 20-35		
☐ Van driver	☐ Other	☐ 35-50		
☐ HGV driver	☒ Undefined	☐ 50-60		

3. Description of issue / design feature

High levels of traffic moment at user worked crossings increase the chances of an incident.

4. User behaviour

Traffic moment is a measure of the frequency of trains and utilisation of the crossing by users.

Traffic moment = traverses (by user) per day X trains per day.

Research has identified high traffic moment as a feature of those crossings with accident histories. Research has identified a total of 56% of crossings surveyed to have traffic moments in excess of 1000. A high percentage of these had accident history (44% versus 12%).

It should be noted that the HSE, Railway Safety Principles, Part 2, Section E, Guidance on level crossings, does not give a maximum traffic moment for UWC's or footpath crossings. The only reference to daily road usage (not traffic moment) is that telephones or MWL's should be provided on both sides of the crossing when usage exceeds 50.

5. Error type

☒ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☐ RAIL INDUSTRY		☐ Milton Keynes	☒ RAIL INDUSTRY		☐ OTHER	st/au
☐ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☒ HSE/HMRI	☒ GOVERNMENT	☐ TRL (rail)	ar/au
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☒ DfT (rail)	☐ TRL (road)	HSE/ra, section E
☐ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☒ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 38 | Creation date 21.06.2004 | Last modified 02.02.2005

Issue

Visitor parking

Issue at a level crossing

Bainton Green AHB: Contractors park on the road in front of the crossing. Vehicle drivers approaching from the Lolham bridges level crossing are forced to drive on the opposite of the road, crossing the double white lines.

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☐ MCBcctv	☐ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☒ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☒ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

The position of visitors parked vehicles at a level crossing may affect the behaviour of other road drivers.

4. User behaviour

'Visitor' parking refers to those persons using the level crossing for any kind of associated business with the crossing, i.e., maintenance. It differs from *Issue 34: Parked cars*, as the position of these vehicles are often located in places other than just on the approach and exit roads of the crossing.

Because of the remote position of many level crossings, people tend to drive their vehicles when visiting a level crossing. The location of where the visitor parks their vehicle can influence the behaviour of other road drivers.

For example, if they park in the 'long/slow' parking bay this will prevent drivers of long or slow vehicles from stopping and therefore influence them to drive straight over the crossing without informing the signaller.

Parking on the immediate approach or exit to the crossing may force other drivers to take evasive action, such as driving into the middle of the crossing or it may cause blocking-back of vehicles over the crossing.

The position of their parked vehicle can also block from view the warning information from other approaching vehicle drivers.

5. Error type

☒ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☐ OTHER	
☐ Network Rail	☐ ROAD INDUSTRY	☒ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☒ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 39 | Creation date 21.06.2004 | Last modified 02.02.2005

Issue

Crossing utilisation

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☒ UWC
- ☒ UWC/T
- ☒ UWC/MWL
- ☒ OC
- ☒ FP/MWL
- ☒ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☒ Farmer
- ☐ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Level crossings with high crossing utilisation increases the risks to users.

4. User behaviour

Research has shown that 100+ pedestrian users equates to 'high' crossing utilisation. It warns of daily, weekly or even seasonal effects on utilisation which may not be captured during specific visits, and therefore suggests that to determine utilisation, numerous visits must be made to each crossing.

Where there is high pedestrian utilisation, this usually means the crossing is located as an access point between places such as a school, a housing estate, places of work or a local shopping area. Pedestrians may be using the crossing a couple of times a day and therefore they are likely to be regular users of the crossing. It is unclear from research the exact behavioural traits of users at these crossings, however it can be assumed that with continued use, the user becomes less sensitive to the risks posed by the crossing, resulting in less cautious crossing behaviour. This research has shown that 'high' pedestrian utilisation appears to be a dominant risk factor at level crossings that have previous accident history.

5. Error type

- ☒ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☒ HSE/HMRI
- ☐ Network Rail
- ☒ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

ar/us
HMRI internal report

Level crossings: communication and user behaviour issues

Ref 40 | Creation date 21.06.2004 | Last modified 02.02.2005

Issue

Type of trains

Issue at a level crossing

Lolham Footpath: is used regularly by the Peterborough Bird Watching Club for access to a local wildlife area. Both freight and passenger trains pass this crossing.

1. Level Crossing type

1.1 Protected

- ☒ AOCL
- ☒ AOCR
- ☐ ABCL
- ☒ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☒ UWC
- ☒ UWC/T
- ☒ UWC/MWL
- ☒ OC
- ☒ FP/MWL
- ☒ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☒ Farmer
- ☒ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☒ Motorcyclist
- ☒ Passenger
- ☒ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.

4. User behaviour

Both passenger and freight trains using a train line route will affect the behaviour of users at a level crossing.

Freight trains are often longer than passenger trains and travel at much slower speeds. This may result in the following user behaviours:

Users knowing they will have to wait for longer periods of time and therefore they may demonstrate increased impatience to wait and attempt to cross immediately before the train passes;
Users seeing a train in the distance and judging they have sufficient time to cross because it appears to be or it is normally always a freight train that passes (user's perception of speed based on their previous knowledge).

5. Error type

- ☒ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☒ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☒ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☒ Non-UK

6.4 Document details

GI/GN7611
ntsb/sa

Level crossings: communication and user behaviour issues

Ref 41 | Creation date 21.06.2004 | Last modified 02.02.2005

Issue

Vehicle-activated signs

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☐ AOCL	☐ MCBcctv	☐ UWC	☐ Undefined
☐ AOCR	☒ Undefined	☐ UWC/T	
☐ ABCL		☐ UWC/MWL	
☐ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☐ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☒ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Over a period of time, vehicle drivers remain responsive to the specific message given by vehicle-activated signs.

4. User behaviour

The road industry has devised a range of measures to encourage drivers to adopt a safe speed on the approach to hazards, for example, junctions or bends. One method currently in use at various sites within the UK, are vehicle-activated signing. The sign displays a message relating to the road conditions to specific drivers that are exceeding a particular speed threshold. The signs are effective in reducing the habitual nature of vehicle drivers, resulting in drivers continuing to respond to the messages over a long period of time.

It has been suggested by the road industry that the benefits demonstrated in reducing accidents at road hazards and maintaining the effectiveness of the message could also be applied successfully to advising vehicle drivers of level crossing hazards.

Note: vehicle activated signs are due to be tested at various level crossing sites.

Issue at a level crossing

A 40mph vehicle-activated speed sign.

5. Error type

☐ Error
☐ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☐ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☒ OTHER	wi/wh
☐ Network Rail	☒ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☒ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☒ TRL (road)	
☒ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☒ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 42 | Creation date 24.06.2004 | Last modified 02.02.2005

Issue

Days of the week

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☐ UWC	☒ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☒ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☐ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Risk taking behaviour at level crossings increases on working days.

4. User behaviour

The occurrence of crossing accidents by vehicle drivers have been associated with specific days of the week. There is a higher rate of crossing accidents at both protected and unprotected level crossings for Monday through to Friday, compared to those for Saturday and even fewer for Sundays.

The journeys undertaken at weekends differ from those during the week. At weekdays, people are under considerable more pressure to reach destinations at a specific time, for example, school-runs, work and meetings. At weekends, vehicle drivers are less likely to need to meet stringent time scales and therefore be in a more relaxed mind frame, resulting in improved behaviour at crossings.

(Note: the research considered both the reduced road traffic and frequency of trains at weekends and its effect on lower incident rates at level crossings. However, reduced exposure was not judged to be the main factor in the dramatic decrease in crossing accidents at the weekends.)

Issue at a level crossing

5. Error type

☐ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☐ RAIL INDUSTRY		☐ Milton Keynes	☒ RAIL INDUSTRY		☒ OTHER	pi/ve
☐ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☒ HSE/HMRI	☐ GOVERNMENT	☒ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☐ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 43 | Creation date 24.06.2004 | Last modified 02.02.2005

Issue

Suicide

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [ ] MCB
- [ ] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [x] UWC
- [x] UWC/T
- [x] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [x] Farmer
- [x] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [x] Passenger
- [ ] Horserider
- [ ] Train driver
- [x] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Level crossings are a potential target for use by persons attempting to commit suicide

4. User behaviour

With access onto the UK railways, level crossings could be used by persons wanting to committ suicide. This could have a severe impact on both railway employees and passengers.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [ ] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [x] RAIL INDUSTRY
- [x] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

hse/tr

Level crossings: communication and user behaviour issues

Ref 44 | Creation date 24.06.2004 | Last modified 02.02.2005

Issue

Automatic open crossings

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [ ] ABCL
- [ ] AHB
- [ ] MG
- [ ] MCB
- [ ] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [x] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Automatic open level crossings result in increased risk taking behaviour, later in the crossing cycle.

4. User behaviour

Automatic open crossings have wigwag lights, but there is no physical barrier that closes the road off to traffic during the activated warning system. Without a barrier present, vehicle drivers or pedestrians can quite easily choose to violate the crossing procedures. A higher percentage of vehicle drivers cross AOCL's at between 20 and 40 seconds after the warning system has been activated, a time at which they are at a greater chance of being hit by a train.

This is often due to vehicle drivers becoming agitated at the time required to wait at the lights and perceiving there to be time available to cross before the train arrives, or that the system is faulty, resulting in users crossing later in the crossing cycle. Without a barrier present, vehicle drivers can also move past a point of safety and look for oncoming trains more easily than when a barrier is present.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

vi/re

Level crossings: communication and user behaviour issues

Ref 45 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Animals: Horses

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [ ] MCBcctv
- [x] AOCR
- [x] Undefined
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB

1.2 Unprotected

- [ ] UWC
- [x] Undefined
- [ ] UWC/T
- [x] UWC/MWL
- [ ] OC
- [x] FP/MWL
- [ ] FC

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Motorcyclist
- [ ] Farmer
- [ ] Passenger
- [ ] Cyclist
- [x] Horserider
- [x] Car driver
- [ ] Train driver
- [x] Van driver
- [ ] Other
- [x] HGV driver
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 60+
- [ ] 11-15
- [x] Undefined
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Activated warnings at level crossings may result in undesirable behaviour by horses, and influence the behaviour of other road vehicle users.

4. User behaviour

Activated crossings used as access by horse riders, may result in undesirable horse behaviour. The flashing lights and audible alarms can affect the behaviour of horses on the approach to and while waiting at the level crossing. This may result in horses moving across the crossing or along the train lines during the activated warning system.

Normal courteous behaviour exhibited by the majority of vehicle drivers are often not followed when approaching a crossing being used by horses. The vehicle driver not wanting to risk being caught at the crossing, continues to drive at speed. This may frighten the horse and result in the horse failing to respond to guidance provided by its rider.

Level crossings located on-route to local stables or farm yards may have high numbers of horses and riders using the crossing.

5. Error type

- [x] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] ROAD INDUSTRY
- [ ] RSSB
- [ ] AA
- [ ] HSE/HMRI
- [ ] Bus drivers
- [ ] RPC
- [ ] BTP
- [x] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 46 | Creation date 24.06.2004 | Last modified 02.02.2005

Issue

Gate crossing procedure

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [ ] AOCL
- [ ] MCBcctv
- [ ] AOCR
- [ ] Undefined
- [ ] ABCL
- [ ] AHB
- [ ] MG
- [ ] MCB

1.2 Unprotected

- [x] UWC
- [ ] Undefined
- [x] UWC/T
- [x] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [x] Motorcyclist
- [x] Farmer
- [ ] Passenger
- [ ] Cyclist
- [ ] Horserider
- [x] Car driver
- [ ] Train driver
- [x] Van driver
- [x] Other
- [x] HGV driver
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 60+
- [ ] 11-15
- [x] Undefined
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

The requirement to open and close the gate, following a procedure of crossing the tracks five times, is a factor in why gates are left open at UWC's.

4. User behaviour

The most common violation at UWC/MWL was found to be users leaving gates open. Reasons for this behaviour are:

Gates left open during the whole day to allow easier access to homes and places of work either side of the crossing;
Gates open for short periods of the day to accommodate shorter visits, such as deliveries to a farm;
Only one gate closed for the purposes of fencing off the owner's land;
Adverse weather conditions, i.e., users wanting to reduce the amount of time they are exposed to the weather;
Vehicle tailgating or vehicles following later-on;
First-time or irregular users not aware of the correct crossing procedure.

Tractor drivers are the most likely abusers of gate procedures, when their work procedures would require them to undertake multiple crossings. It is suggested that following the correct procedures for gate opening and closing may hinder their work progress.

In general, users perceive the process for crossing correctly as complex, compared with the aim of crossing which is regarded as fairly simple.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] ROAD INDUSTRY
- [ ] RSSB
- [ ] AA
- [ ] HSE/HMRI
- [ ] Bus drivers
- [ ] RPC
- [x] BTP
- [x] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

hu/hu
ar/us
th/me
bi/hu

Level crossings: communication and user behaviour issues

Ref 47 | Creation date 28.06.2004 | Last modified 02.02.2005

Issue

Violations at MWL

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☐ UWC/T
- ☒ UWC/MWL
- ☐ OC
- ☒ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☒ Farmer
- ☐ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Over estimation of warning time and underestimation of crossing leads to risk taking behaviour.

4. User behaviour

A suggestion of why crossing violations are likely to occur is provided by those users who say they would consider violating a red warning light.

A combination of underestimating their crossing time and overestimating the time between the warning onset and train arrival indicates that users feel they have time to make the violation 'safely'.

The research suggests, the user is more likely to make a crossing if they believe they have more time than the actual warning time. Of those that would consider violating a red light at a UWC/MWL, car and truck drivers regularly underestimated how long it would take to complete the full crossing procedure. 80% of vehicular users were observed to take longer to complete the crossing procedure than the actual allocated crossing time.

Users are underestimating the level of risk associated with violating the crossing procedures.

5. Error type

- ☐ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☐ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☐ Non-UK

6.4 Document details

hu/hu

Level crossings: communication and user behaviour issues

Ref 48 | Creation date 30.06.2004 | Last modified 02.02.2005

Issue

Observation of amber light

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☒ AOCL
- ☒ AOCR
- ☒ ABCL
- ☒ AHB
- ☐ MG
- ☒ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☐ UWC/T
- ☐ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☐ Pedestrian
- ☐ Farmer
- ☐ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☒ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

The length of activation time of the amber light has little affect on the behaviour of the vehicle driver.

4. User behaviour

Once the crossing closure procedure has been activated, the amber light of the road traffic lights immediately shows for approximately 3 seconds. After this period, the intermittent red lights immediately show.

Vehicle drivers approaching the level crossing often continue to drive through the amber light stage. The length of time the light is activated for provides vehicle drivers with limited viewing time to react and stop prior to the crossing.

5. Error type

- ☐ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☒ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☒ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 49 | Creation date 30.06.2004 | Last modified 02.02.2005

Issue

Road access

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☐ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☒ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Level crossings that provide the only access to routes either side of the crossing influences the risk taking behaviour of vehicle drivers.

4. User behaviour

Vehicle drivers using level crossings that provide the only access to roads and locations within the area, may increase their risk taking behaviour. Knowing they will be held at the crossing for some time and without an opportunity to seek an alternative route, they may violate the activated warning system.

Issue at a level crossing

5. Error type

☐ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☐ OTHER	
☒ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☒ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☐ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 50 | Creation date 30.06.2004 | Last modified 02.02.2005

Issue

Passenger drop-off points

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☐ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☒ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☒ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Non-designated passenger drop-off points close to level crossings affects the flow and behaviour of traffic approaching a crossing.

4. User behaviour

Problems are caused by vehicle drivers parking in side turnings or with two wheels on the pavement, close to the level crossing for short periods of time to allow their passengers to exit the vehicle. This results in traffic flow problems over the level crossing and also distracts other vehicle drivers from observing the warning information and general road procedures.

Issue at a level crossing

Roydon CCTV: vehicle drivers parking before the level crossing to drop passengers off for the train station. On many occasions, other vehicle drivers were observed driving onto the opposite side of the road, just prior to the crossing and ahead of oncoming traffic, to avoid the parked vehicles.

5. Error type

☒ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☐ OTHER	
☒ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☒ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 51 | Creation date 30.06.2004 | Last modified 02.02.2005

Issue

See-through effect

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Level crossing located in a dip or on a brow of a long straight road may result in increases of red-light running.

4. User behaviour

The see-through effect is an established road design effect that results in the failure of the vehicle driver to observe road features and therefore fail to respond with the required change in vehicle driver behaviour. This effect is most often observed at road junctions and road traffic lights, where the result of the see-through effect has the most adverse impact. Vehicle drivers approaching a set of traffic lights continue to drive straight past the red light and have later reported that they have not only missed the red light, but failed to see any lights at all.

This effect is also an issue for vehicle drivers approaching a level crossing. As the vehicle driver looks ahead, the rail line and surrounding crossing information is lost within the immediate environment because of its position within a dip or on a brow of the road, resulting in the vehicle driver fixating their vision further along the road. The driver unintentionally misses the information regarding the level crossing.

Issue at a level crossing

5. Error type

- [x] Error
- [ ] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [x] ROAD INDUSTRY
- [x] AA
- [ ] Bus drivers
- [x] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [x] GOVERNMENT
- [x] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

trl/ar

Level crossings: communication and user behaviour issues

Ref 52 | Creation date 30.06.2004 | Last modified 02.02.2005

Issue

HGV drivers using rail station facilities

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [ ] Car driver
- [ ] Van driver
- [x] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

The effectiveness of information is reduced by HGV drivers parking in front of signs and warning devices.

4. User behaviour

Information signs and warning lights can be blocked from the view of approaching traffic by HGV drivers parking their vehicle to use station facilities.

Issue at a level crossing

St.Margarets CCTV: a HGV driver parked in front of the station. The driver vehicle completely blocked the view of the warning light from approaching traffic.

5. Error type

- [x] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [ ] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [x] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

Level crossings: communication and user behaviour issues

Ref 53 | Creation date 30.06.2004 | Last modified 02.02.2005

Issue

Events

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [x] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Events increase the amount of irregular users at level crossings.

4. User behaviour

Events can attract enormous increases in visitors to an area, often for only short periods of time and at certain times of the year. Visitors may be needing to arrive at their destination at a particular time or have a had a long and difficult journey, resulting in users wanting to avoid any further delays by being held at a crossing. This may result in increased risk taking behaviour by these users. The general increase in vehicle and pedestrian traffic also affects the flow of traffic on the level crossings, and this is further impaired when visitors may have additional vehicle equipment, such as horse trailers and caravans.

Issue at a level crossing

Helpston: the Burghley horse trials are held for a few days each September. Horse-trailers, caravans and the overall increase in local traffic cause blocking-back and result in increased risk taking behaviour at the Helpston crossing.

5. Error type

- [x] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [x] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 54 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Narrow roads

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Narrow roads before and after the level crossing may result in vehicle drivers slowing and stopping while on the level crossing.

4. User behaviour

Narrow roads before and after the crossing affect the traffic flow over the level crossing. As vehicle drivers progress over the crossing, they may have to slow to accommodate the narrow road or stop to allow oncoming vehicles to pass. Vehicle drivers may have to wait for some time before they can move off from the crossing.

The road infrastructure around the crossing could further impact on the risk taking behaviour of vehicle drivers. If the narrow roads force the level crossing users to have to wait for longer periods of time, while other vehicles pass, it may influence them to attempt to jump the red lights to avoid having to wait.

Issue at a level crossing

Lolham CCTV: both sides of this crossing are accessed by a single road. Passing points are provided further along the road and vehicle drivers move slowly or stop on the crossing to accommodate for oncoming traffic.

Stopping on the crossing occurs more often during rush hours.

5. Error type

- [x] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [ ] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [x] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [x] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [x] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 55 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Contractors

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☒ UWC
- ☒ UWC/T
- ☒ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☐ Pedestrian
- ☒ Farmer
- ☐ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Landowners failure to inform new contractors of the procedures and restrictions for using their vehicles across the level crossing may increase the risk of an incident.

4. User behaviour

Landowners should always inform new contractors of the restrictions and any implications for using vehicles over the level crossing to gain access to their land.

Users not fully aware of the restrictions the level crossing imposes on their vehicles, may experience problems when traversing the crossing. For example, while transporting goods they may not be aware of restrictions on vehicle size and therefore unable to manoeuvre their vehicle easily or without creating an obstruction on the crossing.

In Scotland, crossings only previously used by the forestry commission are now being used by contractors, because of the rapid development of wind farms in recent years, bringing contractors into areas that require the use of UWC.

5. Error type

- ☒ Error
- ☐ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☒ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☒ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

HMRI internal report

Level crossings: communication and user behaviour issues

Ref 56 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Location near major roads

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☒ AOCL
- ☒ AOCR
- ☒ ABCL
- ☒ AHB
- ☐ MG
- ☒ MCB
- ☒ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☐ UWC/T
- ☐ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☐ Pedestrian
- ☐ Farmer
- ☐ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

The risk of vehicle drivers blocking-back over the level crossing, or general risk taking behaviour is increased when the crossing is located on roads with direct access to major roads or motorways.

