Measure Name Learning from evidence-based practices

Definition Learning from evidence-based practices related to rail safety and suicide prevention from industry, researchers, and others.

Tags

Incident Type	Both trespass and suicide
Location	Both station and right-of-way
Intervention Strategy	Data: application and planning
Measure Group	Collaboration, training, and education

Description

There is no one-size-fits-all approach to managing responses to trespass activity. Mitigation strategies must consider each railroad's unique characteristics, the actions of individual trespassers, the interests of the community, and a wide range of other factors. Nevertheless, sharing experiences, evidence-based best practices, and lessons learned related to rail trespass and suicide mitigation can help other railroads take advantage of what is already known and tailor effective interventions for their specific circumstances. Understanding the factors contributing to railway incidents is crucial for developing preventive measures [1]. Railroads may also use this type of information to develop new mitigation strategies. It is vital for the railroad industry to share lessons learned and best practices as a means, to mitigate future trespassing and suicide incidents and build on the existing body of knowledge. Sharing knowledge with one another can reduce rail suicides and prevent loss of life, minimize train traffic delays, and alleviate work-related stress and trauma for railway staff, rescue personnel, and eyewitnesses [2].

Learning from evidence-based practices can include learning from other railroads within the United States and from other countries. Although there may be differences between cultures and rail operations across the globe, this information is valuable in implementing known mitigation strategies and developing novel mitigations. It is important to remember that sharing of knowledge does not itself prevent railway suicides but provides valuable insights and best practices. These insights can enhance railway safety efforts by introducing new ideas on preventative measures and improving the allocation of resources for safety work and serve as indirect safety measures [2]. Other sources for evidence-based practices include FRA, state rail regulators, researchers, and other modes of transportation.

Insight from previous experiences may include findings from a mitigation evaluation or controlled study, the rationale behind implementing specific mitigations, an objective description of the railroad's experience, the effectiveness of the mitigation (or lack thereof), and other relevant details. Documenting this information assists other railroads and stakeholders with choosing and implementing specific mitigations, for example, if the documented practices are applicable and cost/benefit is in their favor (e.g., [3]). Best practices and lessons learned can be shared with industry or a larger public audience in several ways, such as though written documentation and presentations that are accessible online or presented at conferences or workshops.

Additional search term: *experience, lessons, research*

Advantages

- Railroads sharing their experience with specific mitigation efforts provides other railroads with information to consider when implementing their own mitigation efforts.
- Learning from another's experiences has little-to-no cost.
- Collective knowledge within the industry will increase as more railroads share best practices.
- Collaborating with other railroads and researchers to assist in implementation and/or evaluation can help grow the collective body of knowledge for rail suicide and trespass prevention.

Drawbacks

- Some best practices may not be applicable to every railroad, and in some cases, this may not be apparent if background information or other relevant details are not shared.

Notable Practices

- It may be helpful to consider best practices and lessons learned from transportation modes other than rail [4].
- Consider seeking knowledge about successful past strategies to help guide future decision making and resource allocation.
- When implementing mitigations, conduct evaluations and share findings publicly, for example through online documentation or presentations at conferences [5]. Social media can also be a useful platform for sharing information.
- When documenting an evaluation or pilot test/study, consider including details such as the decision process and rationale for choosing a particular mitigation, cost-benefit analysis, planning and implementation process and timeline, evaluation metrics, results, and lessons learned. It is valuable to share both positive and negative findings—what worked and what did not—to help others interested in similar implementations.
- It may be helpful for railroad staff to include individuals who are trained in research and analysis, or to collaborate with outside researchers when conducting pilot tests and evaluations [4].
- Consider information sharing and collaboration within the United States and internationally.

References

[1] Grabušić, S., & Barić, D. (2023). A systematic review of Railway Trespassing: Problems and Prevention Measures. *Sustainability*, *15*(18).

