Measure Name Station design considerations

Definition Design considerations for new and existing stations to improve safety.

Tags

Incident Type	Both trespass and suicide
Location	Station only
Intervention Strategy	Engineering: technological and physical deterrents
Measure Group	Infrastructure modification

Description

This measure focuses on improving safety in new and existing stations by evaluating and modifying the physical features and layout, including businesses that share their space with stations, such as retailers. A well-designed station can also reduce trespassing as well as the perceived viability of the railway as a means to attempt suicide.

When designing a new station, it is important to identify potential safety issues and consider incorporating other countermeasures into the design and layout to minimize trespassing potential. For example, when considering the placement of parking lots, the use of overpasses or underpasses can be included in the initial design, along with fencing, anti-suicide pits, and enhanced lighting or stud lighting in the floor [1]. Several documents from rail carriers that discuss station design guidelines and principles are publicly available (refer to References and Additional Resources).

Modifying existing stations may be more difficult than incorporating countermeasures into a new design, particularly if safety risks involve infrastructure, such as anti-suicide pits or platform screen doors, which can be costly [1]. An example of such a change would be installing “refuge spaces” under the railroad tracks for individuals that fall below the wheelbase preventing them from being struck [2]. Some safety measures may be easier to implement in existing stations such as new lighting or infrared beams that alert rail workers to people too close to edge of the platform. In addition to station design, implementing speed restrictions for trains when approaching stations, especially ones with high passenger traffic [2], can be another strategy to help reduce incidents. Another potential installation for deterring trespassing includes seating faced at right angles from the track, making it necessary for people to turn 90 degrees to turn and walk toward the rail [1].

It may be possible to assess the risk level of a new station based on various factors that may contribute to risk. This may provide a path to constructing the station with the capability to meet the potential challenges that the environmental circumstances of a new station location may introduce. ProRail, the railroad infrastructure manager in the Netherlands, has a risk assessment tool that they use to consider potential risks for suicide at a new station. This risk assessment tool determines the mitigations that must be built into any new station that is constructed. The tool uses a variety of inputs to assess risk, including factors such as: nearby population density, through trains, fencing, station staffing, fencing, nearby psychiatric facilities and more [3].

Station design must also ensure that the station is accessible to any individual that may seek to use the services at that station. Public Right-of-Way Accessibility Guidelines (PROWAG) from the United States

Access Board provides guidance for pedestrian accessibility at railway crossings, which may be common near stations (www.access-board.gov/prowag/).

Additional search terms: *assessment, construction, deterrent, platform*

Advantages

- Station design evaluation and modification can be applied to existing stations and new construction.
- Improved station design can help to prevent both trespass and suicide incidents.
- It is low cost to identify vulnerabilities that may lead to increases in trespass risk.
- Station additions such as posts, chains, ropes, or focused lighting can be economical ways to guide passenger movements at stations and reduce the risk that passengers get too close to the tracks.

Drawbacks

- There is a lack of research on ways that station design can reduce or prevent trespassing or suicide.
- It may be expensive to correct design components of existing stations, such as parking lots adjacent to tracks that lack physical barriers for protection.

Notable Practices

- When designing or renovating a station, consider potential vulnerabilities that may inadvertently encourage or allow trespassers to enter the ROW.
- Consider assessing potential risk for trespassing/suicide based on environmental conditions in and around the station location, including population density, nearby psychiatric hospitals, anticipated through trains, anticipating station staffing, and incidents at nearby station locations [3].
- Avoid pedestrian routes that cross active tracks whenever possible. If these routes are unavoidable, follow available design recommendations and guideline documentation.
- Separate public spaces from unauthorized spaces with symbolic barriers. It should be obvious when an individual is entering an unauthorized location [4].
- Ensure station design provides good visibility for train crews and passengers throughout all public spaces [4].
- Include a direct path for first responders to access the platform and track area [4].

- Refer to PROWAG guidance from the United States Access Board to ensure that legal crossings near a station are appropriately designed to be accessible to any rider who may use the rail system (www.access-board.gov/prowag/).

References

[1] Batchelor, T. (2018, December 30). Train stations set for radical redesign to stop people using them to take their own lives. *The Independent*.

Description: This article describes efforts by Network Rail in the United Kingdom (UK) to redesign stations to help prevent rail suicide.

[2] Lin, P.-S., Kourtellis, A., Islam, M., Menon, N., Godfrey, J., & Keita, Y. (2022). FTA standards development program: Mitigations for trespasser and suicide fatalities and injuries. (FTA No. 0227). Washington, DC: Federal Transit Administration.

Abstract; This research focused on mitigation strategies and countermeasures that may be used by rail transit agencies (RTAs) to reduce trespasser and suicide fatalities and injuries, including RTA practices and practical and promising strategies and countermeasures. This report can serve as a toolbox for RTAs to provide mitigation strategies identified from a literature review and employed by RTAs, including 11 case studies; promising existing and emerging technology applications to detect and/or prevent rail transit trespassing and suicides; and key research findings for mitigating injuries and fatalities associated with trespassing and suicide events.

[3] Janson, R. (2022). *Research risk factors for suicide at stations*. ProRail. Netherlands (translated from Dutch to English by Google).

Document Summary: This document describes research conducted to identify a risk assessment model which can help to determine potential risk for suicide at new railway stations in the Netherlands. The risk assessment model identified a wide variety of factors that may contribute to suicide risk and applied a model to verify which factors were most critical. The outcome of this risk assessment tool is now used by ProRail to determine which mitigations must be included in new station designs.

[4] Amtrak. (2019). *Station Program Planning and Guidelines*.

Document Excerpt: These Guidelines are intended to assist local governments, transportation agencies and authorities, designers, Amtrak staff and other stakeholders in the planning, design, construction, rehabilitation, and redevelopment of Amtrak served passenger stations and related facilities. The guidelines presented here establish design standards and criteria for stations, platforms, and the station site, starting with governing principles, followed by information on the planning and design process, service and facility types, program requirements, station features and amenities, station finishes and architectural design. This document is intended to be used in concert with, and is complemented by, the Amtrak Engineering Stations Standard Design Practices (SDP), which provide further technical requirements, the Amtrak Graphic Standards Signage Manual and other resource documents listed in Appendix A.

Additional Resources

Network Rail. (2015). *Station Design Principles for Network Rail*.

> Document Excerpt: Suicides are a societal issue which Network Rail considers necessary to address in terms of its own business; due to the impact it has on performance and the costs associated with running the network. More recently Network Rail recognises the part it has to play in society and the role that suicide prevention has in achieving a sustainable business.
> Network Rail is working with third parties such as mental health specialists and the Samaritans in the community to conduct outreach work with the aim of reducing the incidence of vulnerable individuals taking their lives. Analytical data has been collated and interpreted to inform physical mitigations which have been used as exemplars on some routes. The creation of a calm environment and the avoidance of over-stimulation are recognised as desirable in this respect.

Public Right-of-Way Access Guide (PROWAG): www.access-board.gov/prowag/

> Website: The Access Board has published new guidelines under the Americans with Disabilities Act (ADA) and the Architectural Barriers Act (ABA) that address access to sidewalks and streets, crosswalks, curb ramps, pedestrian signals, on-street parking, and other components of public right-of-way. These guidelines also review shared use paths, which are designed primarily for use by bicyclists and pedestrians for transportation and recreation purposes. Final Rule published to the National Register on August 8, 2023.

Related Measures

- Anti-suicide pits
- Grade separation
- Identify access points for potential trespassers
- Identify funding opportunities
- Incident cost estimation
- Platform fencing
- Platform gates and doors
- Social atmosphere in stations