4. User behaviour

Long traffic queues onto and off of major roads and motorways result in queues forming on either side of the level crossings. While the crossing is open to road traffic, users do not wait for traffic to exit the other side before progressing across, therefore creating a queue of traffic over the crossing.

5. Error type

- ☐ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☐ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☒ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☒ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

HMRI internal report

Level crossings: communication and user behaviour issues

Ref 57 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Traffic calming systems

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☐ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Road traffic calming systems on the approaches to a level crossing may increase the risk of vehicles blocking-back.

4. User behaviour

Traffic calming systems positioned on the approach roads to a level crossing may increase the risk of vehicle drivers blocking-back onto the crossing.

While the crossing is active, and the road closed to traffic, queues form along the road. Vehicle drivers position themselves around the traffic islands, so they are located in a stationary position on the opposite side of the road. When the road is then opened to traffic again, oncoming vehicles cannot continue along the road because of other vehicles positioned around the traffic islands. This creates slow moving traffic and momentarily causes vehicles to block-back over the crossing.

Issue at a level crossing

Helpston signal box: signallers discouraged the installation of more traffic calming islands on the eastside approach to the Helpston level crossing because of blocking-back already caused by islands situated on the westside approach.

5. Error type

☐ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☐ RAIL INDUSTRY		☐ Milton Keynes	☒ RAIL INDUSTRY		☐ OTHER	HMRI internal report
☐ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☒ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☐ HSE/HMRI	☐ Bus drivers	☒ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 58 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Diversification in farming

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☐ AOCL	☐ MCBcctv	☒ UWC	☐ Undefined
☐ AOCR	☐ Undefined	☐ UWC/T	
☐ ABCL		☐ UWC/MWL	
☐ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☐ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☒ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☒ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☐ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Diversification in farming increases public access to user-worked crossings.

4. User behaviour

Farming is changing the use of its land to ensure the survival of many farming businesses. Instead of using traditional farming methods, many are encouraging the public to access their land for leisure activities, such as open farms and golf courses.

However, members of the public are using UWC to access farm land, and the types of activities undertaken do not allow for new users to be informed of how to correctly use these crossings. This results is many untrained users passing through a crossing which relies upon the user to take full responsibility in opening and closing the gates, ensuring they follow all the correct crossing procedures.

It is also resulting in additional vehicles using UWC, including vehicles completely unsuitable for certain crossings.

Issue at a level crossing

5. Error type

☐ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☒ RAIL INDUSTRY		☐ OTHER	HMRI internal report
☒ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☒ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☐ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☒ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 59 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Foreign vehicle drivers

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Areas with high levels of foreign vehicle drivers may result in increased decision making errors at level crossings. This may be more evident during seasonal periods.

4. User behaviour

Other countries have alternative measures in place for controlling access across level crossings and require different procedures to be followed. Vehicle drivers are unlikely to be familiar with UK procedures and they may also have some difficulty in correctly interpreting written information.

This is particularly prevalent in areas with high volumes of continental HGV drivers. Although they are legally required to be aware of the rules and procedures for using UK crossings, it is unlikely that all foreign HGV drivers will be aware of these. This may result in them failing to make any necessary calls to a signaller if their vehicle is too long or slow for passing over a crossing without previously obtaining permission.

5. Error type

- [x] Error
- [ ] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [x] RAIL INDUSTRY
- [x] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

HMRI internal report

Level crossings: communication and user behaviour issues

Ref 60 | Creation date 27.08.2004 | Last modified 13.01.2005

Issue

Bus stops

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [ ] AOCL
- [ ] AOCR
- [ ] ABCL
- [x] AHB
- [ ] MG
- [ ] MCB
- [ ] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [ ] Car driver
- [ ] Van driver
- [x] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Unofficial bus stops in the level crossing lay-by, affects the behaviour of large or slow vehicle drivers.

4. User behaviour

A lay-by is often provided at the approach and exit of AHB's, so vehicles required to call the signaller for permission to cross, can park clear of the crossing.

However, the lay-by is often used as an unofficial bus stop, sometimes preventing large or slow vehicles from stopping, forcing them to continue across the crossing without calling the signaller.

These unofficial bus stops can arise for various reasons, such as:
The lay-by is closer to bus users' homes than the official bus stop, and users make a request for the bus driver to stop in the lay-by;
The bus company is temporarily using the lay-by because roadworks have blocked the official bus stop;
The local council have allocated the lay-by as an official stop.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [ ] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [x] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 61 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Crossing surface

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☒ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☒ UWC/T	
☒ ABCL		☒ UWC/MWL	
☒ AHB		☒ OC	
☒ MG		☒ FP/MWL	
☒ MCB		☒ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☒ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☒ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☒ Cyclist	☒ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☒ Train driver	☐ 20-35		
☒ Van driver	☒ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Uneven and slippery level crossing surface may present a potential hazard to those using the crossing.

4. User behaviour

Poor crossing surfaces increases the difficulty for users traversing the level crossing. Users may be distracted by having to look carefully at where they are stepping and this may also increase user crossing time. It may present particular problems for cyclists, horseriders, elderly, visually or physically impaired crossing users. The crossing surface may also present a hazard to road vehicles in general as well as a hazard to trains.

Issue at a level crossing

Woburn Sands: the crossing surface was heavily worn in parts at this level crossing.

5. Error type

☐ Error
☐ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☐ RAIL INDUSTRY		☐ Milton Keynes	☒ RAIL INDUSTRY		☒ OTHER	HMRI internal report
☐ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☒ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	ar/us
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	bi/hu
☐ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☒ RSSB	☐ DfT (road)	☒ Independent	sp/fa
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☒ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 62 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Roadworks

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☐ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Roadworks positioned up to 3 kilometres from the level crossing may still impact on vehicles blocking-back.

4. User behaviour

Roadworks located on roads around a level crossing can impact on vehicles blocking-back over the crossing. Vehicle drivers expecting to be able to move forwards over the crossing, may be impeded by slow moving traffic as a result of the road works. This is further compounded by vehicle drivers tailgating the vehicle in-front to avoid potentially being held by an activated warning system.

Blocking-back is also not just associated with roadworks located in the immediate vicinity, they may continue to have an impact on the crossing when located up to 3 kilometres away.

Blocking-back from roadworks is a particular problem at automatic level crossings.

Issue at a level crossing

5. Error type

☐ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☐ RAIL INDUSTRY		☐ Milton Keynes	☒ RAIL INDUSTRY		☐ OTHER	HMRI internal report
☐ Network Rail	☒ ROAD INDUSTRY	☐ Doncaster	☒ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☐ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☒ BTP	☒ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 63 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Housing developments

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [x] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Housing developments increase road traffic and level crossing use.

4. User behaviour

New housing developments near to crossings used as access to major towns or other key locations will affect the use and behaviour of both vehicle drivers and pedestrians over the crossing. These developments will increase vehicle and pedestrian traffic levels and the existing crossing type may be unsuitable for accommodating these increased levels.

An additional factor in affecting the risk taking behaviour of vehicle drivers is the overall congestion of traffic in the local area. Vehicle drivers may be less inclined to stop at a level crossing if their overall journey time has increased since the development of new housing.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [x] HSE/HMRI
- [ ] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

ar/us

Level crossings: communication and user behaviour issues

Ref 64 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Vehicle shortcuts

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [x] UWC
- [x] UWC/T
- [x] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Level crossings on roads used as shortcuts result in increased risk taking behaviour by vehicle drivers.

4. User behaviour

Vehicle drivers may increase their risk taking behaviour when using level crossings on shortcut roads. Shortcuts are in themselves a means of the vehicle driver saving time, and their mindset is one of maintaining movement at all costs. In some cases, the vehicle driver may be more inclined to attempt to 'beat the lights', as waiting at the crossing has a negative impact on their goal of using the shortcut to save time.

Shortcuts may have been established for a period of time and generally used by regular users to avoid busy main roads. However, new shortcuts may develop, both permanently and for interim periods, for the following reasons:

Temporary roadworks;
New housing developments;
Changes to road infrastructures.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [x] HSE/HMRI
- [ ] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [x] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [x] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [x] RAIL INDUSTRY
- [x] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

HMRI internal report

Level crossings: communication and user behaviour issues

Ref 65 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Crossing instructions

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☒ UWC
- ☒ UWC/T
- ☒ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☒ Farmer
- ☒ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☒ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Ambiguous crossing instructions may result in users failing to undertake the correct crossing procedure.

4. User behaviour

Users at UWC are provided with instructions to guide them in carrying out the crossing procedure in the correct order. However, it is not always apparent to users the exact order in which they should undertake the crossing procedure. For example, should they phone the signaller first to obtain permission to cross or open the first gate. If the user has incorrectly followed the procedure, this has a large impact on the overall time taken by the user to cross, as well as impacting on their safety while crossing.

5. Error type

- ☒ Error
- ☐ Violation

6. Sources of information

6.1 Interview source

- ☐ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☒ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☐ Non-UK

6.4 Document details

hu/hu
Railtrack internal report (ra/hu)

Level crossings: communication and user behaviour issues

Ref 66 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Another train approaching

Issue at a level crossing

The sign 'ANOTHER TRAIN COMING if lights continue to show' is positioned underneath the wigwag lights.

1. Level Crossing type

1.1 Protected

- ☒ AOCL
- ☒ AOCR
- ☒ ABCL
- ☒ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☐ UWC/T
- ☐ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☐ Pedestrian
- ☐ Farmer
- ☐ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

The 'Another Train Coming if lights continue to show' sign has minimal impact in providing vehicle drivers with sufficient information.

4. User behaviour

When another train is approaching the level crossing (and without sufficient road opening time), the wigwag lights will continue to flash. However, the static sign provided to inform users, has minimal impact in providing vehicle drivers with sufficient information to confirm whether another train is coming. The increase in waiting time at the crossing, increases the likelihood of vehicle drivers attempting to traverse the crossing, especially if they do not see a train approaching. It was suggested that UK vehicle drivers do not mind waiting, however it is important that they are provided with sufficient information to indicate that another train is about to arrive, and not that they are just being held at the crossing for longer than necessary.

A change in audible warning is provided to warn pedestrians of a second train arriving. It is not intended as an information source to advise vehicle drivers. However, the second audible warning has been suggested by level crossing users as not being detected and/or understood (Issue 20).

5. Error type

- ☐ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☒ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☒ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 67 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Animals: Dogs

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☒ UWC
- ☒ UWC/T
- ☒ UWC/MWL
- ☒ OC
- ☒ FP/MWL
- ☒ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☐ Farmer
- ☐ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Unrestrained dogs may impair their owner's concentration while on the level crossing.

4. User behaviour

An observation of users at UWC level crossings saw over a quarter of all people walking with dogs failing to use any form of dog restraint. A sign requesting dog walkers to put their dog on a lead was positioned on the majority of these UWC's.

Train drivers also have reported seeing unrestrained dogs along side the tracks with their owners standing at the crossing. There have also been near-misses and an incident involving a collision between a train and a pedestrian who was attempting to retrieve their dog from the tracks.

It appears that the risk of not restraining a dog is not evident to dog owners, possibly because of their assumption that they are capable of maintaining control of their pet.

5. Error type

- ☒ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☐ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☒ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☐ Non-UK

6.4 Document details

hu/de
HMRI internal report
bi/hu

Level crossings: communication and user behaviour issues

Ref 68 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Contacting the signaller

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☒ UWC/T
- ☐ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☒ Farmer
- ☒ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☒ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Unclear 'user-type' information may result in users failing to contact the signaller prior to crossing.

4. User behaviour

Information is provided at UWC to indicate which types of users must call the signaller to request permission to cross the railway line. Prior to crossing, all users must determine from this information, whether they should first contact the signaller. However, non-specific and unclear 'user-type' information may result in users failing to contact the signaller.

5. Error type

- ☒ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☐ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☐ Non-UK

6.4 Document details

hu/hu

Level crossings: communication and user behaviour issues

Ref 69 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Rural level crossings

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

The environmental context of a rural level crossing reduces the awareness of approaching vehicle drivers.

4. User behaviour

Rural level crossings, positioned amongst roads with few surrounding roadside structures are often missed by approaching vehicle drivers. The vehicle driver, progressing through country roads, is in a mind-set that is unlikely to be expecting hazard information or a warning system to appear. They may not register the presence of a crossing until they are nearly driving over it or they may miss it completely. The problem is further increased when crossings are located on bends, hills or foliage covers information signs.

5. Error type

- [x] Error
- [ ] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [x] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 70 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Road markings

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

The effectiveness of vehicle drivers stopping in the correct location is impaired by worn road markings.

4. User behaviour

Road markings are provided at some level crossings to help vehicle drivers stop their vehicle in a safe location during the activated warning system. It is important in preventing vehicles from parking underneath the lowering barriers and from positioning their vehicle too close to the train lines. Road markings that have been worn away reduce the effectiveness of informing vehicle drivers where they should stop. Markings are also a particularly important element in informing an irregular user of where they should locate their vehicle.

The importance of road markings in providing vehicle drivers with information has been highlighted by the road industry. Dramatic reductions in vehicle drivers running through red lights have been recorded when the 'STOP' line has been newly painted on road surfaces.

5. Error type

- [x] Error
- [ ] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [x] HSE/HMRI
- [ ] RPC
- [x] BTP
- [x] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [x] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [x] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

hu/hu

Level crossings: communication and user behaviour issues

Ref 71 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Number of train lines

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☐ MCBcctv	☒ UWC	☒ Undefined
☒ AOCR	☐ Undefined	☒ UWC/T	
☒ ABCL		☒ UWC/MWL	
☒ AHB		☒ OC	
☒ MG		☒ FP/MWL	
☒ MCB		☒ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☒ Pedestrian	☒ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☒ Farmer	☒ Passenger	☐ 11-15	☒ Undefined	☐ Group
☒ Cyclist	☒ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Single train lines may increase the risk taking behaviour of both vehicle drivers and pedestrians.

4. User behaviour

Users may perceive a single train line to present less of a risk than double train lines. Therefore users may see the opportunity to drive over or walk across the lines without observing the activated warning system or by behaving less cautiously at unprotected crossings.

This user behaviour is in line with the risk compensation theory; the user perceiving there to be less of a risk to themselves results in them behaving less cautiously.

Issue at a level crossing

5. Error type

☒ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☐ OTHER	
☐ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☒ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 72 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Location near farms

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☐ MCBcctv	☐ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☒ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☒ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

High volumes of farm traffic impact on the speed and behaviour of other vehicles traversing the crossing.

4. User behaviour

Farm traffic tends to move at a much slower pace and impacts on the speed and general driving behaviour of other road vehicles.

High volumes of farm traffic using local roads to transport produce or move between farm land will impact on the behaviour of other vehicles traversing the level crossing. This may increase vehicle driver frustration and result in them overtaking on the approach to and while on the level crossing to avoid being held at the activated warning system.

Issue at a level crossing

Bainton Green: a tractor using the crossing after leaving nearby farm land. Tractors combined with the position of the crossing on a straight road, its proximity to Lolham crossing and use as a regular shortcut route could impact heavily on the behaviour of other vehicle drivers.

5. Error type

☐ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☐ OTHER	
☐ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☒ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☒ BTP	☒ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 73 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Commercial traffic

Issue at a level crossing

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☒ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☒ UWC/T	
☒ ABCL		☒ UWC/MWL	
☒ AHB		☐ OC	
☒ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☒ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Level crossings with high volumes of commercial traffic may result in increased risk taking behaviour.

4. User behaviour

Commercial vehicle drivers, such as salespersons, work to strict timescales and therefore their driving behaviour is often influenced by having to reach destinations on time. Commercial drivers using a level crossing may be inclined to 'beat the lights' to avoid having to wait at the crossing, or they may fail to obey the correct crossing procedure at unprotected crossings.

5. Error type

☐ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☐ OTHER	
☐ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☒ HSE/HMRI	☐ Bus drivers	☒ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 74 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Proximity of level crossing to another

Issue at a level crossing

Lolham CCTV & Bainton Green AHB: vehicle drivers are often held at Lolham crossing for a considerable amount of time, and then also held at Bainton Green. The lengthy barrier downtimes at the Lolham crossing, which is used frequently as a shortcut route by vehicle drivers adds to their frustration when they are held at both crossings.

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☐ MCBcctv	☐ UWC	☒ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Level crossings located in close proximity to another may influence the risk taking behaviour of vehicle drivers.

4. User behaviour

A road or geographical area may have more than one level crossings located in close proximity. If a driver is required to wait at one level crossing and then at the next, and so on, this may affect their risk taking behaviour. The vehicle driver may become aggitated at being delayed at each level crossing and exhibit behaviour such as speeding to the approach of the next crossing to try and avoid being held again or crossing during the activated warning lights.

This risk taking behaviour may be further increased at level crossings with lengthy barrier downtimes on busy rail lines or those with CCTV, as vehicle drivers know that if they are unable to get over each crossing they may be held at the crossing for a considerable time.

5. Error type

☐ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☐ OTHER	
☒ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☒ HSE/HMRI	☐ Bus drivers	☒ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☒ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 75 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Public houses

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☒ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☒ UWC/T	
☒ ABCL		☒ UWC/MWL	
☒ AHB		☒ OC	
☐ MG		☒ FP/MWL	
☒ MCB		☒ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☒ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☒ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☐ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Crossings located on route to public houses may result in increased violations of crossing procedures.

4. User behaviour

Level crossings on routes between homes and public houses may present additional problems because of the type of users using the crossing. Users under the influence of alcohol may be more inclined to ignore normal crossing procedures and undertake risky behaviour.

Rural level crossings may also be used by local vehicle drivers under the influence of alcohol to avoid using main routes where they may be an increased chance of being apprehended by the police.

Issue at a level crossing

Tallington CCTV: the public house is located on the left-hand side of the crossing. The nearest homes are located on the other side and some locals often use the crossing in their vehicle or on foot while under the influence of alcohol.

5. Error type

☐ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☒ RAIL INDUSTRY		☐ OTHER	GI/GN7611
☐ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☐ HSE/HMRI	☐ Bus drivers	☒ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☒ Railway GS	☐ Other dept.	☐ Non-UK	
☒ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 76 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Pedestrians on vehicular crossings

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☐ AOCL	☐ MCBcctv	☐ UWC	☐ Undefined
☐ AOCR	☐ Undefined	☐ UWC/T	
☐ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☐ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☒ Pedestrian	☐ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☒ Group
☒ Cyclist	☐ Horserider	☐ 16-20		☐ Undefined
☐ Car driver	☐ Train driver	☐ 20-35		
☐ Van driver	☐ Other	☐ 35-50		
☐ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

Large volumes of pedestrians and cyclists using road level crossings ignore the activated warning information and barriers.

4. User behaviour

Both pedestrians and cyclists ignore the activated warning information and barriers on vehicular crossings because many perceive them only applicable to vehicle drivers.

At AHB crossings, pedestrians and cyclists on the opposite side of the barrier can continue to progress past the line of the barrier and onto the train line. This is a particular problem when there are large volumes of pedestrian and cycle users because of the affect of group activity on an individual's behaviour. For example, once a few users have crossed during the activated warning, others will follow their behaviour.

Users may also unintentionally progress past the barrier line and move onto the train tracks because of the lack of any physical barrier.

Issue at a level crossing

5. Error type

☒ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☒ OTHER	va/sa
☐ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☒ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☒ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 77 | Creation date 31.08.2004 | Last modified 02.02.2005

Issue

Decision point

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☒ UWC
- ☒ UWC/T
- ☒ UWC/MWL
- ☒ OC
- ☒ FP/MWL
- ☒ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☒ Farmer
- ☒ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

An obvious decision point is critical for users at unprotected level crossings.

4. User behaviour

A decision point is the position at which the user can view along both sides of the tracks but not be standing past a point of safety. This point is designated at 3 metres from the nearest running rail, however it is normally determined by the physical characteristics around the level crossing, for example, foliage and other obstructions at the side of the line may force the user to stand closer to the rail lines to ensure they have a clear view. The areas where a user should not stand while observing for oncoming trains may also be unclear, resulting in users standing in a position that is too close to the railway line.

Issue at a level crossing

Ware footpath: the user can stand in various positions to observe for oncoming trains, however it is unclear where they should not stand while observing for trains.

5. Error type

- ☒ Error
- ☐ Violation

6. Sources of information

6.1 Interview source

- ☐ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☒ Independent
- ☐ Non-UK

6.4 Document details

hu/de
ar/us

Level crossings: communication and user behaviour issues

Ref 78 | Creation date 27.08.2004 | Last modified 02.02.2005

Issue

Signal sections

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☒ UWC/T
- ☐ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☒ Farmer
- ☒ Cyclist
- ☒ Car driver
- ☒ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Long signal sections increase the risk taking behaviour of users at UWC's.

4. User behaviour

UWC crossings positioned within long signal sections affect the behaviour of users and the communication between the user and the signaller.

If a train is within a section, the signaller will normally request that the user calls back after a period of time, for example, in 15 minutes. The signaller is then able to inform the user whether the train is now out of the section and past the UWC. However, users do not understand why the signaller cannot provide an exact indication of where the train is. The user becomes frustrated at waiting for an unknown and often lengthy period of time and decides to cross without confirmation from the signaller.
Additional factors which may further increase the risk taking behaviour of users include:
When the user is crossing multiple times during the day;
While the user is waiting, they continue not to see a train for a lengthy period of time and perceive they have a sufficient period of safe time to cross within;
If one train passes (but another may be within the section) this gives a clear message to the user, "I can go", without receiving confirmation from the signaller.

