Measure Name: Flangeway gap filler

Definition: Rubber filler used at grade crossings to reduce the gap between the rail and adjacent crossing surface to prevent non-motorized wheel from being trapped in the flangeway gap.

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

Flangeway gap filler is a rubber filler used at grade crossings to reduce the gap between the rail and adjacent crossing surface where the flange of the rail wheel passes, also known as the flangeway. Bicycles, wheelchairs, scooters, and other wheeled devices can easily become trapped in the flangeway gap at grade crossings [1]. In general, the Americans with Disabilities Act (ADA) guidelines [2][3] require that flangeway gaps be larger than ideal for wheelchairs and other wheeled devices. Passenger and freight train wheels need 2 ½ and 3 inches, respectively, to prevent derailments and other damage. Additionally, flangeway gaps widen due to normal wear and use over time and may reach up to 4 ½ inches wide [4]. One common way to address these gaps and create a more level surface is through the use of rubberized flangeway fillers, although the gap is not entirely eliminated.

Rubber flangeway fillers have the added benefit of accommodating the 3-inch gap required by freight train wheels. The rubber compresses to fit the additional space needed by trains and returns to accommodate ADA guidelines. In 2013, the approximate cost of a 16 square foot strip was $1,600 [5].

Additional search terms: *gap, filler, rubber filler, groove filler, track filler*

Advantages

- Flangeway gap filler is relatively low cost.
- This measure increases crossing safety for a variety of wheeled devices while accommodating passenger and freight trains that pass through the crossing.

Drawbacks

- Flangeway gap filler may not be appropriate for high-speed or freight operations. [1]
- Grease from the train wheels may spread onto the gap filler, creating a slipping hazard, and maintenance may be needed to keep the area clean. [6]

Notable Practices

- For passenger rail where pedestrian paths cross the tracks at grade, flangeway gaps should be no greater than 2.5 inches (64 mm). [2][3][4]
- For freight rail, flangeway gaps should be no greater than 3 inches (75 mm). [3][4]
- Ongoing maintenance may be needed to remove any wheel grease that has accumulated. [6]
- Flangeway gap filler is recommended when the pedestrian path crosses the tracks at an angle less than 60 degrees. [6]

References

[1] Demers, A., Suddarth, A., Mahmassani, H. S., Ardekani, S. A., Govind, S. (1995). Bicycle Hazard Mitigation (FHWA/TXDOT-96/1394-1). Texas Department of Transportation.

> Abstract: The primary goal of this study was to identify and compile a list of potential hazards to cyclists, to rank order the hazards in terms of their perceived and actual degree of risk, and propose mitigation actions to address these hazards. Of particular concern was the mitigation actions that can be incorporated in an agency's regular maintenance activities; however, in almost all cases, there may be corresponding considerations that are better addressed at the design stage, and these ore pointed to as well. This report presents the guidelines developed in this study for the detection and mitigation of the principal roadway hazards for bicyclists.

[2] Department of Justice. (2010). *2010 ADA Standards ADA Regulations for Accessible Design*.

> Excerpt: The Department of Justice published revised regulations for Titles II and III of the Americans with Disabilities Act of 1990 "ADA" in the Federal Register on September 15, 2010. These regulations adopted revised, enforceable accessibility standards called the 2010 ADA Standards for Accessible Design "2010 Standards" or "Standards". The 2010 Standards set minimum requirements – both scoping and technical -- for newly designed and constructed or altered State and local government facilities, public accommodations, and commercial facilities to be readily accessible to and usable by individuals with disabilities. Adoption of the 2010 Standards also establishes a revised reference point for Title II entities that choose to make structural changes to existing facilities to meet their program accessibility requirements; and it establishes a similar reference for Title III entities undertaking readily achievable barrier removal.

[3] U.S. Access Board. *Public Rights-of-Way Accessibility Guidelines*.

> Description: This document includes proposed accessibility guidelines for public rights-of-way.

[4] Federal Railroad Administration. (2012). *Guidance on Pedestrian Crossing Safety at or Near Passenger Stations*. Federal Railroad Administration.

> Excerpt: As envisioned in Section 201 of the RSIA [Rail Safety Improvement Act of 2008], this document is intended as guidance to railroads on strategies and methods to prevent pedestrian accidents, incidents, injuries, and fatalities at or near passenger stations. FRA hopes that that the illustrative examples of the pedestrian safety concepts described in this document will foster the exchange of information and experiences among railroads and other organizations that are involved with enhancing pedestrian safety in and around passenger stations. Inclusion of any device identified herein should not, in itself, be considered a requirement for its use.

[5] Miami-Dade Metropolitan Planning Organization. (2013). *Pedestrian Improvements at Railroad Crossings*.

> Description: This document describes a field evaluation, toolbox development, and identification and implementation of countermeasures.

[6] KiwiRail. (2017). *Design Guidance for Pedestrian & Cycle Rail Crossings*.

> Excerpt: This guide provides urban designers and planners, and traffic and rail engineers, with principles, design considerations and standard designs for level crossings located on footpaths, shared paths or cycle paths. Many of the principles discussed should also be applied when considering providing for cyclists

using on-road cycle lanes. It asks users to consider all types of rail crossing options, including grade separation and the potential to remove a rail level crossing completely; however, the design guidance only covers treatments at rail level crossings. This guide focuses on crossings of the rail corridor; it does not consider the planning and design of pedestrian/cycle pathways running along rail corridors.

Additional Resources

Thompson, A., and Kennedy IV, B. (2016). Engineering Design for Pedestrian Safety at Highway-Rail Grade Crossings. Technical Report No. DOT/FRA/ORD-16/24. Washington, DC: U.S. Department of Transportation, Federal Railroad Administration.

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

- Crossing alignment adjustment for bicycles and other wheeled devices
- Pedestrian channelization

Images

Figure 1. Example of flangeway gap filler at a grade crossing in Opa Locka, FL
Image Credit: Volpe Center

Figure 2. Example of flangeway gap filler at a grade crossing in Opa Locka, FL
Image Credit: Volpe Center