Abstract: Railway trespassing is a growing problem in both rail and road transport. A high percentage of rail accidents are a result of the former. Factors that contribute to trespassing accidents range from poor decision-making by the trespasser and general ignorance of rail traffic rules to poor infrastructure (e.g., a lack of fences along tracks to prevent trespassing). The objective of this study was to provide a systematic review of the known literature on the problem of trespassing on railway tracks. The methodology implemented for literature collection was in accordance with the PRISMA method. The literature was searched using keywords: railway trespassing, railway trespassing accidents, trespassing factors, trespassing prevention, railway trespassing detection, and railway trespassing education in the Web of Science Core Collection and an additional search was conducted through other literature databases. The starting point was the collection of n = 291 studies of which a total of 72 publications were included in the literature review ranging between 1953–2023. The literature review consisted of 73.6% journal papers, 18.1% conference papers, and 8.3% expert reports. The results were the formation of: (1) Factors that influence the occurrence of trespassing accidents: (a) locations of frequent railway trespassing, (b) the temporal frequency of railway trespassing, (c) trespasser profile and behaviour, (d) motivation for and general knowledge of railway trespassing, and (e) other factors and models for railway trespassing accidents; (2) Measures for trespassing prevention: (a) education measures, (b) signalization, technological and infrastructure measures for trespassing prevention, and (c) pilot studies of railway trespassing preventive measures. The main findings were summarised and discussed with considerations for future work.

[2] Silla, A. (2022). Identifying measures with the highest potential to reduce suicides on Finnish Railways. Applied Ergonomics, 102.

Abstract: The purpose of this study was to work systematically through all known measures for preventing railway suicides and to consider their suitability for the Finnish railway environment. The research method included a selection and grouping of measures, definition of assessment criteria, a literature review and compilation of assessment forms, and a workshop for experts in the field. We assessed 21 measures based on 12 specified criteria. Specifically, the aim of these criteria was to support the identification and structuring of the available information on each measure to be in easily exploitable format for railway stakeholders. The measures were listed in order of priority in three categories based on final assessments from the workshop. The measures categorized as top priority with the highest potential to reduce suicides on Finnish railways included training of railway personnel to identify suicidal people (also called Gatekeeper training), camera surveillance, detection systems (radar, movement sensors, etc.), collaboration between organisations, learning from international experience, cooperation between railway organisations, police and fire and rescue services, and training of mental health providers. This prioritisation, together with the information included in the assessment forms and expert’ s views related to each measure, support the Finnish railway stakeholders in selecting measures and defining implementation strategies to prevent railway suicides on Finnish railways. The insights of Finnish experts on the effectiveness andpotential implementation of these different measures are valuable information also for railway stakeholders in other countries when selecting appropriate measures to prevent railway suicides. The results of this study support the safe and effective functioning of the railway system by adding knowledge that will help effectively prevent railway suicides and loss of life, delays to train traffic, and work-related stress and trauma to railway staff, rescue personnel and eyewitnesses.

[3] Federal Railroad Administration. (2015). *2015 ROW Fatality & Trespass Prevention Workshop*. [PowerPoint slides].

Description: This presentation includes recommendations for rail suicide and trespass prevention based on research and rail industry knowledge. A description, rationale, benefits, and key issues are provided for each prevention/mitigation strategy.

[4] Sebok, A., Wickens, C., Laux, L., & Jones, M. (2015, September). Supporting Human-Automation Interaction in the Rail Industry by Applying Lessons from Aviation. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 59*(1), 1661-1665.

Abstract: This paper describes a project to identify lessons learned from human automation interaction and the aviation industry and apply them to the rail industry. Specifically, the project addresses positive train control (PTC) automation in the locomotive cab. The aviation industry has decades of experience implementing automation on the flight deck. In particular, the flight management system (FMS) has offered numerous challenges and provided many lessons learned that can be applied to the rail industry. Experiences with the FMS indicate that mode complexity and mode transitions are particularly challenging. The current PTC designs have only two modes of operation, thus bypassing many of the FMS challenges. However, the possibility of mode confusion exists. This can occur if the engineer believes that PTC is active, when in fact it is not. Mixed equipage on rail lines, where some – but not all – segments of track are instrumented with PTC equipment, make this mode confusion a relevant concern.

[5] RESTRAIL. (2015, January 27). *Learning from national experience*. Restrail Toolbox.

Description: This webpage provides information on learning about rail trespass and suicide prevention from the experiences of other countries, including recommendations based on lessons learned, considerations for implementation, and relevant research results.

Related Measures

- Collaboration with local government and communities
- Collaboration with suicide prevention groups
- Identify funding opportunities
- Incident cost estimation