Issue at a level crossing

5. Error type

- ☐ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☒ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☒ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☒ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

ro/hu

Level crossings: communication and user behaviour issues

Ref 79 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Combined environmental features

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Level crossings with a combination of environmental features, such as bends, hills, trees and hedges, may increase the decision making errors of vehicle drivers.

4. User behaviour

An environmental feature on the approach to a level crossing may require the vehicle driver to divide their attention, however they can continue to concentrate on and manage the information regarding the crossing.

However, the combined affect of many environmental features, such as bends, hills, trees and hedges on the approach to a crossing, may result in increased decision making errors by the vehicle driver as their attention is diverted in accommodating a range of complex environmental features.

5. Error type

- [x] Error
- [ ] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [x] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 80 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Cats-eyes

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [ ] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Deteriorated 'cats-eyes' on the approach or on the level crossing may reduce the vehicle driver's ability to negotiate the road layout at night.

4. User behaviour

Cats-eyes are located along the centre line and left hand-side of the road. They help vehicle drivers to see in advance the changes in road contour. Cats-eyes support approaching vehicle drivers to assess the position of the level crossing in relation to the road and the contour of the exit road. However, cats-eyes do deteriorate over a period of time and gradually fail to reflect any light, reducing their effectiveness in 'guiding' the vehicle driver along the road.

Cats-eyes are particularly important in rural locations when lighting from surrounding roadside structures will be at a minimum.

5. Error type

- [x] Error
- [ ] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [x] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 81 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Sign pictogram

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☐ MCBcctv	☐ UWC	☒ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☐ ABCL		☐ UWC/MWL	
☐ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☐ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☒ Pedestrian	☒ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

The 'Puffer' sign does not convey any directly useful information to users.

4. User behaviour

The information presented to the vehicle driver or pedestrian on approaching the level crossing should identify the 'potential hazard' ahead of them and support them to adjust their behaviour accordingly.

Subject matter experts in the road industry have suggested the image of a 'steam' train does not support users in identifying with the modern standards of the railway and conveys no relevant information to approaching crossing users. Research has suggested that conveying the appropriate information of protection type prior to each crossing can help users to adapt their behaviour accordingly.

There is no guidance in how this might affect user behaviour, but in our opinion it may lead to vehicle drivers not following the correct level crossing procedures.

Issue at a level crossing

Sign 771, Schedule 3, The Traffic Signs Regulations and General Directions 2002

5. Error type

☒ Error
☐ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☐ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☒ OTHER	tsr/2002
☐ Network Rail	☒ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☒ GOVERNMENT	☐ TRL (rail)	mo/vi
☐ RSSB	☒ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☐ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☒ Other dept.	☒ Non-UK	
☐ BTP	☒ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 82 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Highway Code

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☐ UWC	☐ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☒ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☒ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

The highway code currently contains 278 rules for vehicle drivers.

4. User behaviour

The current issue of the Highway Code contains 278 rules. Since 1959, the rules have increased from just 90. With this quantity of rules to remember, the influence on vehicle drivers making errors in interpreting and understanding level crossing procedures is possible.

This is especially relevant considering vehicle drivers are not required to update their knowledge on the highway code at regular intervals, and as a minimum are only required to learn the code to obtain a full driving licence. The presence of any level crossings in the area where a learner vehicle driver is trained may also influence their competence in correctly obeying level crossing rules.

Issue at a level crossing

An image of a level crossing from the Highway Code.

5. Error type

☐ Error
☐ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☐ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☐ OTHER	
☐ Network Rail	☒ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☒ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☐ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☒ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 83 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Road descents

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Level crossings located at the end of a descent may result in increased red-light running by vehicle drivers.

4. User behaviour

Vehicle speed is easily increased when travelling downhill, and with increased speed a vehicles stopping distance is also greatly increased. The road industry report increased red-light running at traffic lights when situated at the end of a road descent. This is also an issue that could apply level crossings.

Previous rail research suggested vehicle drivers may also be concerned at causing vehicle-vehicle collisions if they were to stop suddenly, which may further suggest why red-light running may be more prevalent at the end of a descent.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [x] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [x] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [x] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [x] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

pi/re

Level crossings: communication and user behaviour issues

Ref 84 | Creation date 31.08.2004 | Last modified 02.02.2005

Issue

Signal box: camera angle

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [ ] AOCL
- [ ] AOCR
- [ ] ABCL
- [ ] AHB
- [ ] MG
- [ ] MCB
- [ ] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [ ] Car driver
- [ ] Van driver
- [ ] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [x] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Position of the camera at a level crossing influences the signallers ability to detect objects.

4. User behaviour

The position of a CCTV camera varies from crossing to crossing. It may be located to the side of the crossing or positioned at one end. Various factors influence the effectiveness of the camera location, such as the direction of the sun (which could shine directly into the camera at certain times of the day or year).

However, the angle at which the camera is positioned also affects the signaller's ability to assess whether the crossing is clear of vehicles, people or other objects.

5. Error type

- [ ] Error
- [ ] Violation

6. Sources of information

6.1 Interview source

- [ ] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [x] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 85 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Passenger compliance with MWL

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☐ UWC/T
- ☐ UWC/MWL
- ☐ OC
- ☒ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☐ Pedestrian
- ☐ Farmer
- ☐ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☒ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☒ Individual
- ☒ Group
- ☐ Undefined

3. Description of issue / design feature

The red light of a MWL is associated with the train the passengers have alighted from.

4. User behaviour

When passengers alight at a station, the active red light at the station foot crossing is assumed by passengers to be associated with the train they have just alighted from. Passengers continue to walk across the train tracks, even though the red light is active.

The mindset of a commuter passenger may also contribute to them violating the red light. For example, they may be thinking about getting home and not concentrating on the immediate surroundings. These passengers may also use their knowledge about train times to make an assessment that a train is not scheduled to pass so it is therefore acceptable to walk while the red light is on. Group behaviour may also have an impact on many users choosing to cross once they have seen other passengers do so during the active warning system.

This issue is a problem at many train stations that have a station foot crossing with MWL. To help deal with the problem, some train companies are reminding passengers via the train public address system not to cross while the red light is active as it may refer to an oncoming train on the other line(s).

Issue at a level crossing

Farnborough North: there have been near-misses for both tourists and regular passengers when they have crossed while the red light is active.

5. Error type

- ☒ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☒ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☒ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

rpc/st
Railtrack internal report (ra/ki)

Level crossings: communication and user behaviour issues

Ref 86 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Train enthusiasts

1. Level Crossing type

1.1 Protected

- ☒ AOCL
- ☒ AOCR
- ☒ ABCL
- ☒ AHB
- ☒ MG
- ☒ MCB
- ☒ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☒ UWC
- ☒ UWC/T
- ☒ UWC/MWL
- ☒ OC
- ☒ FP/MWL
- ☒ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☐ Farmer
- ☐ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

To view trains closely, people undertake risky behaviour at level crossings.

4. User behaviour

Level crossings provide an accessible point onto rail infrastructure and are often used by train enthusiasts, standing inside of the barrier to obtain a clear and unobstructed view of passing trains.

Some level crossings attract many train enthusiasts on a regular basis. These are organised meetings and are often advertised in local papers, indicating which crossings are suitable for obtaining a good view of particular trains. Level crossings positioned prior to a curve in the track are often used by enthusiasts as these provide a clear view of the train for a much longer period of time.

The vehicles parked by the enthusiasts on the approaches to level crossings also cause obstructions for other vehicle drivers approaching the crossing.

Issue at a level crossing

Woodcroft: a train enthusiast went track-side and refused to move to a position of safety, as he believed he was not compromisng his own safety or those of others. The BTP were called to remove him. This crossing is used regularly by enthusiasts as it provides a long clear view of approaching trains.

5. Error type

- ☐ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☒ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☒ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 87 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

School parking

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [x] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [ ] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

School drop-off and collection points close to level crossings affects the flow and behaviour of other vehicle drivers approaching the crossing.

4. User behaviour

Level crossings in the vicinity of schools are used by parents as accessible drop-off and collection points for their children, with vehicle drivers stopping on the crossing as well as on the approach and exit roads.

The position of these parked cars causes problems for other vehicle drivers traversing the level crossing. Their attention is diverted from the level crossing, to concentrate on avoiding and manoeuvering around the parked vehicles. They are also forced to drive down the centre line, resulting in conflicts with oncoming vehicles. The practice of dropping children at or collecting from school means that vehicles may be parked from some time.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 88 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Proximity of different road speeds

Issue at a level crossing

A manned crossing in Ridgmont (Bedford to Bletchley line) is positioned on a low speed road. However, its proximity to the M1 motorway means vehicle drivers continue to pass the crossing at speed. The attendant at this crossing has been knocked over on several occasions.

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

High road speeds in close proximity to a level crossing on a lower speed road influences the speed at which vehicle drivers approach the crossing.

4. User behaviour

Different road speeds in close proximity may affect the speed at which vehicle drivers approach a level crossing. This may influence the vehicle driver in the following ways:

The vehicle driver is conditioned to driving at the higher speed and maintains the same speed on the lower speed limit road; Any small reduction in speed is perceived as considerable, even if it continues to be higher than the lower speed road limit.

The vehicle driver may then continue to cross over the level crossing at a speed which is inappropriate.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 89 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Level crossing equipment

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [ ] MCB
- [ ] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [x] UWC/MWL
- [ ] OC
- [x] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [x] Farmer
- [x] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [x] Passenger
- [x] Horserider
- [ ] Train driver
- [x] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

The reliability and/or perception of reliability of the level crossing equipment affects the risk taking behaviour of regular users.

4. User behaviour

Operational feedback from experts indicates that level crossing warnings lose their effectiveness when they are not perceived as credible by crossing users. Regular users aware that a crossing has frequent reliability problems may choose to ignore an activated warning system, if they perceive the warning as false and want to avoid being kept at the crossing for a perceived unnecessary period of time. Certain conditions, combined with this perception may increase the chances of users crossing during an activated warning, such as having a clear view of the railway line and not seeing a train approach.

The perception of reliability may also affect the behaviour of other users. For example, if people inform others of how unreliable they perceive the crossing to be, this may influence them to ignore the activated warning system.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [x] HSE/HMRI
- [ ] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

le/dr

Level crossings: communication and user behaviour issues

Ref 90 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Position of information

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [x] UWC
- [x] UWC/T
- [x] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Perception of a hazard is improved when information referencing the imminent danger are associated together.

4. User behaviour

A user's detection of a hazard is improved when information about the danger is presented together with the imminent danger.

Therefore, the position of information warning vehicle drivers of the level crossing should be presented while also in view of the crossing. An information 'void' that does not convey the message nor the danger together does not strongly reinforce the presence of the crossing. A vehicle driver is less likely to be aware and suitably prepared for the hazard if they cannot see together information about the crossing hazard and the actual level crossing.

The road industry has undertaken similar research on the position of information signs on motorways and the point at which an action is required by the vehicle driver. The response to a prompt was most evident when the sign and point of where the action was required were seen together.

5. Error type

- [ ] Error
- [ ] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 91 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Vehicle speed zones

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☒ AOCL	☒ MCBcctv	☐ UWC	☒ Undefined
☒ AOCR	☐ Undefined	☐ UWC/T	
☒ ABCL		☐ UWC/MWL	
☒ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☒ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☐ Pedestrian	☒ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☐ Passenger	☐ 11-15	☒ Undefined	☐ Group
☐ Cyclist	☐ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☒ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

The position of incremental speed restriction signs influences the speed of vehicle drivers when approaching the crossing.

4. User behaviour

The position of incremental speed restriction signs on the approach to a level crossing can have an effect on the speed at which vehicle drivers approach and pass over the crossing.

Towns or villages often have a low speed zone within the central residential areas and then apply an incremental increase in speed zones as the roads progress further from housing areas. A level crossing situated just on the outskirts of a town or village is often excluded from the lower speed zones, or positioned too close to the change in road speeds. This fails to accommodate for vehicle drivers slowing with sufficient time or gradually increasing their speed above the specified limits, so when they are approaching the crossing they are moving at fairly high speeds.

The allocation of lower speed zones to incorporate a crossing on the outskirts of a town or village would help encourage the speed at which drivers approach and pass over the crossing, thus having the potential to reduce errors and violations.

Issue at a level crossing

Helpston CCTV: The 30mph zone was positioned to take account of the amount of homes it had an impact on. The crossing and potential approach speed of vehicle drivers was not considered as part of the decision process for positioning the speed zones. Vehicles coming into the village are not encouraged to slow early enough.

5. Error type

☒ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☒ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☐ OTHER	
☒ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☐ HSE/HMRI	☐ Bus drivers	☐ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☒ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 92 | Creation date 31.08.2004 | Last modified 02.02.2005

Issue

Double train lines

1. Level Crossing type

1.1 Protected		1.2 Unprotected	
☐ AOCL	☒ MCBcctv	☐ UWC	☐ Undefined
☐ AOCR	☐ Undefined	☐ UWC/T	
☐ ABCL		☐ UWC/MWL	
☐ AHB		☐ OC	
☐ MG		☐ FP/MWL	
☐ MCB		☐ FC	

2. User details

2.1 Level crossing user type		2.2 Age		2.3 On own
☒ Pedestrian	☒ Motorcyclist	☐ 0-10	☐ 60+	☐ Individual
☐ Farmer	☒ Passenger	☐ 11-15	☒ Undefined	☐ Group
☒ Cyclist	☒ Horserider	☐ 16-20		☒ Undefined
☒ Car driver	☐ Train driver	☐ 20-35		
☒ Van driver	☐ Other	☐ 35-50		
☐ HGV driver	☐ Undefined	☐ 50-60		

3. Description of issue / design feature

The space between two sets of double train lines provides users with a refuge point.

4. User behaviour

Doubles sets of trains lines can be positioned so that the crossing has a ‘refuge’ point in the middle section. This section is often used by vehicle drivers and pedestrians when they are already on the crossing and see the lights being activated. They fail to continue moving over the crossing, believing the middle section a suitable and safe area to wait until the train passes.

Issue at a level crossing

5. Error type

☒ Error
☒ Violation

6. Sources of information

6.1 Interview source		6.2 Level crossing visit - areas	6.3 Document source			6.4 Document details
☐ RAIL INDUSTRY		☐ Milton Keynes	☐ RAIL INDUSTRY		☐ OTHER	ar/us
☐ Network Rail	☐ ROAD INDUSTRY	☐ Doncaster	☐ HSE/HMRI	☐ GOVERNMENT	☐ TRL (rail)	
☐ RSSB	☐ AA	☐ Hertford	☐ Network Rail	☐ DfT (rail)	☐ TRL (road)	
☐ HSE/HMRI	☐ Bus drivers	☒ Peterborough	☐ RSSB	☐ DfT (road)	☐ Independent	
☐ RPC		☐ Bedford	☐ Railway GS	☐ Other dept.	☐ Non-UK	
☐ BTP	☐ OTHERS	☐ Redcar	☐ Others			

Level crossings: communication and user behaviour issues

Ref 93 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Distance between gates

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☒ UWC
- ☒ UWC/T
- ☒ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☐ Pedestrian
- ☒ Farmer
- ☐ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

The overall distance between UWC gates and the distance between the gate and first train line effects the risk taking behaviour of vehicle users.

4. User behaviour

If the overall distance between the gates is fairly wide, this will greatly increase the overall time taken to undertake the correct procedure of crossing 5 times. This impacts on the users willingness to comply with the correct crossing procedure.

If there is sufficient space to park a vehicle inside of the gate, but in front of the train track, users will prefer to do this to reduce the amount of crossings required to manoeuvre their vehicle across the tracks. Instead of following the correct procedure of crossing 5 times, the user only moves across the tracks once. Users benefit through a dramatic saving in time by choosing to park their vehicle inside of the gate.

However, the user may not be aware that the front of their vehicle might be too close or even protruding over the tracks. UWC users may also use vehicles of different lengths when crossing, some which may clear the tracks when parked inside the gate, while others may not.

5. Error type

- ☐ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 94 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Trespassers

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☐ MCBcctv
- ☒ Undefined

1.2 Unprotected

- ☐ UWC
- ☐ UWC/T
- ☐ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☒ Undefined

2. User details

2.1 Level crossing user type

- ☒ Pedestrian
- ☐ Farmer
- ☐ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☒ 0-10
- ☒ 11-15
- ☒ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☐ Undefined

2.3 On own

- ☐ Individual
- ☒ Group
- ☐ Undefined

3. Description of issue / design feature

Food and drink rubbish at a level crossing is often an indicator of young people using the crossing as a meeting place.

4. User behaviour

Young people are often happy to congregate around train lines and level crossings. Food and drink leftovers, such as takeaway cartons and drink cans can indicate that the crossing is not only being used as access but as a meeting place for groups of friends.

The use of crossings as a social area and over a continued period of time may lower the users' perception of how dangerous the crossing is, resulting in risk taking behaviour.

5. Error type

- ☐ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 95 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Noise

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [ ] MCB
- [ ] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [x] UWC
- [x] UWC/T
- [x] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [x] Cyclist
- [ ] Car driver
- [ ] Van driver
- [ ] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [x] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Noisy surroundings may impair the performance of the users to detect trains at level crossings.

4. User behaviour

Users rely heavily on their hearing and/or vision to detect for oncoming trains at crossings without additional protection systems such as miniature warning lights. Noisy surroundings, such as motorways, vehicle bridges, industrial units, schools etc., may impair the ability of the user to listen for trains. Noise not only impairs the user's hearing, it may also affect their ability to carry out visual checks correctly.

Although the issue of noise is most prevalent at unprotected crossings, it may also hinder the performance of other users at protected level crossings.

Issue at a level crossing

Fox Covert Road Footpath: the crossing is positioned close to two roads which pass over the railway line. The noise of passing road vehicles is further increased as they move over the bridges, dramatically reducing the users sense of hearing to check for oncoming trains.

5. Error type

- [x] Error
- [ ] Violation

6. Sources of information

6.1 Interview source

- [ ] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [x] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

bi/hu

Level crossings: communication and user behaviour issues

Ref 96 | Creation date 31.08.2004 | Last modified 02.02.2005

Issue

Straight roads

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [x] Car driver
- [x] Van driver
- [ ] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Straight roads increase the opportunities for vehicle drivers to undertake risky behaviour, to avoid having to wait at the level crossing.

4. User behaviour

A straight road provides vehicle drivers with improved visibility of oncoming cars, resulting in opportunities for passing slower cars or traffic queues. This results in vehicle drivers often moving on to the opposite side of the road when approaching and going over a level crossing. This issue is further compounded if the vehicle at the front of the queue has been progressing slowly and other vehicle drivers now resent the possibility of having to wait at the crossing.

Issue at a level crossing

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [x] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 97 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Stereotypical crossing users

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [ ] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Farmer
- [x] Cyclist
- [x] Car driver
- [x] Van driver
- [ ] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [x] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Users who violate crossing procedures are not always male and in their twenties.

4. User behaviour

Users that fail to obey level crossing procedures are not always the stereotypical male in his twenties, sometimes referred to as the 'Boy Racer'.

Other groups of users, often perceived as law abiders, are known to cross without obeying crossing procedures. The following have all been identified as prominent groups of users who fail to follow level crossing procedures:

Middle-aged family women and men;
People from 'upper-class' groups;
Parents with children;
Coach drivers with tourists;
Taxi drivers with passengers;
Salespersons;
Ramblers;
Cyclists & Motorcyclists.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [x] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [x] ROAD INDUSTRY
- [ ] AA
- [x] Bus drivers
- [x] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [x] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 98 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Train arrival

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [ ] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [ ] Car driver
- [ ] Van driver
- [ ] HGV driver
- [ ] Motorcyclist
- [x] Passenger
- [ ] Horserider
- [ ] Train driver
- [ ] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Activation of the warning lights is used by passengers as a train arrival indicator.

4. User behaviour

Passengers are using the activation of the warning lights as an indicator of their train arriving at the station. Because users are leaving their decision to progress to the platform on the light activation, users are dashing across the level crossing at the last moment.

Passengers walking on the approach to the level crossing know whether they need to run over the crossing to catch their train, by observing the warning lights.

At one level crossing, a board has been positioned next to the station car park to block the view of the warning lights from passengers sitting in their cars. Passengers were waiting in the warmth and comfort of their cars and then rushing across the level crossing to the other platform once the lights were activated.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [ ] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [x] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 99 | Creation date 31.08.2004 | Last modified 02.02.2005

Issue

Sightlines

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [ ] MCBcctv
- [x] AOCR
- [ ] Undefined
- [ ] ABCL
- [ ] AHB
- [ ] MG
- [ ] MCB

1.2 Unprotected

- [x] UWC
- [ ] Undefined
- [x] UWC/T
- [x] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [x] Motorcyclist
- [x] Farmer
- [ ] Passenger
- [x] Cyclist
- [x] Horserider
- [x] Car driver
- [ ] Train driver
- [x] Van driver
- [ ] Other
- [x] HGV driver
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 60+
- [ ] 11-15
- [x] Undefined
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

Restricted or blocked sightlines may encourage users to move past a point of safety.

