

On the horns of a dilemma: Key factors informing train horn use at rail level crossings

**Anjum Naweed^a, Rebecca Keane^b, Grégoire S. Larue^b,
Christopher Watling^b, Ioni Lewis^b**

a - Appleton Institute for Behavioural Science, Central Queensland University,

anjum.naweed@cqu.edu.au

b - Centre for Accident Research and Road Safety – Queensland (CARRS-Q), Queensland University of Technology (QUT)

SUMMATIVE STATEMENT

Questions are arising as to whether train horn use at level crossings remain beneficial for all types of crossings, environments, and users. Six focus groups were undertaken with experienced train drivers ($n = 19$) across five rail organisations and three Australian states, with data collected using a scenario-based task. Study findings revealed that train horn utilisation was highly varied, considered beneficial in some situations, but non-beneficial in others. The results suggest that the uses of trains horns need to be carefully unpacked if more clarity in policy and direction in potential alternatives is to be further investigated.

KEYWORDS: Rail safety, driver-vehicle interactions, level crossings

PROBLEM STATEMENT

Rail level crossing environments are noisier than they once were, vehicles have better sound proofing, and pedestrian ears are adorned with noise-cancelling headsets. Such factors raise questions as to whether train horn use at level crossings remain beneficial for all types of crossings, environments, and users. Most of the research on train horns is focused on the noise polluting aspects (i.e. train horns as a nuisance) (Micheli & Farné, 2016), and examines consumer (i.e. resident) perceptions of the issue, particularly those who live near railway tracks and level crossings. Very little recent information is available on how effective train horns actually are as a warning device for motorists, pedestrians and cyclists at the approach to level crossings, even as the elements in the system are changing (Brach, 2009; Bunn & Zannin, 2016; Larue & Naweed, 2018); however, even less is known about how rail drivers themselves relate to their train horns, and what sorts of factors inform their decisions to use them. As rules around train horn use are currently undergoing changes, shifting in many jurisdictions and countries from what was once a compulsory requirement to a more discretionary driver decision, this presents an important and timely research gap.

RESEARCH OBJECTIVE/QUESTION

The use of train horns at railway level crossings appears to be evolving. This study aimed to gain insights and perceptions into train horn effectiveness using the research question “What factors influence the decision to use a train horn when train drivers approach level crossings?”

METHODOLOGY

Six focus groups were undertaken with experienced train drivers ($n = 19$; 2 females; Mage = 44 years; Mexp = 11 years) across five rail organisations and three Australian states (QLD, NSW, WA). Data were collected using a scenario-based task to elicit concrete examples (Naweed, 2013). This was a generative approach designed to probe knowledge and stimulate situational insight and required each participant to invent a challenging scenario featuring train horn use at a level crossing. Scenarios were created with the aid of A3-sized paper and felt-pens with participants recording any significant decision points, shifts in situation assessment, anomalies, violated expectations, and so on. Data were analysed using conventional content analysis (Hsieh & Shannon, 2005).

RESULTS

Results revealed that while train horns were considered important, they were perceived less effective in some cases, with scenarios depicting how local rule books can be and were being interpreted in many different ways. Different perspectives on mandatory versus discretionary train horn use were also found, with perceptions that what was heard near the train was not always the same as what was heard at a crossing. In some scenarios, train horns were an adopted “voice” for drivers to express emotion (e.g., fear, frustration, anger), thus more than a warning device. Use of train horns in discretionary scenarios was mediated by a dilemma involving concerns for noise pollution/waking residents, and fear of blame or personal liability if the worst was to happen.

DISCUSSION

Study findings suggest that train horn utilisation needs to be carefully unpacked if more clarity in policy and direction in potential alternatives for train horns are to be further investigated. For rail drivers, using a train horn may not necessarily be a simple case of response following cue, but suggests a more complicated relationship influenced by an array of opaque factors and ostensibly complex decision-making processes.

CONCLUSIONS

The findings of this study suggest that ‘discretionary’ use of train horn use needs to be unpacked further if more clarity in policy and direction in potential replacements for train horns are to be investigated. Collection of more data involving driver perspectives is warranted.

ACKNOWLEDGEMENTS

We gratefully acknowledge the assistance of both Queensland Rail and Arc Infrastructure, and financial support from the Australasian Centre for Rail Innovation (ACRI) project LC17.

REFERENCES

- Brach, R. B., M. . (2009). Insertion loss: Train and light-vehicle horns and railroad-crossing sound levels. Paper presented at the 158th Meeting of the Acoustical Society of America, San Antonio, Texas.
- Bunn, F., & Zannin, P. H. T. (2016). Assessment of railway noise in an urban setting. *Applied Acoustics*, 104, 16-23.
- Green, J., Willis, K., Hughes, E., Small, R., Welch, N., Gibbs, L., & Daly, J. (2007). Generating best evidence from qualitative research: the role of data analysis. *Aust N Z J Public Health*, 31(6), 545-550.
- Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative health research*, 15(9), 1277-1288
- Larue, G. S., & Naweed, A. (2018). Key considerations for automated enforcement of non-compliance with road rules at railway level crossings: The Laverton case in Victoria, Australia. *Case Studies on Transport Policy*, 6(4), 774-784.
- Micheli, G. J. L., & Farné, S. (2016). Urban railway traffic noise: Looking for the minimum cost for the whole community. *Applied Acoustics*, 113, 121-131.
- Naweed, A. (2013). Psychological factors for driver distraction and inattention in the Australian and New Zealand rail industry. *Accident Analysis and Prevention*, 60, 193-204.