



U.S. Department  
of Transportation  
**Federal Highway  
Administration**

# Memorandum

Electronic Mail

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Subject: **INFORMATION:** MUTCD – Interim Approval  
for Use of the Wayside Horn System

Date: August 2, 2004

From: Regina S. McElroy /s/Regina McElroy  
Director, Office of Transportation  
Operations

Reply to  
Attn. of: HOTO-1

To: A. George Ostensen, Associate Administrator for Safety  
Division Administrators  
Resource Center Directors  
Federal Lands Highway Division Offices

**Purpose:** The purpose of this memorandum is to issue an Interim Approval for the optional use of wayside horn system (WHS) at highway-rail grade crossings.

**Background Summary:** The use of train horns provides an audible indication to road users of the approach of a train at a highway-rail grade crossing. Although this device provides a safety benefit to the road user, the community in close proximity to the railroad crossing can be subject to the sound impact of the train horn, which can occur any time of the day or night. To mitigate this problem, the Federal Railroad Administration (FRA) and the Federal Highway Administration (FHWA) Office of Safety have monitored over the past 10 years the development and implementation of a WHS. The WHS is located at the crossing and directed at oncoming motorists, which (1) simulates the sound and pattern of a train horn; (2) provides similar (or safer) response from road users, and (3) minimizes the audible impact on individuals located near the crossing (the WHS theory of operations is attached to this memo). Additionally, the FRA has documented an Interim Final Rule, entitled “Use of Locomotive Horns Highway-Rail Grade Crossings” (published in the *Federal Register* at 68 FR 70586 on December 18, 2003), which provides the use of train horns at public crossings and the use of the WHS.

Interim Approval for the WHS is hereby granted based on FRA’s Interim Final Rule, as well as current deployments and evaluations.

## **Provisions for the WHS:**

### **Option:**

The wayside horn system may be installed in accordance with part 222 of title 49 of the Code of Federal Regulations (49 CFR) to provide directional audible warning at highway-rail grade crossings equipped with active traffic control devices consisting of, at a minimum, flashing lights and gates.



**Standard:**

The wayside horn system for use at active highway-rail grade crossings shall conform to the FRA's requirements for the wayside horn prescribed in Part 222 of 49 CFR, Appendix E.

As a minimum, the wayside horn system shall be installed for each roadway approach to the highway-rail grade crossing to provide audible warning.

**Guidance:**

A diagnostic review should be conducted by a diagnostic team to determine the optimal placement of the wayside horn system and to ensure the correct and most effective use of the system. The diagnostic team should be composed of railroad personnel, public safety or law enforcement, engineering personnel from the public agency with the responsibility for the roadway that crosses the railroad, and other concerned parties.

The highway agency or authority with jurisdiction should consider the inclusion of remote health (i.e., status) monitoring capable of automatically notifying maintenance personnel when anomalies have occurred within the system.

The wayside horn system should comply with the same lateral clearance and roadside safety features described in the MUTCD Section 8D.01. When a wayside horn is mounted on a separate pole assembly, it should be installed no closer than 4.6m (15 ft) from the centerline of the nearest track. In addition, a wayside horn should be located where the device will have optimal results, and not obstruct the motorists' line of sight to the flashing-light signals.

**Conditions of Interim Approval:** Jurisdictions wishing to install the WHS under this Interim Approval of WHS must meet the following conditions:

1. The use of WHS shall comply with provisions described in the above *Provisions for the WHS*.
2. A written request shall be submitted to the Director of the Office of Transportation Operations acknowledging the jurisdiction's agreement to comply with MUTCD Section 1A.10, item F. The request must also state the location(s) where the device will be used.
3. Jurisdictions shall be responsible to notify the FRA of installation of WHS as required in 49 CFR 222, and shall inform the FHWA of such notification in their written request to FHWA for interim approval.

Any questions concerning this Interim Approval should be directed to Ms. Guan Xu at [guan.xu@fhwa.dot.gov](mailto:guan.xu@fhwa.dot.gov) or by telephone at 202-366-5892.

**References:**

1. 49 CFR Part 222
2. Wayside Horn System Interim Approval Request from A. George Ostensen
3. 2003 MUTCD Section 1A.10

**Attachments:**

Theory of WHS Operations

WHS Research Summary

## **Theory of WHS Operations**

The WHS system operates in conjunction with train operations. Under normal conditions at an active crossing, the train's locomotive will normally engage its horn approximately one-quarter of a mile from the crossing. The horn will continue to sound several additional times until the train enters the crossing. The WHS focuses the sound of the horn to the road user, thereby eliminating the requirement that the locomotive sound its horn from such a far distance (currently trains typically sound their horns a quarter-mile from the crossing). The WHS is located at the crossing on a pole in close proximity to the Crossbuck. Once the train has approached the crossing where the train horn would begin to blow its horn, the WHS is engaged. The WHS emits a digitized horn sound that is directed in the path of the user. Based on the location and orientation of the WHS, significant sound abatement is created for the general area surrounding the crossing, and provides a warning to road users approaching the crossing. Additionally, a visual signal is placed along the rail corridor's right-of-way in advance of the crossing to notify the locomotive engineer that the WHS is operating. Pursuant to FRA's Interim Final Rule (49 CFR 222, Appendix E), the locomotive engineer has the right to engage the on-board train horn, when it is determined that it is in the best interest in safety (for both the road user and the train).

## WHS Research Summary

The effectiveness of the WHS has been studied and documented over 10 years at active highway-rail grade crossings, and has shown substantial benefits to such grade crossings. The studies were conducted by agencies/organizations such as the FRA, Volpe Center; Northwestern University; City of Richardson, Texas; Association of American Railroads; Iowa State University, and Texas Transportation Institute. Key conclusions of the studies include:

- The studies showed significant reduction (more than 50 percent) in the number of motorists' violations of the crossing gates as compared to the baseline data collected with the train horns sounding.
- The WHS was well accepted by both motorists and locomotive engineers.
- The WHS gives equal or greater audible notification as compared to train horns.
- The WHS provides a good balance between providing adequate advance notification to road users and minimizing community noise levels.
- The WHS appears to continue to be an effective alternative to the locomotive horn.