Measure Name: Gate skirts

Definition: Use of pedestrian gate enhancements, such as secondary gates or mesh, under existing gates to restrict access to the crossing during an activation.

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 gate skirt refers to a horizontal hanging bar attached to the pedestrian gate arm to reduce the probability of pedestrian gate violations. This treatment, along with pedestrian channelization, has shown to be effective at deterring pedestrians from going under a gate and violating the grade crossing [1] [2]. Demonstration tests at crossings near train station platforms and near schools, where pedestrian traffic tends to be high, have shown positive results of installing this measure. This additional gate also benefits blind or low-vision pedestrians since the lower gate can be detected by mobility aids such as canes [3]. This measure informs pedestrians with vision disabilities that the automatic pedestrian gate is in the down position and reduces the likelihood that pedestrians will violate a lowered crossing gate [4].

Gate skirts should be considered for gated grade crossing locations where pedestrians regularly violate the warning devices. These may also be more useful in urban locations where grade crossings tend to be closed for an extended period [5].

Additional search terms: *Pedestrian channelization, pedestrian crossing gate, barrier skirts, horizontal hanging bar*

Advantages

- Gate skirts increase a pedestrian's compliance with activated pedestrian gates. [1] [2] [3]
- Gate skirts are a low-cost measure.

Drawbacks

- Installation of gate skirts may increase frequency of pedestrians using the roadway to circumvent the pedestrian gate. [1]
- Hinged pedestrian gate skirts may require regular inspection.

Notable Practices

- Pedestrian channelization should be implemented with gate skirts, so pedestrians do not have an opportunity to walk around the gate. [2]
- If a horizontal hanging bar is attached to an automatic pedestrian gate, the height of the horizontal hanging bar when in the down position should be a maximum of 26 inches above the pathway or sidewalk. [4]
- Gate skirts should be considered for gated grade crossing locations where pedestrians regularly violate the warning devices or at crossings that many children use. [1]

- Gate skirts may be most useful in urban locations where grade crossings tend to be closed for an extended period of time. [5]

References

[1] Chase, S., Gabree, S. H., & daSilva, M. P. (2013). Effect of Gate Skirts of Pedestrian Behavior at Highway-Rail Grade Crossings. Technical Report No. DOT/FRA/ORD-13/51. Washington, DC: U.S. Department of Transportation, Federal Railroad Administration.

> Abstract: The Federal Railroad Administration was interested in evaluating one type of pedestrian safety device, commonly known as gate skirts, that consists of a secondary horizontal hanging gate under the existing pedestrian gate to better block access to the crossing by pedestrians who gain unauthorized entry by going under the down gates. The Volpe Center participated in a New Jersey Transit rail pilot project to evaluate a prototype design installed at a grade crossing in Matawan, NJ, on May 30, 2012. The purpose of this evaluation was to determine if the addition of gate skirting would result in fewer pedestrians attempting to violate the crossing on the sidewalk after the gates began to descend. Data were collected over a 2-week period before and a 2-week period after the installation of the gate skirts. Pedestrian actions were coded during all train activations that occurred during this 4-week period. The research team found that the total number of pedestrian violations decreased while the gates were descending (78 percent reduction) and horizontal (55 percent reduction), but increased while the gates were ascending (12 percent increase). Additionally, after the installation of the gate skirts, more pedestrians who violated while the gates were descending or horizontal chose to do so in the adjacent street where there were no gate skirts, as opposed to on the sidewalk where the safety enhancement had been added.

[2] daSilva, M. (2020). *Gate Skirts Research at a Highway-Rail Grade Crossing in Ramsey, NJ*. Research Results No. 20-20. Washington, DC: U.S. Department of Transportation, Federal Railroad Administration.

> Excerpt: Results of the gate skirts design tested during this study, along with ROW fencing, indicate a positive safety benefit of this improvement. Violations were completely eliminated on the crossing's northeast quadrant after the fencing addition.

[3] US Department of Transportation Federal Highway Administration. (2019). Noteworthy Practice: Improving Pedestrian Rail-Crossing Safety with Hinged Pedestrian Gate Skirts.

> Excerpt: Both Connecticut and New Jersey have installed hinged pedestrian gate skirts to better block access to crossings, deterring pedestrian violations.

[4] Federal Highway Administration. (2023). Manual on Uniform Traffic Control Devices.