4. User behaviour

At crossings that have restricted sightlines along the tracks, this may result in users moving beyond a position of safety to view for oncoming trains along the tracks.

This may be a particular problem at AOCL's because of the lack of any physical barrier across the road. After waiting a period of time, vehicle drivers may creep forward past a point of safety to view along the tracks. Without the driver knowing, their vehicle may be positioned over the tracks and in the path of an oncoming train.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] ROAD INDUSTRY
- [ ] RSSB
- [ ] AA
- [ ] HSE/HMRI
- [ ] Bus drivers
- [ ] RPC
- [x] BTP
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [x] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

trl/ar

Level crossings: communication and user behaviour issues

Ref 100 | Creation date 26.08.2004 | Last modified 02.02.2005

Issue

Communication with signaller

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [ ] AOCL
- [ ] MCBcctv
- [ ] AOCR
- [ ] Undefined
- [ ] ABCL
- [ ] AHB
- [ ] MG
- [ ] MCB

1.2 Unprotected

- [ ] UWC
- [ ] Undefined
- [x] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [ ] Motorcyclist
- [x] Farmer
- [ ] Passenger
- [x] Cyclist
- [x] Horserider
- [x] Car driver
- [ ] Train driver
- [x] Van driver
- [x] Other
- [x] HGV driver
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 60+
- [ ] 11-15
- [x] Undefined
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

The dialogue between the level crossing user and the signaller may impact on the behaviour of the user.

4. User behaviour

The type of dialogue used between the user and the signaller may affect the behaviour of the user at the level crossing.

Rail specific terminology used by the signaller may be misunderstood and incorrectly interpreted by the user.
Inconsistencies in information provided by the signaller from one call to another may also result in misinterpretation of instructions by the user. This may come about from heavy use of a crossing, with the signaller having to provide continued feedback to users, therefore affecting the depth and quality of information provided on each phonecall.

The information provided by the user also affects the decisions and replies provided by the signaller.
If the user provides inaccurate or false information, or through continued use of a crossing, provides insufficient detail during each phonecall, this may result in the signaller giving permission for the user to cross when in fact it is unsafe for them to do so.

5. Error type

- [x] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] ROAD INDUSTRY
- [ ] RSSB
- [ ] AA
- [ ] HSE/HMRI
- [ ] Bus drivers
- [x] RPC
- [ ] BTP
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

th/er

Level crossings: communication and user behaviour issues

Ref 101 | Creation date 31.08.2004 | Last modified 02.02.2005

Issue

Signal box: detection of objects

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☐ AOCL
- ☐ AOCR
- ☐ ABCL
- ☐ AHB
- ☐ MG
- ☐ MCB
- ☒ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☐ UWC
- ☐ UWC/T
- ☐ UWC/MWL
- ☐ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☐ Pedestrian
- ☐ Farmer
- ☐ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☐ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☒ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Certain conditions impair the signallers ability to detect objects on the level crossing.

4. User behaviour

During rainy weather conditions, the signaller's ability to detect people or objects through the CCTV is impaired from:
Rain directly hitting the lens of the CCTV camera (even with the use of lens wipers).
Combination of rain and car headlights reflecting light up from the rubberised flooring toward the CCTV camera lens.

The ability of the signaller to detect objects is also impaired by the following:
Electric trains can interfere with the quality of the CCTV screen image;
Cobwebs on the camera lens also impair the signaller from clearly seeing the full view of the crossing;
Windy weather moves the camera position, omitting different sections of the crossing from the signallers view, as it sways from side to side.

White and dark clothing can also be very difficult to detect. If a person is standing near the barrier in white clothing, the signaller can find it difficult to ascertain whether they are standing outside or inside the barrier. Dark clothing disguises people when standing on or walking over the rubber floor surfaces.

5. Error type

- ☐ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☐ RAIL INDUSTRY
- ☒ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☐ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 102 | Creation date 31.08.2004 | Last modified 02.02.2005

Issue

Railway sidings

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- ☒ AOCL
- ☒ AOCR
- ☒ ABCL
- ☒ AHB
- ☒ MG
- ☒ MCB
- ☐ MCBcctv
- ☐ Undefined

1.2 Unprotected

- ☒ UWC
- ☒ UWC/T
- ☒ UWC/MWL
- ☒ OC
- ☐ FP/MWL
- ☐ FC
- ☐ Undefined

2. User details

2.1 Level crossing user type

- ☐ Pedestrian
- ☐ Farmer
- ☐ Cyclist
- ☐ Car driver
- ☐ Van driver
- ☒ HGV driver
- ☐ Motorcyclist
- ☐ Passenger
- ☐ Horserider
- ☐ Train driver
- ☐ Other
- ☐ Undefined

2.2 Age

- ☐ 0-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20-35
- ☐ 35-50
- ☐ 50-60
- ☐ 60+
- ☒ Undefined

2.3 On own

- ☐ Individual
- ☐ Group
- ☒ Undefined

3. Description of issue / design feature

Alternative uses of railways sidings may alter the type of traffic using a level crossing.

4. User behaviour

Many disused railway sidings are now being sold off to private companies, who utilise the sidings for holding and transporting large quantities of heavy goods by HGVs. Level crossings located on the access routes into and out of the sidings are often inadequate in their design and level of control measures in accommodating for large vehicles passing over the crossing on a regualr basis.

The issue is further compounded by the nature of HGV drivers needing to work within strict delivery timescales, resulting in possible risk taking behaviour at level crossings to avoid being delayed.

5. Error type

- ☐ Error
- ☒ Violation

6. Sources of information

6.1 Interview source

- ☒ RAIL INDUSTRY
- ☐ Network Rail
- ☐ RSSB
- ☐ HSE/HMRI
- ☐ RPC
- ☒ BTP
- ☐ ROAD INDUSTRY
- ☐ AA
- ☐ Bus drivers
- ☐ OTHERS

6.2 Level crossing visit - areas

- ☐ Milton Keynes
- ☐ Doncaster
- ☐ Hertford
- ☐ Peterborough
- ☐ Bedford
- ☐ Redcar

6.3 Document source

- ☐ RAIL INDUSTRY
- ☐ HSE/HMRI
- ☐ Network Rail
- ☐ RSSB
- ☐ Railway GS
- ☐ Others
- ☐ GOVERNMENT
- ☐ DfT (rail)
- ☐ DfT (road)
- ☐ Other dept.
- ☐ OTHER
- ☐ TRL (rail)
- ☐ TRL (road)
- ☐ Independent
- ☐ Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 103 | Creation date 31.08.2004 | Last modified 02.02.2005

Issue

Emergency services

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [x] Undefined

1.2 Unprotected

- [ ] UWC
- [ ] UWC/T
- [ ] UWC/MWL
- [ ] OC
- [ ] FP/MWL
- [ ] FC
- [x] Undefined

2. User details

2.1 Level crossing user type

- [ ] Pedestrian
- [ ] Farmer
- [ ] Cyclist
- [ ] Car driver
- [ ] Van driver
- [ ] HGV driver
- [ ] Motorcyclist
- [ ] Passenger
- [ ] Horserider
- [ ] Train driver
- [x] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [x] Individual
- [ ] Group
- [ ] Undefined

3. Description of issue / design feature

Crossings located on routes used by emergency service vehicles may result in increased risk taking behaviour.

4. User behaviour

No vehicles, including those of the emergency services, are legally permitted to pass the activated warning system at a level crossing.

Level crossings located on roads used frequently by the emergency services may result in these vehicle drivers undertaking further risky behaviour to avoid having to wait at the lights.

An emergency service driver's perception of risk (when on an emergency call) associated with passing the activated lights may be lower than the risk compared with not reaching their required destination in time. For example, going through the initial warning lights and knowing that they will probably miss the train if they go early enough, compared to arriving late at their required destination and knowing lives may have been lost.

Level crossings may present a dilemma of 'work ethics' to some emergency service vehicle drivers.

5. Error type

- [ ] Error
- [x] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [x] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [ ] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [ ] Independent
- [ ] Non-UK

6.4 Document details

Level crossings: communication and user behaviour issues

Ref 104 | Creation date 31.08.2004 | Last modified 02.02.2005

Issue

Weather: Fog

Issue at a level crossing

1. Level Crossing type

1.1 Protected

- [x] AOCL
- [x] AOCR
- [x] ABCL
- [x] AHB
- [x] MG
- [x] MCB
- [x] MCBcctv
- [ ] Undefined

1.2 Unprotected

- [x] UWC
- [x] UWC/T
- [x] UWC/MWL
- [x] OC
- [x] FP/MWL
- [x] FC
- [ ] Undefined

2. User details

2.1 Level crossing user type

- [x] Pedestrian
- [x] Farmer
- [x] Cyclist
- [x] Car driver
- [x] Van driver
- [x] HGV driver
- [x] Motorcyclist
- [ ] Passenger
- [x] Horserider
- [ ] Train driver
- [x] Other
- [ ] Undefined

2.2 Age

- [ ] 0-10
- [ ] 11-15
- [ ] 16-20
- [ ] 20-35
- [ ] 35-50
- [ ] 50-60
- [ ] 60+
- [x] Undefined

2.3 On own

- [ ] Individual
- [ ] Group
- [x] Undefined

3. Description of issue / design feature

The effectiveness of visual information is impaired by fog.

4. User behaviour

The ability of the vehicle drivers or other users to detect the presence of a level crossing, hazard information, warning lights or an approaching train is impaired by fog. The impact of fog on users behaviour may result in users undertaking risky behaviour, such as failing to take account of warning information or failing to see oncoming trains.

5. Error type

- [x] Error
- [ ] Violation

6. Sources of information

6.1 Interview source

- [x] RAIL INDUSTRY
- [ ] Network Rail
- [ ] RSSB
- [ ] HSE/HMRI
- [ ] RPC
- [x] BTP
- [ ] ROAD INDUSTRY
- [ ] AA
- [ ] Bus drivers
- [ ] OTHERS

6.2 Level crossing visit - areas

- [ ] Milton Keynes
- [ ] Doncaster
- [ ] Hertford
- [ ] Peterborough
- [ ] Bedford
- [ ] Redcar

6.3 Document source

- [ ] RAIL INDUSTRY
- [ ] HSE/HMRI
- [ ] Network Rail
- [ ] RSSB
- [ ] Railway GS
- [ ] Others
- [ ] GOVERNMENT
- [ ] DfT (rail)
- [ ] DfT (road)
- [ ] Other dept.
- [x] OTHER
- [ ] TRL (rail)
- [ ] TRL (road)
- [x] Independent
- [ ] Non-UK

6.4 Document details

mp/001

5 Validation

5.1 Objective

The validation exercise was carried out to assess the feasibility of assigning HF issues to level crossings. This is a precursor to the development of tools and approaches for Inspectors.

5.2 Method

5.2.1 Location

The area of Helpston (figure 15), near Peterborough, was selected for carrying out the validation exercise. The signal box in Helpston, quantity of level crossings, different road infrastructures and level crossing users within a relatively small geographical area, made it an ideal location.

Figure 15
Helpston and the surrounding villages.

The following level crossings were used for the validation exercise;

- Helpston: MCB
- Maxey: CCTV
- Lolham: CCTV
- Tallington: CCTV
- Bainton Green: AHB
- Fox Covert: FP

5.2.2 Timescale

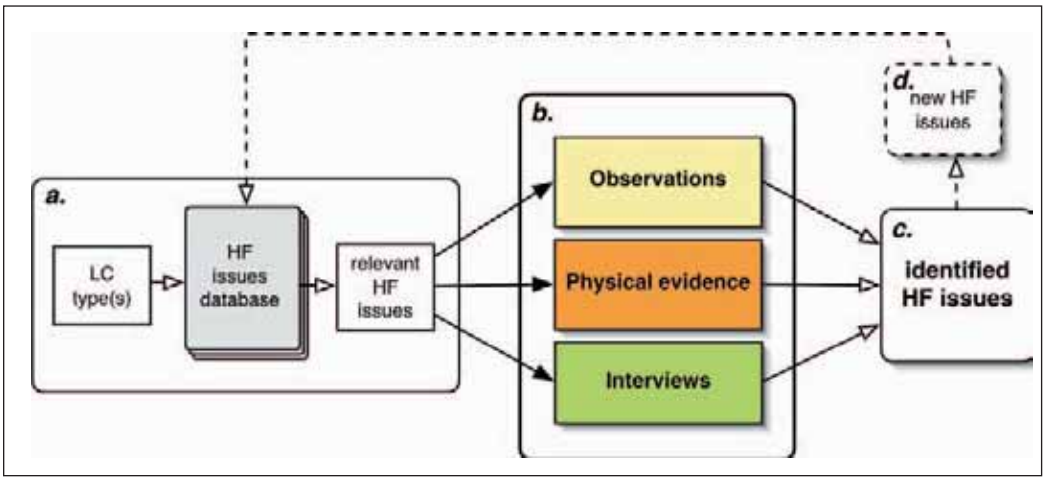
The exercise was conducted over a total of four days, 5th October and 19-21st October, 2004.

5.2.3 Process

The process used for assigning specific HF issues to level crossings is broken down into the following tasks; a, b, c, and d (figure 16).

- Task a: select level crossing types to be reviewed and extract relevant HF issues from database.
- Task b: issues relevant to each crossing type are assessed using ‘Observations’, ‘Physical evidence’ and ‘Interviews’.
- Task c: a set of final HF issues are assigned to each crossing.
- Task d: new HF issues identified from task b are fed back into database.

Figure 16
Process used for assigning HF issues to level crossings.



Three techniques were applied for assigning the human factors issues at each of the level crossings; Observations, Physical evidence and Interviews (task b).

5.2.3.1 Observations

During the validation exercise, observations were carried out at the level crossings. This involved spending periods of time at the crossing and observing the behaviour of users. Any issues from the database that were confirmed from observing users were recorded against a data sheet with issues relevant to that specific type of crossing.

All observations were video recorded.

5.2.3.2 Physical evidence

A review of the physical aspects of each crossing and its immediate surroundings were made.

This involved verifying the presence of issues from any physical evidence. For example, a nearby 'road junction', 'farm land' in the vicinity of the crossing, 'traffic calming system' or 'type of trains'. An assessment of the crossing from a user's perspective, both on foot and from a vehicle was also made to ensure all physical evidence was confirmed. Any issues established through this process were recorded on the data sheet.

Still photographs and video footage were taken to record each identified issue.

5.2.3.3 Interviews

Contact was made with key persons within the Helpston area. These contacts were used for the interview stages of the validation exercise.

The type of users sourced for the interviews were chosen to ensure that each of the following 'characteristics' were covered by at least one person;

- Local to area
- Represented community

- Business user
- Rail industry member

Response from the local community and railway industry was forthcoming and the following users agreed to participate;

- Joe Dobson, Parish Councillor for Helpston
- Pc Dave Roberston, BTP
- Fred Mann, Warden of local Glinton College
- Mark Delaine-Smith, Delaine Buses (and drivers)
- Signallers at Helpston signal box

The use of local knowledge is a valuable method for gaining insights into the behaviour of level crossing users. However, correctly defining the boundaries of each interview is key to ensuring the discussion generates HF issues and the reasons behind user behaviour, and not on 'fault-finding' with individual users or any industry. Each interviewee was provided with a set of guidelines prior to the interview, which detailed some examples of HF issues. These examples provided a framework for the discussion and facilitated users to talk around the issues, ensuring maximum output from the interview.

Interviews were carried out with people either at their place of work, home or during visits to the local level crossings. The visits to crossings with users can assist in confirming many HF issues. The context-specific environment supported the user in their discussion of issues and helped uncover additional minor details about user behaviour relevant to each individual crossing.

During each interview, the HF issues previously confirmed as relevant to each level crossing were reviewed, as well as all HF issues relevant to the type(s) of crossing.

5.3 Findings

The following tables list the identified human factors issues for each level crossing. Each table gives the reference number, name and description for each issue. The issues are not ranked in terms of their level of risk, but are presented in numerical order.

Key:
O = Observations
P = Physical evidence
I = Interviews

O	P	I

An indication of how the human factors issues were identified is also provided. A colour-coding key has been used to show whether an issue was identified through Observation, Physical evidence or Interview. An issue may have been identified by one, two or all three of the techniques.

5.3.1 Generating information through interviews

The colour coding clearly shows that the interview technique identified the majority of issues for all level crossings, followed by physical evidence and then observations.

Not only did the interviews identify which issues were relevant, they also uncovered a breadth of knowledge about the resultant behaviour of users. This additional information on user behaviour has been included within the database.

Many of the issues and associated behaviours of users would not have been captured through using just evidence at the crossing or from observing users for interim periods of time. The inclusion of interviews with local users and those from the rail industry has generated extensive feedback on HF issues and user behaviour.

5.3.2 Assigned HF issues

Tables are provided for Helpston (table 3), Tallington (table 4), Maxey (table 5), Lolham (table 6), Bainton Green (table 7) and Fox Covert (table 8) level crossings. Photographic evidence of some of the issues are provided at the end of each table.

Table 3
Helpston: MCB

Ref	*Issue identified*	*Description*	*O*	*P*	*I*
03	Weather: Ice	Icy weather conditions on the approach, exit and on the crossing affects the behaviour of users.			
04	Users familiarity with a crossing	Regular users are more likely to undertake risky behaviour when crossing. Those living close to level crossings often behave less cautiously when using the crossing.			
07	Vehicle approach speed	The speed of the road traversing a level crossing is a factor in vehicle driver errors.			
11	Pedestrian access	Pedestrian and passengers are more likely to undertake risky behaviour at vehicular level crossings where bridges are not provided.			
13	Groups	People in groups may undertake more risky behaviour, than when on their own (figure 18).			
14	Time of day	Risk taking at level crossings increases during rush-hours, at midday and at the beginning and end of the school day.			
16	Presence of rail staff	The presence of rail staff in high-visibility clothing can have an undesirable impact on level crossing user behaviour.			
18	Closure time	The amount of time the user expects to wait at the level crossing may influence their risk taking behaviour.			
20	Audible alarm	Second audible warning tone is not detected and/or understood by level crossing users.			
22	Conspicuity of flashing lights	The effectiveness of flashing lights is limited be veiling glare, limited light output and their position.			
40	Type of trains	Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.			
42	Days of the week	Risk taking behaviour at level crossings increases on working days.			
45	Animals: Horses	Activated protected level crossings may result in undesirable behaviour by horses, and influence the behaviour of other road users.			
48	Observation of amber light	The length of activation of the amber light has little affect on the behaviour of vehicle drivers.			

53	Events	Events increase the amount of irregular users at level crossings.			
56	Location near major roads	The risk of vehicle drivers blocking-back over the level crossing or general risk taking behaviour is increased when the crossing is located on roads with direct access to major roads and motorways.			
57	Traffic calming systems	Road traffic calming systems on the approaches to a level crossing may increase the risk of vehicles blocking-back (figure 19).			
72	Location near farms	High volumes of farm traffic impact on the speed and behaviour of other vehicles traversing the crossing.			
75	Public houses	Crossing located on-route to public houses may result in increased violations of crossing procedures.			
86	Train enthusiasts	To view trains closely, people undertake risky behaviour at level crossings.			
88	Proximity of different road speeds	High road speeds in close proximity to a level crossing on a lower speed road influences the speed at which vehicle drivers approach the crossing (figure 20).			
91	Vehicle speed zones	The position of incremental speed restriction signs influences the speed of vehicle drivers on approaching the crossing.			
92	Double train lines	The space between two sets of double train lines provides users with a refuge point.			
96	Straight roads	Straight roads increase the opportunities for vehicle drivers to undertake risky behaviour, to avoid having to wait at a level crossing.			
97	Stereotypical crossing users	Users who violate crossing procedures are not always male and in their twenties.			
104	Weather: Fog	The effectiveness of visual information is impaired by fog.			

Figure 18
13: many young children use the Helpston crossing, before and after school on cycles and by foot. Children in groups undertake more risky behaviour than children on their own.

Figure 19
57: The local traffic calming scheme can cause blocking-back problems over the crossing. Additional schemes on the other side of the crossing was considered inappropriate.

Figure 20
88: the 30mph zone is positioned very close to the crossing, after a 60mph straight road. It provides very limited time for vehicles drivers to adjust their behaviour.

Table 4
Tallington: CCTV

Ref	*Issue identified*	*Description*	*O*	*P*	*I*
03	Weather: Ice	Icy weather conditions on the approach, exit and on the crossing affects the behaviour of users.			
04	Users familiarity with a crossing	Regular users and those living close to level crossings are more likely to undertake risky behaviour when using the crossing.			
10	Representation of HGV users	HGV drivers form a disproportionately high number of incidents at level crossings.			
14	Time of day	Risk taking at level crossings increases during rush-hours, at midday and at the beginning and end of the school day.			
15	Visual clutter	Superfluous information and roadside structures on the approach to the crossing may reduce user's detection of level crossing information and warning signs (figure 21).			
18	Closure time	The amount of time the user expects to wait at the level crossing may influence their risk taking behaviour.			
40	Type of trains	Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.			
42	Days of the week	Risk taking behaviour at level crossings increases on working days.			
48	Observation of amber light	The length of activation of the amber light has little affect on the behaviour of vehicle drivers (figure 22).			
72	Location near farms	High volumes of farm traffic impact on the speed and behaviour of other vehicles traversing the crossing.			
75	Public houses	Crossing located on-route to public houses may result in increased violations of crossing procedures (figure 23).			
86	Train enthusiasts	To view trains closely, people undertake risky behaviour at level crossings.			
97	Stereotypical crossing users	Users who violate crossing procedures are not always male and in their twenties.			

