11.0
Conclusions

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11.0 The Literature Review

The review of publications has revealed that no matter what part of the world one considers, level crossings cause safety problems; This is highlighted particularly by the problems experienced in America where the fatality rates are the highest in the world.

In America, substantial amounts of university research has been undertaken; much of it appears to consider localised problems rather than studying level crossings as a national problem. It is interesting to note that Schoppert and Hoyt found that approximately 66% of American grade crossing accidents did not involve railway vehicles. The pace of life in America may be a contributory factor. Operation Lifesaver has considered it as a national problem and has had some dramatic effect in reducing fatalities and casualties.

In the UK, university research has been negligible. The Railway Inspectorate have produced many detailed accident reports which consider, in great depth, the causes of level crossing accidents and make recommendations to minimise further similar events. The accident reports relating to Hixon and Lockington had a major impact on level crossing matters in the UK; all too often, however, the recommendations made are not acted upon. Other notable UK reports, sponsored by the HMRI, have been Stott's report into AOCR/AOCL level crossings and Oppenheim's report into pedestrian safety, both of which also had a major impact on level crossing matters in the UK

Professional Institutions have also produced many papers; which describe local practice or new products. Horler's paper to the IRSE in 1927, recognises the dangers of trapping people behind barriers and pleads for change; some of which has happened in subsequent years.

The author believes that UK practice has been more carefully thought out than that in the USA and this is evidenced by simple things like white lines at level crossings, road traffic signals on both sides of the road, traffic calming measures such as the traffic islands at Callerton AOCL LC (Appendix K: Figure K.6); compare with USA practice by looking at figure 1.3.

11.1 The Questionnaire

In overall terms the questionnaire has shown a low level of understanding of the Highway Code, particularly with respect to level crossings (Chapter 5 & Appendix F) in areas with large numbers of level crossings and areas with minimal numbers of level crossings. When the sample is considered with respect to the total UK number of licensed drivers and population this must be a matter of great concern. The Railway Inspectorate noted such concerns in their annual report in 1994/95[180] stating; *'the lack of understanding of road traffic signs by road vehicle users is of concern to the Inspectorate and ways of educating the public to improve their understanding are being considered'.*

The Police were generally better than the public in correctly identifying the various signs and signals, although, as the sample size is minute, care has to be taken with the police responses. It was notable that Lincolnshire Police were not as good as their Nottinghamshire colleagues; this is also worrying as Lincolnshire has a higher proportion of level crossings and they were traffic police officers, who would be expected to have a more thorough understanding of any road signs and signals. On an anecdotal note, the Nottinghamshire Police officer who kindly assisted the author by getting his colleagues to participate told the author that 'filling in the forms would be a pointless exercise as Police officers have to learn the Highway Code parrot fashion, and thus a 100% correct response would be a worthless exercise'!

Whilst reviewing the road traffic publications relevant to the questionnaire it became apparent that there is some considerable inconsistency within the Highway Code. Also of great concern are the results from questions 9 and 19 relating to open level crossings: the respondents who thought the correct answer was a gated or barrier equipped level crossing may be at some risk if they decide to jump the red lights as they may expecting to find gates or barriers when in fact none exist; choosing the wrong moment in the sequence to jump the lights may result in a collision with a train[181].

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[180] Railway Safety, HM Chief Inspecting Officer's Annual Report on the safety record of the railways in Great Britain 1994/95, paragraph 160, HSE/HMRI, 1995, ISBN 0 7176 1047 0.

[181] During the author's twelve hour period of research at Ramsey Road LC, at Whittlesea, he noted around 12 occasions of motorists illegally going through red road signals as trains approached, and on one occasion 5 motorists doing so during one LC closure.

Constructing a questionnaire is a difficult task; one has to ensure that the questions are not misleading, confusing or lead the respondent into a particular answer. Unfortunately, question 4 confused some respondents and the results from this question had to be disregarded.

11.2 Level Crossing and Bridge Costs

The actual costs of level crossings and bridges can only be shown in an averaged range estimate, as each level crossing or bridge is an individual project with individual problems at each site. When actual level crossing base costs are considered over the design life of a bridge, they appear to be about ten times the base cost of a bridge with a similar capacity and associated construction. This is largely caused by the need to renew the level crossing every 25 years and substantially higher annual maintenance costs. NPV tests confirm that the level crossing is a bigger drain on resources.

In addition to the construction and maintenance costs there is also a substantial economic cost to the region or nation in terms of accident costs and, to a far greater extent, delay costs caused by the normal daily operation of the level crossing holding up the flow of road traffic. All such costs are non-existent with a bridge.

