Measure Name: Manual swing gate

Definition: Barrier that pedestrians and other non-motorized users must open manually to cross tracks.

Tags:

Type of Incident:

- ☒ Non-Motorized Users Only
- ☐ Motor Vehicles Only
- ☐ Both

Intervention Strategy:

- ☐ Data: application and planning
- ☐ Education: outreach and messaging
- ☐ Enforcement: policy development and rulemaking
- ☒ Engineering: technological and physical deterrents

Type of Problem:

- ☒ Non-Motorized Users Violating Warning Devices
- ☐ Motor Vehicles Violating Warning Devices
- ☐ Vehicle ROW Incursion
- ☐ Vehicle Congestion
- ☐ Blocked Crossing
- ☐ Vehicle Hang-up

Measure Category:

- ☐ Risk Assessment
- ☐ Policy and Enforcement
- ☐ Collaboration, Training, and Education
- ☐ Public Communication
- ☒ Physical Barriers
- ☐ Detection and Lighting
- ☐ Infrastructure Modification
- ☐ Post-Incident Management
- ☐ Warning Devices

Description

A manual swing gate is a barrier that pedestrians and other non-motorized users must open manually to access a rail grade crossing. Swing gates open away from the tracks and are designed to return to the closed position after use [1]. The device restricts movement and is intended to encourage users to check for approaching rail traffic and assess the environment before crossing [2]. Swing gates are especially useful at crossings where pedestrians tend to cross without looking and where channelization can prevent pedestrians from easily bypassing the swing gates [3].

Swing gates are also used commonly as an emergency exit for pedestrian automatic gates. In this application, the swing gates are intended only to be used if a pedestrian becomes trapped within the crossing area or if there is otherwise a need for emergency access [2].

Applications of manual swing gates shown a reduction in number of incidents due to passenger inattention to trains in a station area [4]. The installation of swing gates should consider channelization to ensure that pedestrians cannot easily bypass the swing gates to access the crossing [3].

Additional search terms: *barrier, door, Z crossing*

Advantages

- Measure provides a passive method of encouraging safe pedestrian behavior at crossings.
- Inexpensive to maintain after installation.

Drawbacks

- Self-closing mechanisms (spring, angle-cut hinge, etc.) can fail over time, which can reduce the effectiveness of the swing gate. [5]
- If not designed properly, swing gates can be an obstacle for wheelchair users.

Notable Practices

- Swing gates should be designed to open away from the track(s) so that users can push the gate to exit the track. [6]
- Characteristics of a swing gate, such as gate opening forces, should abide by Americans with Disabilities Act (ADA) guidelines found in the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG). [6]
- Detectable warning devices, such as tactile strips, are often installed before and after the tracks to indicate where a pedestrian enters/exits the track area. [5]
- Kickplates on the bottom of a swing gate can be useful in making the device easier for users in wheelchairs to open gates. [5]
- Nighttime visibility should be considered at crossings with swing gates. [6]

- Swing gates should be self-closing. [1]
- At stations with high passenger flows, multiple entry and exit gates should be used side by side. [1]

References

[1] US Department of Transportation Federal Railroad Administration. (2012). Guidance on Pedestrian Crossing Safety at or near Passenger Stations.

> Excerpt: FRA has intended this guidance primarily for both passenger railroads and freight railroads that operate trains over trackage that also supports passenger operations. The presence of pedestrians within station areas and moving toward or across tracks to access station platforms can create numerous potential conflict areas where pedestrian movement must be restricted once an approaching train is detected.
> This guidance is also intended to provide railroads, as well as State and local agencies and other stakeholders, with strategies and methods that can help them to prevent pedestrian incidents and fatalities specifically in areas within or near passenger stations.

[2] U.S. Department of Transportation. (2019). Highway-Rail Grade Crossing Handbook – Third Edition.