Figure 21
15: the approach to Tallington is cluttered with yellow advertising signs and a yellow branded petrol station. These all make it very difficult for approaching vehicle drivers to identify the similar coloured crossing signage.

Figure 22
48: drivers have been observed ignoring the amber light, although they have had sufficient time to stop at the lights. The vehicle driver approaching the crossing continues to drive straight over.

Figure 23
75: some users of the local public house use the crossing while under the influence of alcohol. The BTP have been called to this crossing to clear it of nusiance users who jump the barriers.

Table 5
Maxey: CCTV

Ref	*Issue identified*	*Description*	*O*	*P*	*I*
03	Weather: Ice	Icy weather conditions on the approach, exit and on the crossing affects the behaviour of users.			
04	Users familiarity with a crossing	Regular users and those living close to level crossings are more likely to undertake risky behaviour when crossing when using the crossing (figure 24).			
11	Pedestrian access	Pedestrian and passengers are more likely to undertake risky behaviour at vehicular level crossings where bridges are not provided.			
14	Time of day	Risk taking at level crossings increases during rush-hours, at midday and at the beginning and end of the school day.			
16	Presence of rail staff	The presence of rail staff in high-visibility clothing can have an undesirable impact on level crossing user behaviour.			
18	Closure time	The amount of time the user expects to wait at the level crossing may influence their risk taking behaviour.			
20	Audible alarm	Second audible warning tone is not detected and/or understood by level crossing users.			
22	Conspicuity of flashing lights	The effectiveness of flashing lights is limited be veiling glare, limited light output and their position.			
25	Users perception of train speed and distance	Train speed and distance is underestimated by users, which may result in increased decision making errors by users at level crossings.			
26	Foliage on roadside	The effectiveness of information on the approach to the level crossing is reduced by overgrown foliage (figure 25).			
40	Type of trains	Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.			
42	Days of the week	Risk taking behaviour at level crossings increases on working days.			
45	Animals: Horses	Activated protected level crossings may result in undesirable behaviour by horses, and influence the behaviour of other road vehicle users.			
48	Observation of amber light	The length of activation of the amber light has little affect on the behaviour of vehicle drivers.			
63	Housing developments	Housing developments increase road traffic and level crossing use.			
70	Road markings	The effectiveness of vehicle drivers stopping in the correct location is impaired by worn road markings.			
72	Location near farms	High volumes of farm traffic impact on the speed and behaviour of other vehicles traversing the crossing.			
86	Train enthusiasts	To view trains closely, people undertake risky behaviour at level crossings.			
88	Proximity of different road speeds	High road speeds in close proximity to a level crossing on a lower speed road influences the speed at which vehicle drivers approach the crossing (figure 26).			
92	Double train lines	The space between two sets of double train lines provides users with a refuge point.			

97	Stereotypical crossing users	Users who violate crossing procedures are not always male and in their twenties.			
104	Weather: Fog	The effectiveness of visual information is impaired by fog.			

Figure 24
04: local users living next to the crossing have consistently undertaken risky behaviour when crossing at Maxey.

Figure 25
26: the level crossing sign, positioned on the left-hand side is obscured from the vehicle driver's view.

Figure 26
88: the 30mph zone is positioned close to the crossing, after a 60mph zone on a long straight road.

Table 6
Lolham: CCTV

Ref	*Issue identified*	*Description*	*O*	*P*	*I*
03	Weather: Ice	Icy weather conditions on the approach, exit and on the crossing affects the behaviour of users.			
04	Users familiarity with a crossing	Regular users and those living close to level crossings are more likely to undertake risky behaviour using the crossing.			
18	Closure time	The amount of time the user expects to wait at the level crossing may influence their risk taking behaviour.			
26	Foliage on roadside	The effectiveness of information on the approach to the level crossing is reduced by overgrown foliage.			
40	Type of trains	Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.			
42	Days of the week	Risk taking behaviour at level crossings increases on working days.			
45	Animals: Horses	Activated protected level crossings may result in undesirable behaviour by horses, and influence the behaviour of other road users.			
48	Observation of amber light	The length of activation of the amber light has little affect on the behaviour of vehicle drivers.			
54	Narrow roads	Narrow roads before and after the level crossing may result in drivers slowing and stopping while on the level crossing (figure 27).			
64	Vehicle shortcuts	Level crossings on roads used as shortcuts result in increased risk taking behaviour by vehicle drivers (figure 28).			
70	Road markings	The effectiveness of drivers stopping in the correct location is impaired by worn road markings.			
72	Location near farms	High volumes of farm traffic impact on the speed and behaviour of other vehicles traversing the crossing.			

74	Proximity of level crossings to another	Level crossings located in close proximity of another may influence the risk taking behaviour of vehicle drivers (figure 29).			
75	Public houses	Crossing located on-route to public houses may result in increased violations of crossing procedures.			
80	Cats-eyes	Deteriorated cats-eyes on the approach or on the level crossing may reduce the vehicle driver's ability to negotiate the road layout at night.			
86	Train enthusiasts	To view trains closely, people undertake risky behaviour at level crossings.			
97	Stereotypical crossing users	Users who violate crossing procedures are not always male and in their twenties.			
104	Weather: Fog	The effectiveness of visual information is impaired by fog.			

Figure 27
54: the approaches to both sides of Lolham bridges is very narrow. There is only room for one vehicle to pass at a time.

Figure 28
64: the Lolham bridges crossing is often used as a shortcut for vehicle drivers avoiding the busy A1 between Stamford and Peterborough.

Figure 29
74: the Lolham bridges crossing is positioned in close proximity to Bainton Green. After being held at Lolham, many vehicle drivers speed along the straight road to avoid being caught at the next crossing.

Table 7
Bainton Green: AHB

Ref	*Issue identified*	*Description*	*O*	*P*	*I*
04	Users familiarity with a crossing	Regular users are more likely to undertake risky behaviour when crossing. Those living close to level crossings often behave less cautiously when using the crossing.			
06	Road junctions	Road junctions close to the level crossing may result in increased decision making, possible errors by vehicle drivers and blocking-back over the crossing (figure 30).			
07	Vehicle approach speed	The speed of the road traversing a level crossing is a factor in vehicle driver errors.			
16	Presence of rail staff	The presence of rail staff in high-visibility clothing can have an undesirable impact on level crossing user behaviour.			
23	Sunlight strobing	Sunlight passing through lines of trees positioned on the side of the road, imparts a strobing effect on the road which may impair the visibility of vehicle drivers.			

24	Half barrier	Automatic half barriers facilitate vehicle drivers to undertake risk taking behaviour (figure 31).			
25	User perception of train speed and distance	Train speed and distance is underestimated by users, which may increase the decision making errors of users at level crossings.			
26	Foliage on roadside	The effectiveness of information on the approach to a level crossing is reduced by overgrown foliage.			
38	Visitor parking	The position of visitor's parked vehicles at a level crossing may affect the behaviour of other road users.			
40	Type of trains	Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.			
42	Days of the week	Risk taking behaviour at level crossings increases on working days.			
45	Animals: Horses	Activated protected level crossings may result in undesirable behaviour by horses, and influence the behaviour of other road users.			
48	Observation of amber light	The length of activation of the amber light has little affect on the behaviour of vehicle drivers.			
64	Vehicle shortcuts	Level crossings on roads used as shortcuts result in increased risk taking behaviour by vehicle drivers.			
72	Location near farms	High volumes of farm traffic impact on the speed and behaviour of other vehicles traversing the crossing (figure 32).			
74	Proximity of level crossing to another	Level crossings located in close proximity to another may influence the risk taking behaviour of vehicle drivers.			
75	Public houses	Crossing located on-route to public houses may result in increased violations of crossing procedures.			
96	Straight roads	Straight roads increase the opportunities for vehicle drivers to undertake risky behaviour, to avoid having to wait at a level crossing.			
97	Stereotypical crossing users	Users who violate crossing procedures are not always male and in their twenties.			
104	Weather: Fog	The effectiveness of visual information is impaired by fog.			

Figure 30
06: two road junctions cross before leading to Bainton Green crossing. The complexity of this junction leads to vehicle drivers having to focus on a variety of different information cues, especially during rush-hours when this is used as a shortcut route.

Figure 31
24: Bainton Green is a half barrier crossing. Zig-zagging has been observed by locals.

Figure 32
72: the route over Bainton is used heavily by local farmers. The straight road and shortcut route combined with slow farming traffic may influence some vehicle drivers to overtake while approaching the crossing.

Table 8
Fox Covert: FP

Ref	*Issue identified*	*Description*	*O*	*P*	*I*
04	Users familiarity with a crossing	Regular users and those living close to level crossings are more likely to undertake risky behaviour when using level crossings (figure 35).			
05	Frequency of trains	Crossing with a low frequency of trains are likely to increase the risk taking behaviour of regular users (figure 36).			
12	Regularity of trains	Variations in train schedules, such as engineering work, unexpected delays to train services, and line speed restrictions etc., all contribute to fluctuations in trains passing a point at a supposedly 'known' time.			
13	Groups	People in groups may undertake more risky behaviour, than when on their own.			
14	Time of day	Risk taking behaviour increases during rush-hours, at midday and at the beginning and end of the school day.			
21	Darkness	Unprotected crossings used during hours of darkness may lead to increased decision making errors by crossing users.			
25	User perception of train speed and distance	Train speed and distance is underestimated by users, which may increase the decision making errors of users at level crossings.			
30	Trespassing on rail structures	Rail structures located at the entrance and exit areas to crossings that appear suitable for climbing may result in undesirable risk taking behaviour by members of the public.			
32	Train speeds	Low train speeds may increase the risk taking behaviour of users.			
33	Sighting distance	Good sighting distance should indicate the crossing as high risk (figure 34).			
39	Crossing utilisation	Level crossings with high crossing utilisation increases the risks to users.			
40	Type of trains	Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.			
94	Trespassers	Food and drink rubbish at a level crossing is often an indicator of young people using the crossing as a meeting place (figure 33).			
95	Noise	Noisy surroundings may impair the performance of users to detect trains at level crossings (figure 34).			

Figure 33
30: railway construction material had been left alongside the crossing, with easy access for children.
94: evidence of food and drink rubbish indicated it was used as a meeting place.

Figure 34
33: the sighting distance is long in both directions, and from both sides of the crossing.
95: the local by-pass bridge in the distance produces considerable noise from passing vehicles.

Figure 35
04: local school children use this crossing on a regular basis. This cycle rider failed to look when crossing.
05: the cyclist also commented on the low frequency of trains, and often never seeing a train when crossing in the morning or evening.

5.4 Feasibility of ranking issues

The human factors issues identified from the validation exercise have not been ranked in terms of their importance or by level of risk. The interview technique provides an excellent source for establishing what issues do exist, however some issues may have more of an impact on certain individuals. Therefore any system of ranking would be greatly dependent upon how important they were to a local user.

5.5 Value of the validation exercise

The application of Observations, Physical evidence and Interviews has been successful in assigning human factors issues to level crossings. This process will be used as a guide for developing the tools and approaches for Inspectors.

A matrix of all database issues is provided in appendix B. It provides an overview of those issues assigned at each crossing and the method by which is was confirmed.

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Appendices

A Level crossing visits

This appendix is supplementary to section 2.3, Level crossing visits at the beginning of this report. It provides photographs of 31 of the 45 level crossings visited.

B HF issues by level crossing type

This appendix contains a list of the HF issues relevant to each level crossing type.

Appendix A: Level crossing visits

Bedford

Kempston Hardwick: ABCL



Millbrook Station: MCG


Stewartby Brickworks: MCG, Private Crossing Keeper



Stewartby Green Lane Station: MCG



Wootton Broadmead: AHB


Doncaster

Creykes: AHB



Dockhills: MCB CCTV



Eggborough: FP


Fields Lane: AOCL



Hensall Station: MCG



Marsh Lane: FP



Snaith & Pontefract: MCB CCTV



Stainforth Road: MCB CCTV



Thorpe: AOCL



Hertford

Roydon Station: MCB CCTV


St.Margarets Station: MCB CCTV



Ware Station: MCB CCTV



Ware (a): FP



Ware (b): FP



Milton Keynes

Berry Lane: UWC+T


Bow Brickhill Station: AHB



Leighton Buzzard: National Heritage Railway, Open Crossing



Woburn Sands: FP



Woburn Sands Station: MCB



Peterborough

Bainton Green: AHB



Fox Covert: FP



Lolham Bridges: MCB CCTV



Lolham: FP



Maxey: MCB CCTV



Tallington: MCB CCTV



Woodcroft: MCG



Appendix B: HF issues by crossing type

The following pages contain a list of the Human Factors issues by level crossing type.

Level crossing type: AOCL

02	**Driver distractions**

Distractions on the approach to a level crossing may impair the performance of both vehicle and train drivers.

03	**Weather: Ice**

Icy weather conditions on the approach, exit and on the crossing affects the behaviour of crossing users.

04	**Users familiarity with a crossing**

Regular users and those living close to level crossings are more likely to undertake risk taking behaviour when using the crossing.

05	**Frequency of trains**

Crossings with a low frequency of trains are likely to increase the risk taking behaviour of regular users.

06	**Road junctions**

Road junctions close to the level crossing may result in increased decision making and errors by vehicle drivers, and blocking-back over the crossing.

07	**Vehicle approach speed**

The speed of the road traversing a level crossing is a factor in vehicle driver errors.

08	**Age of drivers**

Violations at level crossings may be influenced by the age of the local population.

10	**Representation of HGV users**

HGV drivers form a disproportionately high number of incidents at level crossings.

11	**Pedestrian access**

Pedestrian and passengers are more likely to undertake risky behaviour at vehicular level crossings where bridges are not provided.

12	**Regularity of trains**

Variations in train schedules, such as engineering works, unexpected delays to train services, and line speed restrictions etc., all contribute to fluctuations in trains passing a point at a supposedly ‘known’ time.

13	**Groups**

People in groups may undertake more risky behaviour, than when on their own.

14	**Time of day**

Risk taking at level crossings increases during rush-hours, at midday and at the beginning and end of the school day.

15	**Visual clutter**

Superfluous information and roadside structures on the approach to the crossing may reduce the user’s detection of level crossing information and warning signs.

16	**Presence of rail staff**

The presence of rail staff in high-visibility clothing can have an undesirable influence on level crossing user behaviour.

17	**Understanding of warning lights**

The onset of the amber and proceeding red lights of the activated warning system lead to various vehicle driver behaviours at level crossings.

18	**Closure time**

The amount of time the user expects to wait at the level crossing may influence their risk taking behaviour.

20	**Audible alarm**

Second audible warning tone is not detected and/or understood by level crossing users.

Level crossing type: AOCL

22	**Conspicuity of flashing lights**

The effectiveness of flashing lights is limited by veiling glare, limited light output and their position.

26	**Foliage**

The effectiveness of information on the approach to and at the level crossing is reduced by overgrown foliage.

28	**Position of warning lights**

The effectiveness of warning lights is influenced by their position.

29	**Quantity of information**

The quantity of signage information that can be read and understood decreases with road speed.

30	**Trespassing on rail structures**

Rail structures located at the entrance and exit areas to crossings that appear suitable for climbing may result in undesirable risk taking behaviour by members of the public.

31	**Location near rail stations**

Level crossings adjacent to rail stations influence the risk taking behaviour of vehicle drivers and other users.

32	**Train speeds**

Low train speeds may increase the risk taking behaviour of users.

33	**Sighting distance**

Good sighting distance should indicate the level crossing as high risk.

34	**Parked cars**

Parked cars before and after the level crossing may result in drivers slowing and stopping while on the level crossing.

38	**Visitor parking**

The position of visitors parked vehicles at a level crossing may affect the behaviour of other road drivers.

40	**Type of trains**

Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.

42	**Days of the week**

Risk taking behaviour at level crossings increases on working days.

43	**Suicide**

Level crossings are a potential target for use by persons attempting to commit suicide

44	**Automatic open crossings**

Automatic open level crossings result in increased risk taking behaviour, later in the crossing cycle.

48	**Observation of amber light**

The length of activation time of the amber light has little affect on the behaviour of the vehicle driver.

49	**Road access**

Level crossings that provide the only access to routes either side of the crossing influences the risk taking behaviour of vehicle drivers.

50	**Passenger drop-off points**

Non-designated passenger drop-off points close to level crossings affects the flow and behaviour of traffic approaching a level crossing.

Level crossing type: AOCL

51	**See-through effect**

Level crossing located in a dip or on a brow of a long straight road may result in increases of red-light running.

52	**HGV drivers using rail station facilities**

The effectiveness of information is reduced by HGV drivers parking in front of signs and warning devices.

53	**Events**

Events increase the amount of irregular users at level crossings.

54	**Narrow roads**

Narrow roads before and after the level crossing may result in vehicle drivers slowing and stopping while on the level crossing.

56	**Location near major roads**

The risk of vehicle drivers blocking-back over the level crossing, or general risk taking behaviour is increased when the crossing is located on roads with direct access to major roads or motorways.

57	**Traffic calming systems**

Road traffic calming systems on the approaches to a level crossing may increase the risk of vehicles blocking-back.

59	**Foreign vehicle drivers**

Areas with high levels of foreign vehicle drivers may have increases in decision making errors at level crossings. This may be more evident during seasonal periods.

61	**Crossing surface**

Uneven and slippery level crossing surface may present a potential hazard to those using the crossing.

62	**Roadworks**

Roadworks positioned up to 3 kilometres from the level crossing may still impact on vehicles blocking-back.

63	**Housing developments**

Housing developments increase road traffic and level crossing use.

64	**Vehicle shortcuts**

Level crossings on roads used as shortcuts result in increased risk taking behaviour by vehicle drivers.

66	**Another train approaching**

The ‘Another Train Coming if lights continue to show’ sign has minimal impact in providing vehicle drivers with sufficient information.

69	**Rural level crossings**

The environmental context of a rural level crossing reduces the awareness of approaching vehicle drivers.

70	**Road markings**

The effectiveness of vehicle drivers stopping in the correct location is impaired by worn road markings.

71	**Number of train lines**

Single train lines may increase the risk taking behaviour of both vehicle drivers and pedestrians.

72	**Location near farms**

High volumes of farm traffic impact on the speed and behaviour of other vehicles traversing the crossing.

73	**Commercial traffic**

Level crossings with high volumes of commercial traffic may result in increased risk taking behaviour.

Level crossing type: AOCL

74	**Proximity of level crossing to another**

Level crossings located in close proximity to another may influence the risk taking behaviour of vehicle drivers.

79	**Combined environmental features**

Level crossings with a combination of environmental features, such as bends, hills, trees and hedges, may increase the decision making errors of vehicle drivers.

80	**Cats-eyes**

Deteriorated ‘cats-eyes’ on the approach or on the level crossing may reduce the vehicle driver’s ability to negotiate the road layout at night.

81	**Sign pictogram**

The ‘Puffer’ sign does not convey any directly useful information to users.

83	**Road descents**

Level crossings located at the end of a descent may result in increased red-light running by vehicle drivers.

86	**Train enthusiasts**

To view trains closely, people undertake risky behaviour at level crossings.

87	**School parking**

School drop-off and collection points close to level crossings affects the flow and behaviour of other vehicle drivers approaching the crossing.

88	**Proximity of different road speeds**

High road speeds in close proximity to a level crossing on a lower speed road influences the speed at which vehicle drivers approach the crossing.

89	**Level crossing equipment**

The reliability and/or perception of reliability of the level crossing equipment affects the risk taking behaviour of regular users.

90	**Position of information**

Perception of a hazard is improved when information referencing the imminent danger are associated together.

91	**Vehicle speed zones**

The position of incremental speed restriction signs influences the speed of vehicle drivers when approaching the crossing.

95	**Noise**

Noisy surroundings may impair the performance of the users to detect trains at level crossings.

96	**Straight roads**

Straight roads increase the opportunities for vehicle drivers to undertake risky behaviour, to avoid having to wait at the level crossing.

97	**Stereotypical crossing users**

Users who violate crossing procedures are not always male and in their twenties.

98	**Train arrival**

Activation of the warning lights is used by passengers as a train arrival indicator.

102	**Railway sidings**

Alternative uses of railways sidings may alter the type of traffic using a level crossing.

103	**Emergency services**

Crossings located on routes used by emergency service vehicles may result in increased risk taking behaviour.

