

Measure Name: Second train warning

Definition: Use of an activated warning sign to warn users of a second train approaching to mitigate violations at a multi-track crossing.

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

Second train warning refers to the use of an activated warning sign to warn users of a second train approaching to mitigate violations at a multi-track crossing. Variations of this measure include an audible warning accompanying the activating sign and/or indication of the direction from which the second train is approaching from. At multi-track crossings, a second train may arrive during a single activation of the crossing warning devices. Users may wrongly assume that it is safe to cross after the first train clears the crossing and therefore circumvent the gates and risk getting struck by a second train. The warning system is intended to warn drivers, pedestrians, and cyclists to the presence of multiple approaching trains.

Several evaluations of second train warnings have been conducted. In an FRA-funded research study of an activated warning system consisting of a visual and auditory message, researchers recorded a substantial 50 percent reduction in the number of pedestrians crossing the tracks between the two trains when the crossing gates were down [1]. Results of that study also seemed to indicate that the system may have altered pedestrians' decision making about when to violate (i.e., violate prior to either train arriving instead of waiting to violate between trains) but not if they should violate [1]. Another study reported a reduction of 32 percent of vehicles crossing the tracks between trains after the installation of an animated sign including the message "Warning- 2nd Train Coming" [2].

The body of research indicates that this measure provides a positive safety benefit to driver and pedestrian compliance with crossing warning devices. Second train warning devices should be considered for crossings in locations with high frequency of second train events and high volumes of pedestrian traffic during single crossing activations.

Additional search terms: *another train, second train coming, audible warning, changeable message sign, blank out sign*

Advantages

- Second train warnings increase driver and pedestrian compliance with activated crossing devices. [1] [2]
 - These warnings reduce uncertainty of why the grade crossing gates remain down after the passing of a train. [4]
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Drawbacks

- Warning equipment may require regular inspection and maintenance.
- These warnings may increase pedestrian propensity to violate gates before the first train, especially at crossings near stations where one of the trains is stopped at the station. [1]

- If the blank out sign is lit too long before a train arrives, pedestrians will ignore the sign. [5]

Notable Practices

- A public education campaign (media, additional signage) should accompany the implementation of this measure, so users are informed on this change and what this new message means. [4]
- Visibility could be reduced under certain lighting conditions (e.g., glare); shading equipment or dynamic adjustment of brightness can be used to mitigate this. [4]
- This measure is normally used near commuter stations where multiple tracks and high volumes of pedestrian traffic are present.
- Passenger railroads with station platforms in multiple-track territory should work cooperatively to develop a standardized system to clearly and accurately communicate to passengers in station areas and on platforms that a second train (in addition to any train currently occupying or approaching any station track) is approaching the station and that its arrival may be obscured by the train in the station. [6]
- Supplementary use of convex mirrors can be a simple way to provide pedestrians with a clearer view along the tracks, or to enhance their ability to see a train approaching from behind them. [6]
- These warning signs should be mounted as close as possible to the minimum height above the ground set by MUTCD, Part 2, Section 2A-15 [3]. If they are mounted higher than the minimum height specified, pedestrians may not see or simply ignore the signs.
- It is recommended that the sign be placed on the far side of the crossing (and on the near side as well if necessary for pedestrian visibility). [7]
- Users might respond better to a specific verbal warning rather than a visual device that may get ignored if distracted or not looking for it. [8]

References

[1] Gabree, S., & daSilva, M. (2014). [Effect of an Active Another Train Coming Warning System on Pedestrian Behavior at a Highway-Rail Grade Crossing](#). Technical Report No. DOT/FRA/ORD-14/21. Washington, DC: U.S. Department of Transportation, Federal Railroad Administration.

Abstract: The Federal Railroad Administration (FRA) was interested in evaluating a type of grade crossing safety enhancement which alerts pedestrians at the crossing to the presence of a second train. The system chosen for this analysis, known as an Another Train Coming Warning System (ATCWS), consists of signage and an accompanying aural alert which is activated by the presence of multiple trains during gate activation. The ATCWS was installed at a crossing in Garfield, NJ, to assess the impacts of such a warning system on pedestrian behaviors during gate activations with multiple trains. Pedestrian violations were therefore tracked before and after the installation of the ATCWS. No difference was found in the number of violators during a second train activation before and after the installation of the ATCWS. However, small sample sizes and extreme weather during the data collection period indicate that further testing is necessary before strong conclusions about the effects of an ATCWS can be reached.

- [2] Transit Cooperative Research Program. (2002). [Second Train Coming Warning Sign Demonstration Projects. Transit Cooperative Research Program Research Results Digest - Number 51.](#)

Excerpt: This digest provides the results of two demonstrations of active sign warning systems that could increase awareness of and compliance with the conditions of the second train coming phenomenon.