> Abstract: The purpose of the *Highway-Rail Crossing Handbook, 3rd Edition* is an information resource developed to provide a unified reference document on prevalent and best practices as well as adopted standards relative to highway-rail grade crossings. The handbook provides general information on highway-rail crossings; characteristics of the crossing environment and users; and physical and operational changes that can be made at crossings to enhance the safety and operation of both highway and rail traffic over such intersections. The guidelines identified and potential alternative improvements presented in this handbook reflect current best practices nationwide.

[3] Utah Department of Transportation. (2013). UDOT Pedestrian Grade Crossing Manual.

> Document Excerpt: This manual identifies some of the risk factors associated with pedestrian grade crossings and summarizes applicable best practices and mandatory controls that address these risk factors. This manual also presents a standard evaluation and implementation procedure intended to improve consistent application of devices to support pedestrian safety at grade crossings throughout the state.

[4] Federal Railroad Administration. (2008). Compilation of Pedestrian Safety Devices In Use at Grade Crossings.

> Document Excerpt: The FRA has worked to gather information on any signs, signals, pavement markings, or other devices used to enhance the safety of pedestrians at grade crossings. State DOTs and rail transit operators have made several submissions, which have included background information and illustrations. These are presented here so that the larger grade crossing safety community might benefit from the work of others in this important area.

[5] California Public Utilities Commission. (2008). Pedestrian-Rail Crossings in California.

> Document Excerpt: In recent years light rail transit and commuter rail systems have expanded significantly, leading to construction of many new stations and pedestrian-rail crossings. Accompanying

this expansion has been a trend of increasing high-density development of residential and retail property immediately adjacent to light rail transit and railroad tracks. The combination of these factors requires greater attention to pedestrian-rail at-grade crossing design/improvements to better warn the public of potential train pedestrian conflicts. This document reviews design and placement of warning devices that are currently used at pedestrian-rail at-grade crossings in California.

[6] Federal Highway Administration. (2009). Manual on Uniform Traffic Control Devices for Streets and Highways, 2009 Edition.

Document Excerpt: The Manual on Uniform Traffic Control Devices (MUTCD), by setting minimum standards and providing guidance, ensures uniformity of traffic control devices across the nation. The use of uniform TCDs (messages, locations, sizes, shapes, and colors) helps reduce crashes and congestion, and improves the efficiency of the surface transportation system. Uniformity also helps reduce the cost of TCDs through standardization. The information contained in the MUTCD is the result of years of practical experience, research, and/or the MUTCD experimentation process. This effort ensures that TCDs are visible, recognizable, understandable, and necessary. The MUTCD is a dynamic document that changes with time to address contemporary safety and operational issues.

Additional Resources

Thompson, A., and Kennedy IV, B. (2016). Engineering Design for Pedestrian Safety at Highway-Rail Grade Crossings.

Abstract: A number of pedestrian treatments at railroad grade crossings have been developed and are used throughout the United States. The decision of when to use these treatments is generally a matter of best practices, using a decision tree, or conducting a site assessment. There has been little research on the efficacy of particular treatments. More important, because pedestrian treatments are seldom, if ever, used in isolation, there is no known research on what particular configurations of available pedestrian treatments provide the highest level of safety.
A USDOT 2010 policy statement encourages transportation agencies to improve opportunities for pedestrian and bicyclists. The United States Access Board, in turn, has issued a Notice of Proposed Rulemaking to establish guidelines to address public right of way issues for people with disabilities. In anticipation of more non-motorized users of varying abilities making use of pedestrian grade-crossing facilities, it is important that the efficacy of pedestrian treatments at grade crossings be fully understood.

Related Measures

- Automatic pedestrian gates

Images

Figure 1. Example of manual swing gate at a pathway crossing in New Britain, CT
Image Credit: Volpe Center

Figure 2. Example of manual swing gate
Image Credit: FRA, Compilation of Pedestrian Safety Devices In Use at Grade Crossings