Level crossing type: AOCL

104	**Weather: Fog**

The effectiveness of visual information is impaired by fog.

75	**Public houses**

Crossings located on route to public houses may result in increased violations of crossing procedures.

45	**Animals: Horses**

Activated warnings at protected level crossings may result in undesirable behaviour by horses, and influence the behaviour of other road vehicle users.

23	**Sunlight strobing**

Sunlight passing through lines of trees positioned on the side of the road imparts a strobing effect on the road which may impair the visibility of vehicle drivers.

99	**Sightlines**

Restricted or blocked sightlines may encourage users to move past a point of safety.

Level crossing type: AOCR

02	**Driver distractions**

Distractions on the approach to a level crossing may impair the performance of both vehicle and train drivers.

03	**Weather: Ice**

Icy weather conditions on the approach, exit and on the crossing affects the behaviour of crossing users.

04	**Users familiarity with a crossing**

Regular users and those living close to level crossings are more likely to undertake risk taking behaviour when using the crossing.

05	**Frequency of trains**

Crossings with a low frequency of trains are likely to increase the risk taking behaviour of regular users.

06	**Road junctions**

Road junctions close to the level crossing may result in increased decision making and errors by vehicle drivers, and blocking-back over the crossing.

07	**Vehicle approach speed**

The speed of the road traversing a level crossing is a factor in vehicle driver errors.

08	**Age of drivers**

Violations at level crossings may be influenced by the age of the local population.

10	**Representation of HGV users**

HGV drivers form a disproportionately high number of incidents at level crossings.

11	**Pedestrian access**

Pedestrian and passengers are more likely to undertake risky behaviour at vehicular level crossings where bridges are not provided.

12	**Regularity of trains**

Variations in train schedules, such as engineering works, unexpected delays to train services, and line speed restrictions etc., all contribute to fluctuations in trains passing a point at a supposedly ‘known’ time.

13	**Groups**

People in groups may undertake more risky behaviour, than when on their own.

14	**Time of day**

Risk taking at level crossings increases during rush-hours, at midday and at the beginning and end of the school day.

15	**Visual clutter**

Superfluous information and roadside structures on the approach to the crossing may reduce the user’s detection of level crossing information and warning signs.

16	**Presence of rail staff**

The presence of rail staff in high-visibility clothing can have an undesirable influence on level crossing user behaviour.

17	**Understanding of warning lights**

The onset of the amber and proceeding red lights of the activated warning system lead to various vehicle driver behaviours at level crossings.

18	**Closure time**

The amount of time the user expects to wait at the level crossing may influence their risk taking behaviour.

20	**Audible alarm**

Second audible warning tone is not detected and/or understood by level crossing users.

Level crossing type: AOCR

22	**Conspicuity of flashing lights**

The effectiveness of flashing lights is limited by veiling glare, limited light output and their position.

26	**Foliage**

The effectiveness of information on the approach to and at the level crossing is reduced by overgrown foliage.

28	**Position of warning lights**

The effectiveness of warning lights is influenced by their position.

29	**Quantity of information**

The quantity of signage information that can be read and understood decreases with road speed.

30	**Trespassing on rail structures**

Rail structures located at the entrance and exit areas to crossings that appear suitable for climbing may result in undesirable risk taking behaviour by members of the public.

31	**Location near rail stations**

Level crossings adjacent to rail stations influence the risk taking behaviour of vehicle drivers and other users.

32	**Train speeds**

Low train speeds may increase the risk taking behaviour of users.

33	**Sighting distance**

Good sighting distance should indicate the level crossing as high risk.

34	**Parked cars**

Parked cars before and after the level crossing may result in drivers slowing and stopping while on the level crossing.

38	**Visitor parking**

The position of visitors parked vehicles at a level crossing may affect the behaviour of other road drivers.

40	**Type of trains**

Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.

42	**Days of the week**

Risk taking behaviour at level crossings increases on working days.

43	**Suicide**

Level crossings are a potential target for use by persons attempting to commit suicide

44	**Automatic open crossings**

Automatic open level crossings result in increased risk taking behaviour, later in the crossing cycle.

48	**Observation of amber light**

The length of activation time of the amber light has little affect on the behaviour of the vehicle driver.

49	**Road access**

Level crossings that provide the only access to routes either side of the crossing influences the risk taking behaviour of vehicle drivers.

50	**Passenger drop-off points**

Non-designated passenger drop-off points close to level crossings affects the flow and behaviour of traffic approaching a level crossing.

Level crossing type: AOCR

51	**See-through effect**

Level crossing located in a dip or on a brow of a long straight road may result in increases of red-light running.

52	**HGV drivers using rail station facilities**

The effectiveness of information is reduced by HGV drivers parking in front of signs and warning devices.

53	**Events**

Events increase the amount of irregular users at level crossings.

54	**Narrow roads**

Narrow roads before and after the level crossing may result in vehicle drivers slowing and stopping while on the level crossing.

56	**Location near major roads**

The risk of vehicle drivers blocking-back over the level crossing, or general risk taking behaviour is increased when the crossing is located on roads with direct access to major roads or motorways.

57	**Traffic calming systems**

Road traffic calming systems on the approaches to a level crossing may increase the risk of vehicles blocking-back.

59	**Foreign vehicle drivers**

Areas with high levels of foreign vehicle drivers may have increases in decision making errors at level crossings. This may be more evident during seasonal periods.

61	**Crossing surface**

Uneven and slippery level crossing surface may present a potential hazard to those using the crossing.

62	**Roadworks**

Roadworks positioned up to 3 kilometres from the level crossing may still impact on vehicles blocking-back.

63	**Housing developments**

Housing developments increase road traffic and level crossing use.

64	**Vehicle shortcuts**

Level crossings on roads used as shortcuts result in increased risk taking behaviour by vehicle drivers.

66	**Another train approaching**

The ‘Another Train Coming if lights continue to show’ sign has minimal impact in providing vehicle drivers with sufficient information.

69	**Rural level crossings**

The environmental context of a rural level crossing reduces the awareness of approaching vehicle drivers.

70	**Road markings**

The effectiveness of vehicle drivers stopping in the correct location is impaired by worn road markings.

71	**Number of train lines**

Single train lines may increase the risk taking behaviour of both vehicle drivers and pedestrians.

72	**Location near farms**

High volumes of farm traffic impact on the speed and behaviour of other vehicles traversing the crossing.

73	**Commercial traffic**

Level crossings with high volumes of commercial traffic may result in increased risk taking behaviour.

Level crossing type: AOCR

74	**Proximity of level crossing to another**

Level crossings located in close proximity to another may influence the risk taking behaviour of vehicle drivers.

79	**Combined environmental features**

Level crossings with a combination of environmental features, such as bends, hills, trees and hedges, may increase the decision making errors of vehicle drivers.

80	**Cats-eyes**

Deteriorated ‘cats-eyes’ on the approach or on the level crossing may reduce the vehicle driver’s ability to negotiate the road layout at night.

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The ‘Puffer’ sign does not convey any directly useful information to users.

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Level crossings located at the end of a descent may result in increased red-light running by vehicle drivers.

86	**Train enthusiasts**

To view trains closely, people undertake risky behaviour at level crossings.

87	**School parking**

School drop-off and collection points close to level crossings affects the flow and behaviour of other vehicle drivers approaching the crossing.

88	**Proximity of different road speeds**

High road speeds in close proximity to a level crossing on a lower speed road influences the speed at which vehicle drivers approach the crossing.

89	**Level crossing equipment**

The reliability and/or perception of reliability of the level crossing equipment affects the risk taking behaviour of regular users.

90	**Position of information**

Perception of a hazard is improved when information referencing the imminent danger are associated together.

91	**Vehicle speed zones**

The position of incremental speed restriction signs influences the speed of vehicle drivers when approaching the crossing.

95	**Noise**

Noisy surroundings may impair the performance of the users to detect trains at level crossings.

96	**Straight roads**

Straight roads increase the opportunities for vehicle drivers to undertake risky behaviour, to avoid having to wait at the level crossing.

97	**Stereotypical crossing users**

Users who violate crossing procedures are not always male and in their twenties.

98	**Train arrival**

Activation of the warning lights is used by passengers as a train arrival indicator.

102	**Railway sidings**

Alternative uses of railways sidings may alter the type of traffic using a level crossing.

103	**Emergency services**

Crossings located on routes used by emergency service vehicles may result in increased risk taking behaviour.

Level crossing type: AOCR

104	**Weather: Fog**

The effectiveness of visual information is impaired by fog.

75	**Public houses**

Crossings located on route to public houses may result in increased violations of crossing procedures.

45	**Animals: Horses**

Activated warnings at protected level crossings may result in undesirable behaviour by horses, and influence the behaviour of other road vehicle users.

23	**Sunlight strobing**

Sunlight passing through lines of trees positioned on the side of the road imparts a strobing effect on the road which may impair the visibility of vehicle drivers.

99	**Sightlines**

Restricted or blocked sightlines may encourage users to move past a point of safety.

Level crossing type: ABCL

02	**Driver distractions**

Distractions on the approach to a level crossing may impair the performance of both vehicle and train drivers.

03	**Weather: Ice**

Icy weather conditions on the approach, exit and on the crossing affects the behaviour of crossing users.

04	**Users familiarity with a crossing**

Regular users and those living close to level crossings are more likely to undertake risk taking behaviour when using the crossing.

05	**Frequency of trains**

Crossings with a low frequency of trains are likely to increase the risk taking behaviour of regular users.

06	**Road junctions**

Road junctions close to the level crossing may result in increased decision making and errors by vehicle drivers, and blocking-back over the crossing.

07	**Vehicle approach speed**

The speed of the road traversing a level crossing is a factor in vehicle driver errors.

08	**Age of drivers**

Violations at level crossings may be influenced by the age of the local population.

10	**Representation of HGV users**

HGV drivers form a disproportionately high number of incidents at level crossings.

11	**Pedestrian access**

Pedestrian and passengers are more likely to undertake risky behaviour at vehicular level crossings where bridges are not provided.

13	**Groups**

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14	**Time of day**

Risk taking at level crossings increases during rush-hours, at midday and at the beginning and end of the school day.

15	**Visual clutter**

Superfluous information and roadside structures on the approach to the crossing may reduce the user's detection of level crossing information and warning signs.

16	**Presence of rail staff**

The presence of rail staff in high-visibility clothing can have an undesirable influence on level crossing user behaviour.

17	**Understanding of warning lights**

The onset of the amber and proceeding red lights of the activated warning system lead to various vehicle driver behaviours at level crossings.

18	**Closure time**

The amount of time the user expects to wait at the level crossing may influence their risk taking behaviour.

20	**Audible alarm**

Second audible warning tone is not detected and/or understood by level crossing users.

22	**Conspicuity of flashing lights**

The effectiveness of flashing lights is limited by veiling glare, limited light output and their position.

Level crossing type: ABCL

26	**Foliage**

The effectiveness of information on the approach to and at the level crossing is reduced by overgrown foliage.

28	**Position of warning lights**

The effectiveness of warning lights is influenced by their position.

29	**Quantity of information**

The quantity of signage information that can be read and understood decreases with road speed.

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Parked cars before and after the level crossing may result in drivers slowing and stopping while on the level crossing.

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The position of visitors parked vehicles at a level crossing may affect the behaviour of other road drivers.

40	**Type of trains**

Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.

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Risk taking behaviour at level crossings increases on working days.

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Level crossings are a potential target for use by persons attempting to commit suicide

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The length of activation time of the amber light has little affect on the behaviour of the vehicle driver.

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Non-designated passenger drop-off points close to level crossings affects the flow and behaviour of traffic approaching a level crossing.

51	**See-through effect**

Level crossing located in a dip or on a brow of a long straight road may result in increases of red-light running.

52	**HGV drivers using rail station facilities**

The effectiveness of information is reduced by HGV drivers parking in front of signs and warning devices.

53	**Events**

Events increase the amount of irregular users at level crossings.

54	**Narrow roads**

Narrow roads before and after the level crossing may result in vehicle drivers slowing and stopping while on the level crossing.

Level crossing type: ABCL

56	**Location near major roads**

The risk of vehicle drivers blocking-back over the level crossing, or general risk taking behaviour is increased when the crossing is located on roads with direct access to major roads or motorways.

57	**Traffic calming systems**

Road traffic calming systems on the approaches to a level crossing may increase the risk of vehicles blocking-back.

59	**Foreign vehicle drivers**

Areas with high levels of foreign vehicle drivers may have increases in decision making errors at level crossings. This may be more evident during seasonal periods.

61	**Crossing surface**

Uneven and slippery level crossing surface may present a potential hazard to those using the crossing.

62	**Roadworks**

Roadworks positioned up to 3 kilometres from the level crossing may still impact on vehicles blocking-back.

63	**Housing developments**

Housing developments increase road traffic and level crossing use.

64	**Vehicle shortcuts**

Level crossings on roads used as shortcuts result in increased risk taking behaviour by vehicle drivers.

66	**Another train approaching**

The ‘Another Train Coming if lights continue to show’ sign has minimal impact in providing vehicle drivers with sufficient information.

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The environmental context of a rural level crossing reduces the awareness of approaching vehicle drivers.

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The effectiveness of vehicle drivers stopping in the correct location is impaired by worn road markings.

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Single train lines may increase the risk taking behaviour of both vehicle drivers and pedestrians.

72	**Location near farms**

High volumes of farm traffic impact on the speed and behaviour of other vehicles traversing the crossing.

73	**Commercial traffic**

Level crossings with high volumes of commercial traffic may result in increased risk taking behaviour.

74	**Proximity of level crossing to another**

Level crossings located in close proximity to another may influence the risk taking behaviour of vehicle drivers.

79	**Combined environmental features**

Level crossings with a combination of environmental features, such as bends, hills, trees and hedges, may increase the decision making errors of vehicle drivers.

80	**Cats-eyes**

Deteriorated ‘cats-eyes’ on the approach or on the level crossing may reduce the vehicle driver’s ability to negotiate the road layout at night.

83	**Road descents**

Level crossings located at the end of a descent may result in increased red-light running by vehicle drivers.

Level crossing type: ABCL

86	**Train enthusiasts**

To view trains closely, people undertake risky behaviour at level crossings.

87	**School parking**

School drop-off and collection points close to level crossings affects the flow and behaviour of other vehicle drivers approaching the crossing.

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High road speeds in close proximity to a level crossing on a lower speed road influences the speed at which vehicle drivers approach the crossing.

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Perception of a hazard is improved when information referencing the imminent danger are associated together.

91	**Vehicle speed zones**

The position of incremental speed restriction signs influences the speed of vehicle drivers when approaching the crossing.

95	**Noise**

Noisy surroundings may impair the performance of the users to detect trains at level crossings.

96	**Straight roads**

Straight roads increase the opportunities for vehicle drivers to undertake risky behaviour, to avoid having to wait at the level crossing.

97	**Stereotypical crossing users**

Users who violate crossing procedures are not always male and in their twenties.

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Activation of the warning lights is used by passengers as a train arrival indicator.

102	**Railway sidings**

Alternative uses of railways sidings may alter the type of traffic using a level crossing.

103	**Emergency services**

Crossings located on routes used by emergency service vehicles may result in increased risk taking behaviour.

104	**Weather: Fog**

The effectiveness of visual information is impaired by fog.

75	**Public houses**

Crossings located on route to public houses may result in increased violations of crossing procedures.

45	**Animals: Horses**

Activated warnings at protected level crossings may result in undesirable behaviour by horses, and influence the behaviour of other road vehicle users.

23	**Sunlight strobing**

Sunlight passing through lines of trees positioned on the side of the road imparts a strobing effect on the road which may impair the visibility of vehicle drivers.

Level crossing type: AHB

02	**Driver distractions**

Distractions on the approach to a level crossing may impair the performance of both vehicle and train drivers.

03	**Weather: Ice**

Icy weather conditions on the approach, exit and on the crossing affects the behaviour of crossing users.

04	**Users familiarity with a crossing**

Regular users and those living close to level crossings are more likely to undertake risk taking behaviour when using the crossing.

05	**Frequency of trains**

Crossings with a low frequency of trains are likely to increase the risk taking behaviour of regular users.

06	**Road junctions**

Road junctions close to the level crossing may result in increased decision making and errors by vehicle drivers, and blocking-back over the crossing.

07	**Vehicle approach speed**

The speed of the road traversing a level crossing is a factor in vehicle driver errors.

08	**Age of drivers**

Violations at level crossings may be influenced by the age of the local population.

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12	**Regularity of trains**

Variations in train schedules, such as engineering works, unexpected delays to train services, and line speed restrictions etc., all contribute to fluctuations in trains passing a point at a supposedly ‘known’ time.

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People in groups may undertake more risky behaviour, than when on their own.

14	**Time of day**

Risk taking at level crossings increases during rush-hours, at midday and at the beginning and end of the school day.

15	**Visual clutter**

Superfluous information and roadside structures on the approach to the crossing may reduce the user’s detection of level crossing information and warning signs.

16	**Presence of rail staff**

The presence of rail staff in high-visibility clothing can have an undesirable influence on level crossing user behaviour.

17	**Understanding of warning lights**

The onset of the amber and proceeding red lights of the activated warning system lead to various vehicle driver behaviours at level crossings.

18	**Closure time**

The amount of time the user expects to wait at the level crossing may influence their risk taking behaviour.

20	**Audible alarm**

Second audible warning tone is not detected and/or understood by level crossing users.

Level crossing type: AHB

22	**Conspicuity of flashing lights**

The effectiveness of flashing lights is limited by veiling glare, limited light output and their position.

24	**Half barrier**

Automatic half barriers facilitate vehicle drivers to undertake risk taking behaviour.

25	**Users perception of train speed & distance**

Train speed and distance is underestimated by users, which may result in increased decision making errors by users at level crossings.

26	**Foliage**

The effectiveness of information on the approach to and at the level crossing is reduced by overgrown foliage.

28	**Position of warning lights**

The effectiveness of warning lights is influenced by their position.

29	**Quantity of information**

The quantity of signage information that can be read and understood decreases with road speed.

30	**Trespassing on rail structures**

Rail structures located at the entrance and exit areas to crossings that appear suitable for climbing may result in undesirable risk taking behaviour by members of the public.

31	**Location near rail stations**

Level crossings adjacent to rail stations influence the risk taking behaviour of vehicle drivers and other users.

32	**Train speeds**

Low train speeds may increase the risk taking behaviour of users.

33	**Sighting distance**

Good sighting distance should indicate the level crossing as high risk.

34	**Parked cars**

Parked cars before and after the level crossing may result in drivers slowing and stopping while on the level crossing.

38	**Visitor parking**

The position of visitors parked vehicles at a level crossing may affect the behaviour of other road drivers.

40	**Type of trains**

Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.

42	**Days of the week**

Risk taking behaviour at level crossings increases on working days.

43	**Suicide**

Level crossings are a potential target for use by persons attempting to commit suicide

48	**Observation of amber light**

The length of activation time of the amber light has little affect on the behaviour of the vehicle driver.

49	**Road access**

Level crossings that provide the only access to routes either side of the crossing influences the risk taking behaviour of vehicle drivers.

Level crossing type: AHB

50	**Passenger drop-off points**

Non-designated passenger drop-off points close to level crossings affects the flow and behaviour of traffic approaching a level crossing.

51	**See-through effect**

Level crossing located in a dip or on a brow of a long straight road may result in increases of red-light running.

52	**HGV drivers using rail station facilities**

The effectiveness of information is reduced by HGV drivers parking in front of signs and warning devices.

53	**Events**

Events increase the amount of irregular users at level crossings.

54	**Narrow roads**

Narrow roads before and after the level crossing may result in vehicle drivers slowing and stopping while on the level crossing.

56	**Location near major roads**

The risk of vehicle drivers blocking-back over the level crossing, or general risk taking behaviour is increased when the crossing is located on roads with direct access to major roads or motorways.

57	**Traffic calming systems**

Road traffic calming systems on the approaches to a level crossing may increase the risk of vehicles blocking-back.

59	**Foreign vehicle drivers**

Areas with high levels of foreign vehicle drivers may have increases in decision making errors at level crossings. This may be more evident during seasonal periods.

60	**Bus stops**

Unofficial bus stops in the level crossing lay-by, affects the behaviour of large or slow vehicle drivers.

61	**Crossing surface**

Uneven and slippery level crossing surface may present a potential hazard to those using the crossing.

62	**Roadworks**

Roadworks positioned up to 3 kilometres from the level crossing may still impact on vehicles blocking-back.

63	**Housing developments**

Housing developments increase road traffic and level crossing use.

64	**Vehicle shortcuts**

Level crossings on roads used as shortcuts result in increased risk taking behaviour by vehicle drivers.

66	**Another train approaching**

The ‘Another Train Coming if lights continue to show’ sign has minimal impact in providing vehicle drivers with sufficient information.

69	**Rural level crossings**

The environmental context of a rural level crossing reduces the awareness of approaching vehicle drivers.

70	**Road markings**

The effectiveness of vehicle drivers stopping in the correct location is impaired by worn road markings.