- [3] Federal Highway Administration. (2023). [Manual on Uniform Traffic Control Devices.](#)

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.

- [4] SAFER-LC. (2022, May 16). [Additional Display “Two Trains”.](#) 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.

- [5] Transportation Research Board. (2009). [TCRP Report 137: Improving Pedestrian and Motorist Safety Along Light Rail Alignments.](#)

Excerpt: TCRP Report 137: Improving Pedestrian and Motorist Safety Along Light Rail Transit Alignments addresses pedestrian and motorist behaviors contributing to light rail transit (LRT) safety and describes mitigating measures available to improve safety along LRT alignments.

- [6] 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.

- [7] Transportation Research Board. (1996). [Integration of Light Rail Transit into City Streets.](#)

Excerpt: The report provides information to facilitate the safe, orderly, and integrated movement of all traffic, including light rail, throughout the public highway system, and it provides guidance for the safe and informed operation of individual elements of the transportation network. It is intended to assist those involved in the planning, design, and operation of LRT systems by providing a consistent set of guidelines and standards for LRT operations at low to moderate speeds.

- [8] New Zealand Transport Agency. (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.

Additional Resources

Related Measures

- Barrier gates
 - Pedestrian violation audio warning
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Images



Figure 1. Example of second train coming signage with train direction at a passenger station
Image Credit: [FRA](#)

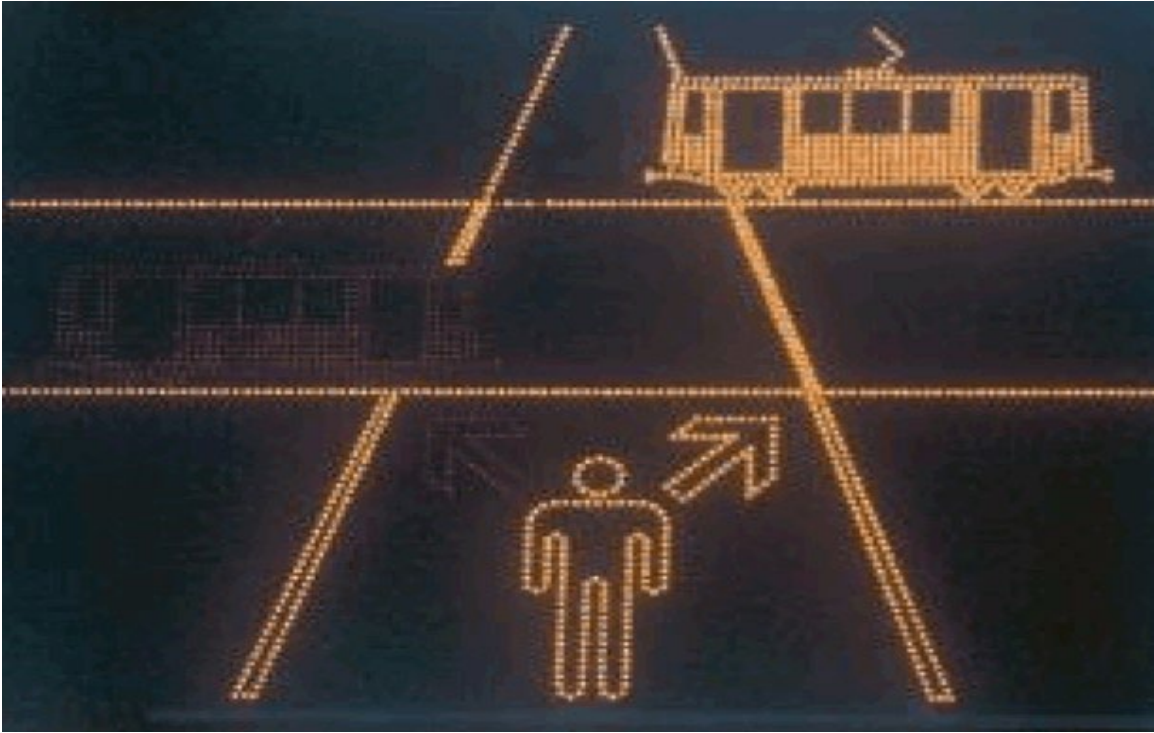


Figure 2. Example of second train coming signage with train direction in Los Angeles, CA
Image Credit: FRA



Figure 3. Example of a second train warning system at a crossing in Garfield, NJ
Image Credit: Volpe Center

FRA Grade Crossing Toolkit: Second train warning



Figure 4. Example of a second train warning system at a station crossing in Orlando, FL
Image Credit: Volpe Center



Figure 5. Example of a second train warning system at a crossing in Elmhurst, IL
Image Credit: Volpe Center