> Document Excerpt: The purpose of the MUTCD is to establish uniform national criteria for the use of traffic control devices that meet the needs and expectancy of road users on all streets, highways, pedestrian and bicycle facilities, and site roadways open to public travel.

[5] SAFER-LC. (2022, March 29). Skirts Under the Barriers. SAFER-LC Toolbox.

> Description: This webpage provides information on implementing skirts under the crossing gates in Europe, including recommendations, considerations for implementation, and relevant research results.

Additional Resources

U.S. Department of Transportation. (2019). Highway-Rail 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.

Related Measures

- Automatic pedestrian gate
- Pedestrian channelization

Images

Figure 1. Example of a pedestrian gate skirts with sidewalk fencing at a grade crossing in Matawan, NJ
Image Credit: Volpe Center

Figure 2. Example of a hinged pedestrian gate skirts at a pathway crossing in New Britain, CT
Image Credit: Volpe Center

Figure 3. Example of a pedestrian gate skirts with ROW fencing at a grade crossing in Ramsey, NJ
Image Credit: Volpe Center

Figure 4. Example of a hinged pedestrian gate skirt in upright position at a grade crossing in Ramsey, NJ
Image Credit: Volpe Center

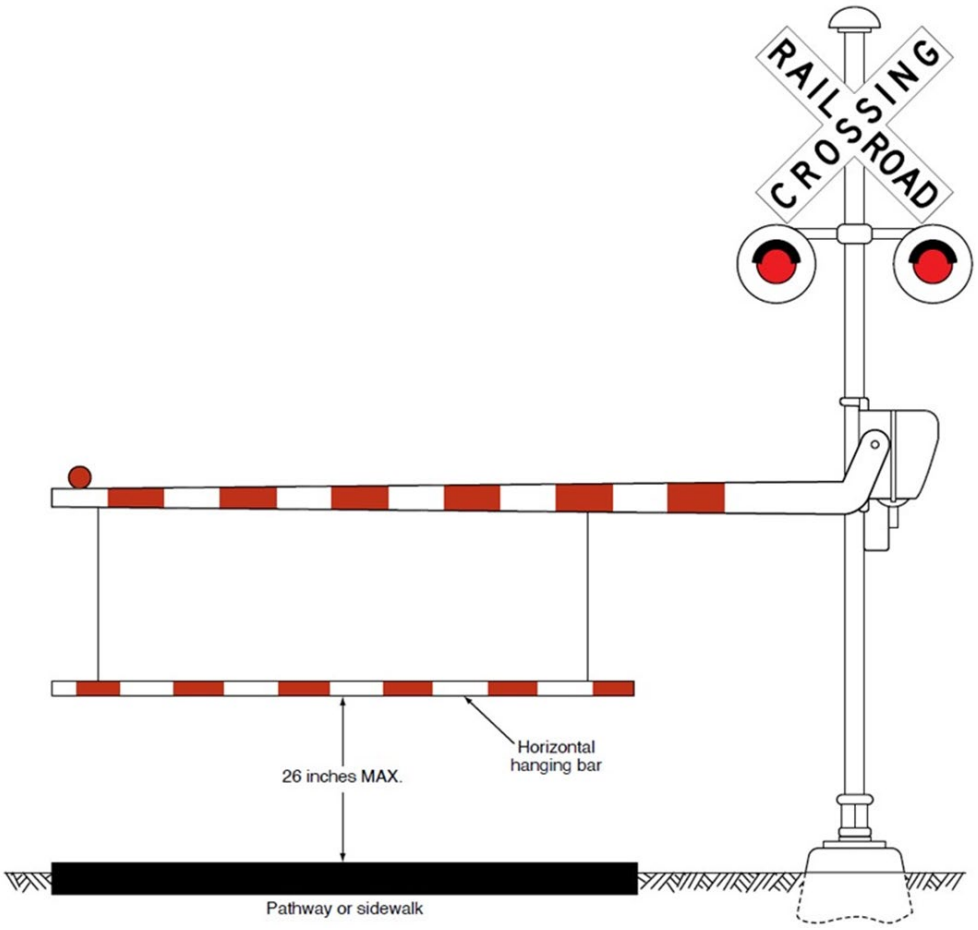

Figure 5. Example of an automatic pedestrian gate with a horizontal hanging bar at a pathway or sidewalk grade crossing
Image Credit: Manual on Uniform Traffic Control Devices [4]