71	**Number of train lines**

Single train lines may increase the risk taking behaviour of both vehicle drivers and pedestrians.

Level crossing type: AHB

72	**Location near farms**

High volumes of farm traffic impact on the speed and behaviour of other vehicles traversing the crossing.

73	**Commercial traffic**

Level crossings with high volumes of commercial traffic may result in increased risk taking behaviour.

74	**Proximity of level crossing to another**

Level crossings located in close proximity to another may influence the risk taking behaviour of vehicle drivers.

76	**Pedestrians on vehicular crossings**

Large volumes of pedestrians and cyclists using road level crossings ignore the activated warning information and barriers.

79	**Combined environmental features**

Level crossings with a combination of environmental features, such as bends, hills, trees and hedges, may increase the decision making errors of vehicle drivers.

80	**Cats-eyes**

Deteriorated ‘cats-eyes’ on the approach or on the level crossing may reduce the vehicle driver’s ability to negotiate the road layout at night.

83	**Road descents**

Level crossings located at the end of a descent may result in increased red-light running by vehicle drivers.

86	**Train enthusiasts**

To view trains closely, people undertake risky behaviour at level crossings.

87	**School parking**

School drop-off and collection points close to level crossings affects the flow and behaviour of other vehicle drivers approaching the crossing.

88	**Proximity of different road speeds**

High road speeds in close proximity to a level crossing on a lower speed road influences the speed at which vehicle drivers approach the crossing.

89	**Level crossing equipment**

The reliability and/or perception of reliability of the level crossing equipment affects the risk taking behaviour of regular users.

90	**Position of information**

Perception of a hazard is improved when information referencing the imminent danger are associated together.

91	**Vehicle speed zones**

The position of incremental speed restriction signs influences the speed of vehicle drivers when approaching the crossing.

95	**Noise**

Noisy surroundings may impair the performance of the users to detect trains at level crossings.

96	**Straight roads**

Straight roads increase the opportunities for vehicle drivers to undertake risky behaviour, to avoid having to wait at the level crossing.

97	**Stereotypical crossing users**

Users who violate crossing procedures are not always male and in their twenties.

98	**Train arrival**

Activation of the warning lights is used by passengers as a train arrival indicator.

Level crossing type: AHB

102	**Railway sidings**

Alternative uses of railways sidings may alter the type of traffic using a level crossing.

103	**Emergency services**

Crossings located on routes used by emergency service vehicles may result in increased risk taking behaviour.

104	**Weather: Fog**

The effectiveness of visual information is impaired by fog.

75	**Public houses**

Crossings located on route to public houses may result in increased violations of crossing procedures.

45	**Animals: Horses**

Activated warnings at protected level crossings may result in undesirable behaviour by horses, and influence the behaviour of other road vehicle users.

23	**Sunlight strobing**

Sunlight passing through lines of trees positioned on the side of the road imparts a strobing effect on the road which may impair the visibility of vehicle drivers.

Level crossing type: MCG

03	**Weather: Ice**

Icy weather conditions on the approach, exit and on the crossing affects the behaviour of crossing users.

04	**Users familiarity with a crossing**

Regular users and those living close to level crossings are more likely to undertake risk taking behaviour when using the crossing.

05	**Frequency of trains**

Crossings with a low frequency of trains are likely to increase the risk taking behaviour of regular users.

13	**Groups**

People in groups may undertake more risky behaviour, than when on their own.

16	**Presence of rail staff**

The presence of rail staff in high-visibility clothing can have an undesirable influence on level crossing user behaviour.

26	**Foliage**

The effectiveness of information on the approach to and at the level crossing is reduced by overgrown foliage.

30	**Trespassing on rail structures**

Rail structures located at the entrance and exit areas to crossings that appear suitable for climbing may result in undesirable risk taking behaviour by members of the public.

42	**Days of the week**

Risk taking behaviour at level crossings increases on working days.

43	**Suicide**

Level crossings are a potential target for use by persons attempting to commit suicide

59	**Foreign vehicle drivers**

Areas with high levels of foreign vehicle drivers may have increases in decision making errors at level crossings. This may be more evident during seasonal periods.

61	**Crossing surface**

Uneven and slippery level crossing surface may present a potential hazard to those using the crossing.

63	**Housing developments**

Housing developments increase road traffic and level crossing use.

64	**Vehicle shortcuts**

Level crossings on roads used as shortcuts result in increased risk taking behaviour by vehicle drivers.

71	**Number of train lines**

Single train lines may increase the risk taking behaviour of both vehicle drivers and pedestrians.

72	**Location near farms**

High volumes of farm traffic impact on the speed and behaviour of other vehicles traversing the crossing.

74	**Proximity of level crossing to another**

Level crossings located in close proximity to another may influence the risk taking behaviour of vehicle drivers.

86	**Train enthusiasts**

To view trains closely, people undertake risky behaviour at level crossings.

Level crossing type: MCG

88	**Proximity of different road speeds**

High road speeds in close proximity to a level crossing on a lower speed road influences the speed at which vehicle drivers approach the crossing.

90	**Position of information**

Perception of a hazard is improved when information referencing the imminent danger are associated together.

97	**Stereotypical crossing users**

Users who violate crossing procedures are not always male and in their twenties.

102	**Railway sidings**

Alternative uses of railways sidings may alter the type of traffic using a level crossing.

103	**Emergency services**

Crossings located on routes used by emergency service vehicles may result in increased risk taking behaviour.

104	**Weather: Fog**

The effectiveness of visual information is impaired by fog.

75	**Public houses**

Crossings located on route to public houses may result in increased violations of crossing procedures.

23	**Sunlight strobing**

Sunlight passing through lines of trees positioned on the side of the road imparts a strobing effect on the road which may impair the visibility of vehicle drivers.

Level crossing type: MCB

02	**Driver distractions**

Distractions on the approach to a level crossing may impair the performance of both vehicle and train drivers.

03	**Weather: Ice**

Icy weather conditions on the approach, exit and on the crossing affects the behaviour of crossing users.

04	**Users familiarity with a crossing**

Regular users and those living close to level crossings are more likely to undertake risk taking behaviour when using the crossing.

05	**Frequency of trains**

Crossings with a low frequency of trains are likely to increase the risk taking behaviour of regular users.

06	**Road junctions**

Road junctions close to the level crossing may result in increased decision making and errors by vehicle drivers, and blocking-back over the crossing.

07	**Vehicle approach speed**

The speed of the road traversing a level crossing is a factor in vehicle driver errors.

08	**Age of drivers**

Violations at level crossings may be influenced by the age of the local population.

10	**Representation of HGV users**

HGV drivers form a disproportionately high number of incidents at level crossings.

11	**Pedestrian access**

Pedestrian and passengers are more likely to undertake risky behaviour at vehicular level crossings where bridges are not provided.

13	**Groups**

People in groups may undertake more risky behaviour, than when on their own.

14	**Time of day**

Risk taking at level crossings increases during rush-hours, at midday and at the beginning and end of the school day.

15	**Visual clutter**

Superfluous information and roadside structures on the approach to the crossing may reduce the user's detection of level crossing information and warning signs.

16	**Presence of rail staff**

The presence of rail staff in high-visibility clothing can have an undesirable influence on level crossing user behaviour.

17	**Understanding of warning lights**

The onset of the amber and proceeding red lights of the activated warning system lead to various vehicle driver behaviours at level crossings.

18	**Closure time**

The amount of time the user expects to wait at the level crossing may influence their risk taking behaviour.

20	**Audible alarm**

Second audible warning tone is not detected and/or understood by level crossing users.

22	**Conspicuity of flashing lights**

The effectiveness of flashing lights is limited by veiling glare, limited light output and their position.

Level crossing type: MCB

26	**Foliage**

The effectiveness of information on the approach to and at the level crossing is reduced by overgrown foliage.

28	**Position of warning lights**

The effectiveness of warning lights is influenced by their position.

30	**Trespassing on rail structures**

Rail structures located at the entrance and exit areas to crossings that appear suitable for climbing may result in undesirable risk taking behaviour by members of the public.

31	**Location near rail stations**

Level crossings adjacent to rail stations influence the risk taking behaviour of vehicle drivers and other users.

34	**Parked cars**

Parked cars before and after the level crossing may result in drivers slowing and stopping while on the level crossing.

38	**Visitor parking**

The position of visitors parked vehicles at a level crossing may affect the behaviour of other road drivers.

40	**Type of trains**

Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.

42	**Days of the week**

Risk taking behaviour at level crossings increases on working days.

43	**Suicide**

Level crossings are a potential target for use by persons attempting to commit suicide

48	**Observation of amber light**

The length of activation time of the amber light has little affect on the behaviour of the vehicle driver.

49	**Road access**

Level crossings that provide the only access to routes either side of the crossing influences the risk taking behaviour of vehicle drivers.

50	**Passenger drop-off points**

Non-designated passenger drop-off points close to level crossings affects the flow and behaviour of traffic approaching a level crossing.

51	**See-through effect**

Level crossing located in a dip or on a brow of a long straight road may result in increases of red-light running.

52	**HGV drivers using rail station facilities**

The effectiveness of information is reduced by HGV drivers parking in front of signs and warning devices.

53	**Events**

Events increase the amount of irregular users at level crossings.

54	**Narrow roads**

Narrow roads before and after the level crossing may result in vehicle drivers slowing and stopping while on the level crossing.

56	**Location near major roads**

The risk of vehicle drivers blocking-back over the level crossing, or general risk taking behaviour is increased when the crossing is located on roads with direct access to major roads or motorways.

Level crossing type: MCB

57	**Traffic calming systems**

Road traffic calming systems on the approaches to a level crossing may increase the risk of vehicles blocking-back.

59	**Foreign vehicle drivers**

Areas with high levels of foreign vehicle drivers may have increases in decision making errors at level crossings. This may be more evident during seasonal periods.

61	**Crossing surface**

Uneven and slippery level crossing surface may present a potential hazard to those using the crossing.

62	**Roadworks**

Roadworks positioned up to 3 kilometres from the level crossing may still impact on vehicles blocking-back.

63	**Housing developments**

Housing developments increase road traffic and level crossing use.

64	**Vehicle shortcuts**

Level crossings on roads used as shortcuts result in increased risk taking behaviour by vehicle drivers.

69	**Rural level crossings**

The environmental context of a rural level crossing reduces the awareness of approaching vehicle drivers.

70	**Road markings**

The effectiveness of vehicle drivers stopping in the correct location is impaired by worn road markings.

71	**Number of train lines**

Single train lines may increase the risk taking behaviour of both vehicle drivers and pedestrians.

72	**Location near farms**

High volumes of farm traffic impact on the speed and behaviour of other vehicles traversing the crossing.

73	**Commercial traffic**

Level crossings with high volumes of commercial traffic may result in increased risk taking behaviour.

74	**Proximity of level crossing to another**

Level crossings located in close proximity to another may influence the risk taking behaviour of vehicle drivers.

79	**Combined environmental features**

Level crossings with a combination of environmental features, such as bends, hills, trees and hedges, may increase the decision making errors of vehicle drivers.

80	**Cats-eyes**

Deteriorated ‘cats-eyes’ on the approach or on the level crossing may reduce the vehicle driver’s ability to negotiate the road layout at night.

83	**Road descents**

Level crossings located at the end of a descent may result in increased red-light running by vehicle drivers.

86	**Train enthusiasts**

To view trains closely, people undertake risky behaviour at level crossings.

87	**School parking**

School drop-off and collection points close to level crossings affects the flow and behaviour of other vehicle drivers approaching the crossing.

Level crossing type: MCB

88	**Proximity of different road speeds**

High road speeds in close proximity to a level crossing on a lower speed road influences the speed at which vehicle drivers approach the crossing.

89	**Level crossing equipment**

The reliability and/or perception of reliability of the level crossing equipment affects the risk taking behaviour of regular users.

90	**Position of information**

Perception of a hazard is improved when information referencing the imminent danger are associated together.

91	**Vehicle speed zones**

The position of incremental speed restriction signs influences the speed of vehicle drivers when approaching the crossing.

96	**Straight roads**

Straight roads increase the opportunities for vehicle drivers to undertake risky behaviour, to avoid having to wait at the level crossing.

97	**Stereotypical crossing users**

Users who violate crossing procedures are not always male and in their twenties.

98	**Train arrival**

Activation of the warning lights is used by passengers as a train arrival indicator.

101	**Signal box: detection of objects**

Certain conditions impair the signallers ability to detect objects on the level crossing.

102	**Railway sidings**

Alternative uses of railways sidings may alter the type of traffic using a level crossing.

103	**Emergency services**

Crossings located on routes used by emergency service vehicles may result in increased risk taking behaviour.

104	**Weather: Fog**

The effectiveness of visual information is impaired by fog.

92	**Double train lines**

The space between two sets of double train lines provides users with a refuge point.

84	**Signal box: camera angle**

Position of the camera at a level crossing influences the signallers ability to detect objects.

75	**Public houses**

Crossings located on route to public houses may result in increased violations of crossing procedures.

45	**Animals: Horses**

Activated warnings at protected level crossings may result in undesirable behaviour by horses, and influence the behaviour of other road vehicle users.

09	**Signal box: track side workers**

High-visibility clothing appears white on black & white monitors.

23	**Sunlight strobing**

Sunlight passing through lines of trees positioned on the side of the road imparts a strobing effect on the road which may impair the visibility of vehicle drivers.

Level crossing type: MCB+CCTV

02	**Driver distractions**

Distractions on the approach to a level crossing may impair the performance of both vehicle and train drivers.

03	**Weather: Ice**

Icy weather conditions on the approach, exit and on the crossing affects the behaviour of crossing users.

04	**Users familiarity with a crossing**

Regular users and those living close to level crossings are more likely to undertake risk taking behaviour when using the crossing.

05	**Frequency of trains**

Crossings with a low frequency of trains are likely to increase the risk taking behaviour of regular users.

06	**Road junctions**

Road junctions close to the level crossing may result in increased decision making and errors by vehicle drivers, and blocking-back over the crossing.

07	**Vehicle approach speed**

The speed of the road traversing a level crossing is a factor in vehicle driver errors.

08	**Age of drivers**

Violations at level crossings may be influenced by the age of the local population.

10	**Representation of HGV users**

HGV drivers form a disproportionately high number of incidents at level crossings.

11	**Pedestrian access**

Pedestrian and passengers are more likely to undertake risky behaviour at vehicular level crossings where bridges are not provided.

13	**Groups**

People in groups may undertake more risky behaviour, than when on their own.

14	**Time of day**

Risk taking at level crossings increases during rush-hours, at midday and at the beginning and end of the school day.

15	**Visual clutter**

Superfluous information and roadside structures on the approach to the crossing may reduce the user's detection of level crossing information and warning signs.

16	**Presence of rail staff**

The presence of rail staff in high-visibility clothing can have an undesirable influence on level crossing user behaviour.

17	**Understanding of warning lights**

The onset of the amber and proceeding red lights of the activated warning system lead to various vehicle driver behaviours at level crossings.

18	**Closure time**

The amount of time the user expects to wait at the level crossing may influence their risk taking behaviour.

20	**Audible alarm**

Second audible warning tone is not detected and/or understood by level crossing users.

22	**Conspicuity of flashing lights**

The effectiveness of flashing lights is limited by veiling glare, limited light output and their position.

Level crossing type: MCB+CCTV

26	**Foliage**

The effectiveness of information on the approach to and at the level crossing is reduced by overgrown foliage.

28	**Position of warning lights**

The effectiveness of warning lights is influenced by their position.

30	**Trespassing on rail structures**

Rail structures located at the entrance and exit areas to crossings that appear suitable for climbing may result in undesirable risk taking behaviour by members of the public.

34	**Parked cars**

Parked cars before and after the level crossing may result in drivers slowing and stopping while on the level crossing.

38	**Visitor parking**

The position of visitors parked vehicles at a level crossing may affect the behaviour of other road drivers.

40	**Type of trains**

Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.

42	**Days of the week**

Risk taking behaviour at level crossings increases on working days.

43	**Suicide**

Level crossings are a potential target for use by persons attempting to commit suicide

48	**Observation of amber light**

The length of activation time of the amber light has little affect on the behaviour of the vehicle driver.

49	**Road access**

Level crossings that provide the only access to routes either side of the crossing influences the risk taking behaviour of vehicle drivers.

50	**Passenger drop-off points**

Non-designated passenger drop-off points close to level crossings affects the flow and behaviour of traffic approaching a level crossing.

51	**See-through effect**

Level crossing located in a dip or on a brow of a long straight road may result in increases of red-light running.

52	**HGV drivers using rail station facilities**

The effectiveness of information is reduced by HGV drivers parking in front of signs and warning devices.

53	**Events**

Events increase the amount of irregular users at level crossings.

54	**Narrow roads**

Narrow roads before and after the level crossing may result in vehicle drivers slowing and stopping while on the level crossing.

56	**Location near major roads**

The risk of vehicle drivers blocking-back over the level crossing, or general risk taking behaviour is increased when the crossing is located on roads with direct access to major roads or motorways.

57	**Traffic calming systems**

Road traffic calming systems on the approaches to a level crossing may increase the risk of vehicles blocking-back.

Level crossing type: MCB+CCTV

59	**Foreign vehicle drivers**

Areas with high levels of foreign vehicle drivers may have increases in decision making errors at level crossings. This may be more evident during seasonal periods.

61	**Crossing surface**

Uneven and slippery level crossing surface may present a potential hazard to those using the crossing.

62	**Roadworks**

Roadworks positioned up to 3 kilometres from the level crossing may still impact on vehicles blocking-back.

63	**Housing developments**

Housing developments increase road traffic and level crossing use.

64	**Vehicle shortcuts**

Level crossings on roads used as shortcuts result in increased risk taking behaviour by vehicle drivers.

69	**Rural level crossings**

The environmental context of a rural level crossing reduces the awareness of approaching vehicle drivers.

70	**Road markings**

The effectiveness of vehicle drivers stopping in the correct location is impaired by worn road markings.

71	**Number of train lines**

Single train lines may increase the risk taking behaviour of both vehicle drivers and pedestrians.

72	**Location near farms**

High volumes of farm traffic impact on the speed and behaviour of other vehicles traversing the crossing.

73	**Commercial traffic**

Level crossings with high volumes of commercial traffic may result in increased risk taking behaviour.

74	**Proximity of level crossing to another**

Level crossings located in close proximity to another may influence the risk taking behaviour of vehicle drivers.

79	**Combined environmental features**

Level crossings with a combination of environmental features, such as bends, hills, trees and hedges, may increase the decision making errors of vehicle drivers.

80	**Cats-eyes**

Deteriorated ‘cats-eyes’ on the approach or on the level crossing may reduce the vehicle driver’s ability to negotiate the road layout at night.

83	**Road descents**

Level crossings located at the end of a descent may result in increased red-light running by vehicle drivers.

86	**Train enthusiasts**

To view trains closely, people undertake risky behaviour at level crossings.

87	**School parking**

School drop-off and collection points close to level crossings affects the flow and behaviour of other vehicle drivers approaching the crossing.

88	**Proximity of different road speeds**

High road speeds in close proximity to a level crossing on a lower speed road influences the speed at which vehicle drivers approach the crossing.

Level crossing type: MCB+CCTV

89	**Level crossing equipment**

The reliability and/or perception of reliability of the level crossing equipment affects the risk taking behaviour of regular users.

90	**Position of information**

Perception of a hazard is improved when information referencing the imminent danger are associated together.

91	**Vehicle speed zones**

The position of incremental speed restriction signs influences the speed of vehicle drivers when approaching the crossing.

96	**Straight roads**

Straight roads increase the opportunities for vehicle drivers to undertake risky behaviour, to avoid having to wait at the level crossing.

97	**Stereotypical crossing users**

Users who violate crossing procedures are not always male and in their twenties.

98	**Train arrival**

Activation of the warning lights is used by passengers as a train arrival indicator.

101	**Signal box: detection of objects**

Certain conditions impair the signallers ability to detect objects on the level crossing.

102	**Railway sidings**

Alternative uses of railways sidings may alter the type of traffic using a level crossing.

103	**Emergency services**

Crossings located on routes used by emergency service vehicles may result in increased risk taking behaviour.

104	**Weather: Fog**

The effectiveness of visual information is impaired by fog.

92	**Double train lines**

The space between two sets of double train lines provides users with a refuge point.

84	**Signal box: camera angle**

Position of the camera at a level crossing influences the signallers ability to detect objects.

75	**Public houses**

Crossings located on route to public houses may result in increased violations of crossing procedures.

45	**Animals: Horses**

Activated warnings at protected level crossings may result in undesirable behaviour by horses, and influence the behaviour of other road vehicle users.

09	**Signal box: track side workers**

High-visibility clothing appears white on black & white monitors.

23	**Sunlight strobing**

Sunlight passing through lines of trees positioned on the side of the road imparts a strobing effect on the road which may impair the visibility of vehicle drivers.

Level crossing type: UWC

01	**Phone box instructions**

Unclear phone instructions provided within phone boxes at UWC may result in users failing to communicate with the signaller.