Modern electronic level crossing control systems are not yet established sufficiently to determine costs. It is likely that such processor based systems will reduce the installation costs to a reasonable degree although the down side is that such systems will have a shorter lifespan, given the pace of technological development in the electronics industry. However, this may still be an attractive option to the infrastructure owner as it will show a financial saving over the costs of a conventional level crossing control system. The principal cost of renewing the level crossing every 25 years, or perhaps more frequently will remain. Maintenance costs will not reduce significantly as the items requiring the greatest levels of maintenance will still exist; track circuits, road traffic signals, vegetation, barrier machines and booms.

Figure 11.1

The ARMCO bridge at Glenlough, NIR; Note how the bridge has blended in to the surroundings

The generic costs considered strongly support the replacement of level crossings with bridges. Armco bridges are slightly cheaper and are far less obtrusive than concrete bridges (see figure 11.1).

11.3 The Basecase

Careful study of Northern Ireland Railways based on personal knowledge, photographs and study of the Ordnance Survey of Northern Ireland has shown that 65% of their level crossings could be closed without much difficulty. This would cause some minor lengthening of road users' travelling patterns to reach the nearest alternative railway crossing; this should not be much of a problem, given that the people who live in rural areas already have a relatively inconvenient lifestyle.

The cost savings to the infrastructure owner would be very substantial, although an initial outlay to build a small number of bridges would be required. Accident costs and road delay costs would also diminish dramatically.

The public's civil and legal rights of access should not be reduced lightly. However, as the user of such facilities, the public should be required to meet the major part of the costs in keeping the level crossing on the basis of 'the user pays'. Legislation should be changed in favour of the railway in such a manner that the railway would have the right to close a level crossing if there is an alternative existing point of crossing within a reasonable distance.

11.4 Other Road Rail Interface Issues

In Chapter 10, and Appendix K, the author has shown evidence of some dangers seen at level crossings visited during the course of this study. There are undoubtedly more dangers existing at level crossings not seen by the author.

Dazzling sunlight can cause driver 'blindness'; a known cause of level crossing accidents in the past. The danger caused by illegal parking adjacent to double white lines is noted, whilst Figure 10.5 shows the effect of not having a regular train service. Figure 10.2 shows how vegetation can obscure road signals and signs that are critical to the level crossing's safety. Inconsistencies in the Highway Code include the ATC sign which is not shown, the road traffic signal with the earlier white lined backboard, may give a motorist grounds for a successful challenge to a prosecution. Chapter 5 has shown that the public do not have a good understanding of road traffic signs and signals and yet figures K.11 and K.12 in Appendix K show how easy it is to cause confusing situations.

Figure K.18 highlights another Highway Code inconsistency; if you are obeying the Highway Code in an area with no footpaths, a pedestrian should be walking facing oncoming traffic; on arrival at the AHB, there is nothing to stop the pedestrian walking straight under the train and, furthermore, the barrier stopping approaching traffic will prevent the pedestrian's egress from the LC area. In rural areas with minimal pedestrians it may be a minor point but it could be a serious issue for people with hearing or visual impairment; People do walk in rural areas, particularly those living in the surrounding villages. The German authorities have obviously considered that a problem exists.

The risk of grounding at level crossings is prominent; the Hixon accident bought home to the country the dangers of large vehicles on level crossings, although the vehicle concerned had not grounded. The author believes that the problem is not confined to long low lorries; many vehicles today have lower clearances between body and road and there are many more towed caravans and trailers, often with poorly adjusted couplings that miss the road surface by minimal amounts. The picture at Howden shows the road surface on the level crossing is being damaged by passing vehicles; similar situations were noted by the author at other level crossings visited.

Figures 10.7 and 10.8 show incidents of motorist abuse that, could, have caused, and that has caused, a substantial disaster.

11.5 Final Conclusion

Level crossings should be closed; there is substantial evidence highlighting the dangers of level crossings. The cost of bridges is less onerous to the railway infrastructure owner than previously assumed. The infrastructure owner should not have to subsidise rural settlements, although taking this line of action will require legislative change and political support.

Figure 11.2

Rail and road views of bridge at Lambeg, NIR; the best form of railway crossing. The width of the road is circa 5.5 metres but bridge span width is slightly larger to accommodate two footpaths and twist in road.

Figure 11.3
Uttoxeter MCBcctv LC;
PERMANENTLY CLOSED!