Improving road user and pedestrian behaviour at level crossings

In 2005, RSSB commissioned Human Engineering to undertake a comprehensive study into improving road user and pedestrian behaviour at level crossings. The study was intended to help the industry understand and manage the human factors risks associated with level crossings of all types.

The stated aims of the project were:

• To evaluate the research carried out to date into human behaviour at level crossings, in terms of quality and completeness.
• To identify gaps in the knowledge that could become the subject of future research.
• To obtain an understanding of the severity of consequence and frequency of occurrence of each human factors issue and then prioritise these issues according to the risk they pose. This prioritisation will potentially inform the risk assessment process.
• To explore where opportunities exist to reduce behavioural risk through education, engineering, enforcement, and enabling processes; and identify supporting evidence to prioritise these interventions in terms of their effectiveness.
• To review current risk assessment tools used by a range of duty holders, specifically considering the extent to which human factors issues are incorporated.
• To provide practical guidance to level crossing managers on the selection of appropriate public behaviour risk management measures that is compatible with current qualitative and quantitative risk assessment tools.

Methods

To address these aims, the project requirements were divided into five phases:

Phase 1: Assessing and reporting on the current knowledge of public behaviour at level crossings.

Phase 2: Prioritising human factors issues in terms of levels of risk.

Phase 3: Identifying and evaluating new and current mitigation measures to influence public behaviour.

Phase 4: Development of practical guidance for duty holders and risk assessors.

Phase 5: Determining the effectiveness of level crossing risk reduction measures.

Outputs

The primary output of the work is a Level Crossing Risk Management Toolkit, a user-friendly, web-based database application that:
• Promotes a performance-based understanding of road user errors and violations at level crossings.
• Enables the systematic evaluation of human factors issues at level crossings.
• Supplies practical guidance on the selection of appropriate risk mitigation measures at level crossings.
• Provides an audit trail for any decisions made regarding the implementation of risk reduction measures and supports the cost benefit analysis process.

Figure 1: A screen view from the Level Crossing Risk Management Toolkit

The toolkit content was developed in collaboration with Network Rail’s Level Crossing Risk Control Coordinators (LCRCCs) and level crossing engineers. The toolkit contains 109 human factors issues and 74 mitigation measures. The mitigation measures are intended to reduce the risks associated with one or more of the human factors issues contained within the toolkit. Consequently, multiple relationships between the human factors issues and mitigations are represented within the toolkit.

The toolkit has a range of applications, from being an information resource for anyone with an interest in public behaviour at level crossings, to being used to support various more specific activities.

The toolkit has been used by level crossing practitioners for many months now and feedback from users has been subsumed into the model.

As well as the toolkit, the project has produced a report into the activities and findings of each phase of the project:

Phase 2: Prioritisation of human factors issues in the level crossing risk management toolkit.
Phase 3: Identifying and evaluating new and current mitigation measures to influence public behaviour at level crossings.
Phase 4: A review of risk models for level crossing duty holders and risk assessors.
Phase 5: Determining the effectiveness of level crossing risk reduction measures

A short summary report of the project was also produced.

Toolkit Maintenance

Further work will be needed to ensure that the toolkit meets user requirements. The quality of information will need to be regularly enhanced, so that it accurately reflects changes within the industry. This can be achieved through ensuring the toolkit regularly incorporates:

- New industry regulations, standards, and recommendations
- Updates and enhancements to current mitigation measures and human factors (e.g. terminology updates, addition of pictures and case studies)
- Additions or removals of mitigation measures and human factors
- Incorporation of issues or guidance (e.g. design suggestions) as required by the industry.

In order to maintain the toolkit and incorporate the content changes as described above, technical support will also be required in the form of:

- Continual maintenance of the site on the server
- Incorporation of content changes as required
- Incorporation of structural or navigation changes as required.

RSSB and Network Rail have been in discussion about the best means of supplying this support.

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