03	**Weather: Ice**

Icy weather conditions on the approach, exit and on the crossing affects the behaviour of crossing users.

04	**Users familiarity with a crossing**

Regular users and those living close to level crossings are more likely to undertake risk taking behaviour when using the crossing.

05	**Frequency of trains**

Crossings with a low frequency of trains are likely to increase the risk taking behaviour of regular users.

12	**Regularity of trains**

Variations in train schedules, such as engineering works, unexpected delays to train services, and line speed restrictions etc., all contribute to fluctuations in trains passing a point at a supposedly ‘known’ time.

13	**Groups**

People in groups may undertake more risky behaviour, than when on their own.

16	**Presence of rail staff**

The presence of rail staff in high-visibility clothing can have an undesirable influence on level crossing user behaviour.

19	**Open gates**

Open gates increases the risk to approaching users.

21	**Darkness**

Unprotected crossings used during the hours of darkness may lead to increased decision making errors by crossing users.

25	**Users perception of train speed & distance**

Train speed and distance is underestimated by users, which may result in increased decision making errors by users at level crossings.

26	**Foliage**

The effectiveness of information on the approach to and at the level crossing is reduced by overgrown foliage.

27	**Harvesting time**

Harvesting time influences the risk taking behaviour of UWC users.

30	**Trespassing on rail structures**

Rail structures located at the entrance and exit areas to crossings that appear suitable for climbing may result in undesirable risk taking behaviour by members of the public.

32	**Train speeds**

Low train speeds may increase the risk taking behaviour of users.

33	**Sighting distance**

Good sighting distance should indicate the level crossing as high risk.

36	**Telephone use**

Level crossing users failure to use the telephone is a factor in incidents at UWC crossings.

37	**Traffic moment**

High levels of traffic moment at user worked crossings increase the chances of an incident.

Level crossing type: UWC

39	**Crossing utilisation**

Level crossings with high crossing utilisation increases the risks to users.

40	**Type of trains**

Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.

43	**Suicide**

Level crossings are a potential target for use by persons attempting to commit suicide

46	**Gate crossing procedure**

The requirement to open and close the gate, following a procedure of crossing the tracks five times, is a factor in why gates are left open at UWC's.

55	**Contractors**

Landowners failure to inform new contractors of the procedures and restrictions for using their vehicles across the level crossing may increase the risk of an incident.

58	**Diversification in farming**

Diversification in farming increases public access to user-worked crossings.

61	**Crossing surface**

Uneven and slippery level crossing surface may present a potential hazard to those using the crossing.

64	**Vehicle shortcuts**

Level crossings on roads used as shortcuts result in increased risk taking behaviour by vehicle drivers.

65	**Crossing instructions**

Ambiguous crossing instructions may result in users failing to undertake the correct crossing procedure.

67	**Animals: Dogs**

Unrestrained dogs may impair their owners concentration while on the level crossing.

68	**Contacting the signaller**

Unclear 'user-type' information may result in users failing to contact the signaller prior to crossing.

71	**Number of train lines**

Single train lines may increase the risk taking behaviour of both vehicle drivers and pedestrians.

73	**Commercial traffic**

Level crossings with high volumes of commercial traffic may result in increased risk taking behaviour.

77	**Decision point**

An obvious decision point is critical for users at unprotected level crossings.

78	**Signal sections**

Long signal sections increase the risk taking behaviour of users at UWC's.

86	**Train enthusiasts**

To view trains closely, people undertake risky behaviour at level crossings.

88	**Proximity of different road speeds**

High road speeds in close proximity to a level crossing on a lower speed road influences the speed at which vehicle drivers approach the crossing.

Level crossing type: UWC

93	**Distance between gates**

The overall distance between UWC gates and the distance between the gate and first train line effects the risk taking behaviour of vehicle users.

95	**Noise**

Noisy surroundings may impair the performance of the users to detect trains at level crossings.

97	**Stereotypical crossing users**

Users who violate crossing procedures are not always male and in their twenties.

100	**Communication with signaller**

The dialogue between the level crossing user and the signaller may impact on the behaviour of the user.

104	**Weather: Fog**

The effectiveness of visual information is impaired by fog.

75	**Public houses**

Crossings located on route to public houses may result in increased violations of crossing procedures.

23	**Sunlight strobing**

Sunlight passing through lines of trees positioned on the side of the road imparts a strobing effect on the road which may impair the visibility of vehicle drivers.

99	**Sightlines**

Restricted or blocked sightlines may encourage users to move past a point of safety.

Level crossing type: UWC+T

01	**Phone box instructions**

Unclear phone instructions provided within phone boxes at UWC may result in users failing to communicate with the signaller.

03	**Weather: Ice**

Icy weather conditions on the approach, exit and on the crossing affects the behaviour of crossing users.

04	**Users familiarity with a crossing**

Regular users and those living close to level crossings are more likely to undertake risk taking behaviour when using the crossing.

05	**Frequency of trains**

Crossings with a low frequency of trains are likely to increase the risk taking behaviour of regular users.

12	**Regularity of trains**

Variations in train schedules, such as engineering works, unexpected delays to train services, and line speed restrictions etc., all contribute to fluctuations in trains passing a point at a supposedly ‘known’ time.

13	**Groups**

People in groups may undertake more risky behaviour, than when on their own.

16	**Presence of rail staff**

The presence of rail staff in high-visibility clothing can have an undesirable influence on level crossing user behaviour.

19	**Open gates**

Open gates increases the risk to approaching users.

21	**Darkness**

Unprotected crossings used during the hours of darkness may lead to increased decision making errors by crossing users.

25	**Users perception of train speed & distance**

Train speed and distance is underestimated by users, which may result in increased decision making errors by users at level crossings.

26	**Foliage**

The effectiveness of information on the approach to and at the level crossing is reduced by overgrown foliage.

27	**Harvesting time**

Harvesting time influences the risk taking behaviour of UWC users.

30	**Trespassing on rail structures**

Rail structures located at the entrance and exit areas to crossings that appear suitable for climbing may result in undesirable risk taking behaviour by members of the public.

32	**Train speeds**

Low train speeds may increase the risk taking behaviour of users.

33	**Sighting distance**

Good sighting distance should indicate the level crossing as high risk.

36	**Telephone use**

Level crossing users failure to use the telephone is a factor in incidents at UWC crossings.

37	**Traffic moment**

High levels of traffic moment at user worked crossings increase the chances of an incident.

Level crossing type: UWC+T

39	**Crossing utilisation**

Level crossings with high crossing utilisation increases the risks to users.

40	**Type of trains**

Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.

43	**Suicide**

Level crossings are a potential target for use by persons attempting to commit suicide

46	**Gate crossing procedure**

The requirement to open and close the gate, following a procedure of crossing the tracks five times, is a factor in why gates are left open at UWC's.

55	**Contractors**

Landowners failure to inform new contractors of the procedures and restrictions for using their vehicles across the level crossing may increase the risk of an incident.

58	**Diversification in farming**

Diversification in farming increases public access to user-worked crossings.

61	**Crossing surface**

Uneven and slippery level crossing surface may present a potential hazard to those using the crossing.

64	**Vehicle shortcuts**

Level crossings on roads used as shortcuts result in increased risk taking behaviour by vehicle drivers.

65	**Crossing instructions**

Ambiguous crossing instructions may result in users failing to undertake the correct crossing procedure.

67	**Animals: Dogs**

Unrestrained dogs may impair their owners concentration while on the level crossing.

68	**Contacting the signaller**

Unclear 'user-type' information may result in users failing to contact the signaller prior to crossing.

71	**Number of train lines**

Single train lines may increase the risk taking behaviour of both vehicle drivers and pedestrians.

73	**Commercial traffic**

Level crossings with high volumes of commercial traffic may result in increased risk taking behaviour.

77	**Decision point**

An obvious decision point is critical for users at unprotected level crossings.

78	**Signal sections**

Long signal sections increase the risk taking behaviour of users at UWC's.

86	**Train enthusiasts**

To view trains closely, people undertake risky behaviour at level crossings.

88	**Proximity of different road speeds**

High road speeds in close proximity to a level crossing on a lower speed road influences the speed at which vehicle drivers approach the crossing.

Level crossing type: UWC+T

93	**Distance between gates**

The overall distance between UWC gates and the distance between the gate and first train line effects the risk taking behaviour of vehicle users.

95	**Noise**

Noisy surroundings may impair the performance of the users to detect trains at level crossings.

97	**Stereotypical crossing users**

Users who violate crossing procedures are not always male and in their twenties.

100	**Communication with signaller**

The dialogue between the level crossing user and the signaller may impact on the behaviour of the user.

104	**Weather: Fog**

The effectiveness of visual information is impaired by fog.

75	**Public houses**

Crossings located on route to public houses may result in increased violations of crossing procedures.

23	**Sunlight strobing**

Sunlight passing through lines of trees positioned on the side of the road imparts a strobing effect on the road which may impair the visibility of vehicle drivers.

99	**Sightlines**

Restricted or blocked sightlines may encourage users to move past a point of safety.

Level crossing type: UWC+MWL

02	**Driver distractions**

Distractions on the approach to a level crossing may impair the performance of both vehicle and train drivers.

03	**Weather: Ice**

Icy weather conditions on the approach, exit and on the crossing affects the behaviour of crossing users.

04	**Users familiarity with a crossing**

Regular users and those living close to level crossings are more likely to undertake risk taking behaviour when using the crossing.

05	**Frequency of trains**

Crossings with a low frequency of trains are likely to increase the risk taking behaviour of regular users.

08	**Age of drivers**

Violations at level crossings may be influenced by the age of the local population.

12	**Regularity of trains**

Variations in train schedules, such as engineering works, unexpected delays to train services, and line speed restrictions etc., all contribute to fluctuations in trains passing a point at a supposedly ‘known’ time.

13	**Groups**

People in groups may undertake more risky behaviour, than when on their own.

16	**Presence of rail staff**

The presence of rail staff in high-visibility clothing can have an undesirable influence on level crossing user behaviour.

18	**Closure time**

The amount of time the user expects to wait at the level crossing may influence their risk taking behaviour.

19	**Open gates**

Open gates increases the risk to approaching users.

20	**Audible alarm**

Second audible warning tone is not detected and/or understood by level crossing users.

26	**Foliage**

The effectiveness of information on the approach to and at the level crossing is reduced by overgrown foliage.

27	**Harvesting time**

Harvesting time influences the risk taking behaviour of UWC users.

28	**Position of warning lights**

The effectiveness of warning lights is influenced by their position.

30	**Trespassing on rail structures**

Rail structures located at the entrance and exit areas to crossings that appear suitable for climbing may result in undesirable risk taking behaviour by members of the public.

32	**Train speeds**

Low train speeds may increase the risk taking behaviour of users.

33	**Sighting distance**

Good sighting distance should indicate the level crossing as high risk.

Level crossing type: UWC+MWL

36	**Telephone use**

Level crossing users failure to use the telephone is a factor in incidents at UWC crossings.

37	**Traffic moment**

High levels of traffic moment at user worked crossings increase the chances of an incident.

39	**Crossing utilisation**

Level crossings with high crossing utilisation increases the risks to users.

40	**Type of trains**

Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.

42	**Days of the week**

Risk taking behaviour at level crossings increases on working days.

43	**Suicide**

Level crossings are a potential target for use by persons attempting to commit suicide

46	**Gate crossing procedure**

The requirement to open and close the gate, following a procedure of crossing the tracks five times, is a factor in why gates are left open at UWC's.

47	**Violations at MWL**

Over estimation of warning time and underestimation of crossing leads to risk taking behaviour.

55	**Contractors**

Landowners failure to inform new contractors of the procedures and restrictions for using their vehicles across the level crossing may increase the risk of an incident.

58	**Diversification in farming**

Diversification in farming increases public access to user-worked crossings.

59	**Foreign vehicle drivers**

Areas with high levels of foreign vehicle drivers may have increases in decision making errors at level crossings. This may be more evident during seasonal periods.

61	**Crossing surface**

Uneven and slippery level crossing surface may present a potential hazard to those using the crossing.

64	**Vehicle shortcuts**

Level crossings on roads used as shortcuts result in increased risk taking behaviour by vehicle drivers.

65	**Crossing instructions**

Ambiguous crossing instructions may result in users failing to undertake the correct crossing procedure.

67	**Animals: Dogs**

Unrestrained dogs may impair their owners concentration while on the level crossing.

70	**Road markings**

The effectiveness of vehicle drivers stopping in the correct location is impaired by worn road markings.

71	**Number of train lines**

Single train lines may increase the risk taking behaviour of both vehicle drivers and pedestrians.

Level crossing type: UWC+MWL

73	**Commercial traffic**

Level crossings with high volumes of commercial traffic may result in increased risk taking behaviour.

86	**Train enthusiasts**

To view trains closely, people undertake risky behaviour at level crossings.

88	**Proximity of different road speeds**

High road speeds in close proximity to a level crossing on a lower speed road influences the speed at which vehicle drivers approach the crossing.

89	**Level crossing equipment**

The reliability and/or perception of reliability of the level crossing equipment affects the risk taking behaviour of regular users.

93	**Distance between gates**

The overall distance between UWC gates and the distance between the gate and first train line effects the risk taking behaviour of vehicle users.

95	**Noise**

Noisy surroundings may impair the performance of the users to detect trains at level crossings.

97	**Stereotypical crossing users**

Users who violate crossing procedures are not always male and in their twenties.

104	**Weather: Fog**

The effectiveness of visual information is impaired by fog.

75	**Public houses**

Crossings located on route to public houses may result in increased violations of crossing procedures.

23	**Sunlight strobing**

Sunlight passing through lines of trees positioned on the side of the road imparts a strobing effect on the road which may impair the visibility of vehicle drivers.

99	**Sightlines**

Restricted or blocked sightlines may encourage users to move past a point of safety.

Level crossing type: OC

01	**Phone box instructions**

Unclear phone instructions provided within phone boxes at UWC may result in users failing to communicate with the signaller.

03	**Weather: Ice**

Icy weather conditions on the approach, exit and on the crossing affects the behaviour of crossing users.

04	**Users familiarity with a crossing**

Regular users and those living close to level crossings are more likely to undertake risk taking behaviour when using the crossing.

05	**Frequency of trains**

Crossings with a low frequency of trains are likely to increase the risk taking behaviour of regular users.

12	**Regularity of trains**

Variations in train schedules, such as engineering works, unexpected delays to train services, and line speed restrictions etc., all contribute to fluctuations in trains passing a point at a supposedly ‘known’ time.

13	**Groups**

People in groups may undertake more risky behaviour, than when on their own.

14	**Time of day**

Risk taking at level crossings increases during rush-hours, at midday and at the beginning and end of the school day.

16	**Presence of rail staff**

The presence of rail staff in high-visibility clothing can have an undesirable influence on level crossing user behaviour.

19	**Open gates**

Open gates increases the risk to approaching users.

20	**Audible alarm**

Second audible warning tone is not detected and/or understood by level crossing users.

21	**Darkness**

Unprotected crossings used during the hours of darkness may lead to increased decision making errors by crossing users.

25	**Users perception of train speed & distance**

Train speed and distance is underestimated by users, which may result in increased decision making errors by users at level crossings.

26	**Foliage**

The effectiveness of information on the approach to and at the level crossing is reduced by overgrown foliage.

27	**Harvesting time**

Harvesting time influences the risk taking behaviour of UWC users.

30	**Trespassing on rail structures**

Rail structures located at the entrance and exit areas to crossings that appear suitable for climbing may result in undesirable risk taking behaviour by members of the public.

32	**Train speeds**

Low train speeds may increase the risk taking behaviour of users.

33	**Sighting distance**

Good sighting distance should indicate the level crossing as high risk.

Level crossing type: OC

39	**Crossing utilisation**

Level crossings with high crossing utilisation increases the risks to users.

40	**Type of trains**

Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.

43	**Suicide**

Level crossings are a potential target for use by persons attempting to commit suicide

46	**Gate crossing procedure**

The requirement to open and close the gate, following a procedure of crossing the tracks five times, is a factor in why gates are left open at UWC's.

53	**Events**

Events increase the amount of irregular users at level crossings.

55	**Contractors**

Landowners failure to inform new contractors of the procedures and restrictions for using their vehicles across the level crossing may increase the risk of an incident.

61	**Crossing surface**

Uneven and slippery level crossing surface may present a potential hazard to those using the crossing.

63	**Housing developments**

Housing developments increase road traffic and level crossing use.

67	**Animals: Dogs**

Unrestrained dogs may impair their owners concentration while on the level crossing.

71	**Number of train lines**

Single train lines may increase the risk taking behaviour of both vehicle drivers and pedestrians.

73	**Commercial traffic**

Level crossings with high volumes of commercial traffic may result in increased risk taking behaviour.

77	**Decision point**

An obvious decision point is critical for users at unprotected level crossings.

83	**Road descents**

Level crossings located at the end of a descent may result in increased red-light running by vehicle drivers.

86	**Train enthusiasts**

To view trains closely, people undertake risky behaviour at level crossings.

95	**Noise**

Noisy surroundings may impair the performance of the users to detect trains at level crossings.

97	**Stereotypical crossing users**

Users who violate crossing procedures are not always male and in their twenties.

104	**Weather: Fog**

The effectiveness of visual information is impaired by fog.

Level crossing type: OC

75	**Public houses**

Crossings located on route to public houses may result in increased violations of crossing procedures.

23	**Sunlight strobing**

Sunlight passing through lines of trees positioned on the side of the road imparts a strobing effect on the road which may impair the visibility of vehicle drivers.

99	**Sightlines**

Restricted or blocked sightlines may encourage users to move past a point of safety.

Level crossing type: FC

03	**Weather: Ice**

Icy weather conditions on the approach, exit and on the crossing affects the behaviour of crossing users.

04	**Users familiarity with a crossing**

Regular users and those living close to level crossings are more likely to undertake risk taking behaviour when using the crossing.

05	**Frequency of trains**

Crossings with a low frequency of trains are likely to increase the risk taking behaviour of regular users.

12	**Regularity of trains**

Variations in train schedules, such as engineering works, unexpected delays to train services, and line speed restrictions etc., all contribute to fluctuations in trains passing a point at a supposedly ‘known’ time.

13	**Groups**

People in groups may undertake more risky behaviour, than when on their own.

14	**Time of day**

Risk taking at level crossings increases during rush-hours, at midday and at the beginning and end of the school day.

16	**Presence of rail staff**

The presence of rail staff in high-visibility clothing can have an undesirable influence on level crossing user behaviour.

19	**Open gates**

Open gates increases the risk to approaching users.

21	**Darkness**

Unprotected crossings used during the hours of darkness may lead to increased decision making errors by crossing users.

25	**Users perception of train speed & distance**

Train speed and distance is underestimated by users, which may result in increased decision making errors by users at level crossings.

26	**Foliage**

The effectiveness of information on the approach to and at the level crossing is reduced by overgrown foliage.

28	**Position of warning lights**

The effectiveness of warning lights is influenced by their position.

30	**Trespassing on rail structures**

Rail structures located at the entrance and exit areas to crossings that appear suitable for climbing may result in undesirable risk taking behaviour by members of the public.

32	**Train speeds**

Low train speeds may increase the risk taking behaviour of users.

33	**Sighting distance**

Good sighting distance should indicate the level crossing as high risk.

35	**Position of safety**

Insufficient space between trackside gate and rail results in potential obstruction of track by bicycles and pushchairs.

39	**Crossing utilisation**

Level crossings with high crossing utilisation increases the risks to users.

Level crossing type: FC

40	**Type of trains**

Train lines with high frequency of both freight and passenger services may influence the risk taking behaviour of users.

43	**Suicide**

Level crossings are a potential target for use by persons attempting to commit suicide

59	**Foreign vehicle drivers**

Areas with high levels of foreign vehicle drivers may have increases in decision making errors at level crossings. This may be more evident during seasonal periods.

61	**Crossing surface**

Uneven and slippery level crossing surface may present a potential hazard to those using the crossing.

63	**Housing developments**

Housing developments increase road traffic and level crossing use.

67	**Animals: Dogs**

Unrestrained dogs may impair their owners concentration while on the level crossing.

71	**Number of train lines**

Single train lines may increase the risk taking behaviour of both vehicle drivers and pedestrians.

77	**Decision point**

An obvious decision point is critical for users at unprotected level crossings.

86	**Train enthusiasts**

To view trains closely, people undertake risky behaviour at level crossings.

94	**Trespassers**

Food and drink rubbish at a level crossing is often an indicator of young people using the crossing as a meeting place.

95	**Noise**

Noisy surroundings may impair the performance of the users to detect trains at level crossings.

97	**Stereotypical crossing users**

Users who violate crossing procedures are not always male and in their twenties.

104	**Weather: Fog**

The effectiveness of visual information is impaired by fog.

75	**Public houses**

Crossings located on route to public houses may result in increased violations of crossing procedures.

99	**Sightlines**

Restricted or blocked sightlines may encourage users to move past a point of safety.

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