American Railway Engineering and Maintenance-of-Way Association

Letter Ballot

1. **Committee and Subcommittee:** Committee 1, Subcommittee 7

2. **Letter Ballot Number:** 01-18-09

3. **Assignment:** D7-5-17 Revise manual Part 7 signs

4. **Rationale:** Provide new content for this section of the manual which would be simplified material for use primarily by short line railroads and public agencies

5. **Vote:**
   - □ Approve
   - □ Disapprove
   - □ Abstain

   - Note: If you have a conflict of interest on the topic being considered, you must mark the ballot “Abstain.”

6. **Comments:** Comments must be provided when voting to disapprove or abstain. Use additional space on back or attach sheet as necessary. ________________________________
   ___________________________________________________________________

7. **Voting Deadline:** Votes must be sent to: david.warnock@dhwarnock.net ; tbodine@hanson-inc.com; (Send your ballot only if you are not using the on-line process)
   ________________________________
   by: Month ___ Day ___ Year ___

8. **Signature:** I have read the Regulations Governing AREMA Technical Committees and have complied with all its requirements.

   Signed: ___________________________ Name (Please Print) ___________________
   Address (if changed) ________________________________
Part 7

Roadway Signs and Markers

— 2021 —

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7.0 GENERAL

Most Class-1, Class-2 and transit railroads have common standards for their own signs and markers, and this part is intended to provide some guidance for railroads that do not have standards including short lines and industrial railroads.

The purpose of this Part is to provide general information on the types of signs and markers that may be commonly utilized in the railroad industry relating to Engineering applications. These signs and markers are utilized to assist employees in identifying physical locations and characteristics of the railroad track and right-of-way, as well as to provide direction regarding access and usage of railroad property. They may also provide location guidance for maintenance activities related to the railroad track, structures, roadbed, and right-of-way.

Signage related to railroad Signal Systems, as well as Banners/Targets for track elements, such as turnouts, and Grade Crossings are not included in this part.

This part includes an appendix (under development) which in the future will contain representative examples of signs and markers currently in use in North America. The appendix will be provided solely as an engineering reference to help guide design and maintenance personnel, and is not intended to be prescriptive list of required signage.

7.1 SIGN TYPES

The following are typical types of signs or markers discussed in this part and covered in the Appendix.

7.1.1 Locational

7.1.1.1 Mile Post Marker
The mile post marker identifies the approximate linear location of whole miles measured along the track and provides a ready method of location of any physical object on right-of-way relative to that point. Mile post markers typically may be located on existing poles that are the closest pole to the actual mile post location for convenience. Some operators may also utilize tenth of a mile signage, or alternately, quarter, half, and three-quarter mile signage to further demark linear measurement along the track relative to the whole mile.

7.1.1.2 Political Subdivision Sign
Identify where railways cross national, state, county and municipal boundary lines.

7.1.1.3 Standard Right-of-Way Sign and Monument Marker
Define rights-of-way or property ownership limits.

7.1.1.4 No Trespassing Signs
Define locations where trespassing is especially unsafe and/or undesirable.
7.1.2 Maintenance-of-Way

7.1.2.1 Maintenance Limit Signs
Define limits of track ownership and maintenance between railway and industry and between railways.

7.1.2.2 Roadway Structures Signs
Define locations of bridges, trestles, tunnels and culverts.

7.1.2.3 Snowplow Signs
Identify locations of obstructions to snow removal equipment. Flanger signs warn operators to lift flanges in approach to point of obstruction. Wing markers warn operators to close snowplow wings in approach to point of obstruction. —If both indications are required at the same location they should be on one (1) sign.

7.1.2.4 Alignment Signs or Markers
Define the exact locations and limits of easement spirals and point of curve. Superelevation is often shown on the sign or marker at beginning and end of spirals and curves. Superelevation tags are typically attached to the first and last tie within the superelevated transition (spiral) curve or simple curve.

7.1.2.5 Elevation Markers
Define top-of-rail elevations at special locations. Also used to define maximum top-of-rail elevations above which tracks under grade separations or in tunnels cannot be raised.

7.1.2.6 Temporary Work Zone Signs
Define work zones and provide warning to train crews of temporary track conditions and/or presence of Railroad workers in the area. Typically used in accordance with specific Railroad operating rules.

7.1.3 Transportation

7.1.3.1 Speed Control Signs – Temporary and Permanent
Define limits of timetable speed restrictions and define limits of slow orders and locations to stop trains.

7.1.3.2 Whistle Posts and Quiet Zone Signs
Define advance locations of highway grade crossings, stations, railway grade crossings and other special locations where locomotive whistles are required to be sounded and in the case of quiet zones, locations where the locomotive whistles / horns are not to be sounded.

7.1.3.3 Location Signs
As an example and not limited to, these signs define advance locations of railway grade crossings, drawbridges, tunnels, junctions, frequent rock and snow slides, and stations. Also these signs are used to define yard limits, switching limits, signal territory limits, station and derail locations, radio frequency, track capacities, jointly owned track, start or end of ownership, and the existence of Remote Control Locomotive (RCL) territory.
7.1.4 Safety

7.1.4.1 Restricted Clearance Signs
Identify locations of restricted horizontal and vertical clearances or both, at clear points of turnouts, buildings, platforms or other structures.

7.1.4.2 Fire Hazard Signs
Warn everyone concerned of flammable materials storage and subgrade carriers. These signs must meet latest Code Federal Regulation Title 29, Part 1910.

7.1.4.3 Electrical Hazard Signs
Warn everyone concerned of the presence of overhead and subgrade high voltage carriers. These signs must meet latest Code Federal Regulation Title 29, Part 1910.

7.1.4.4 Highway Grade Crossing
Warn all vehicular traffic of the presence of a railway grade crossing. All public highway grade crossing warning signs must conform to the current U.S. Department of Transportation Manual of Uniform Traffic Control Devices (MUCTD) and/or applicable State, Provincial, and Municipal Department of Transportation Specifications. Minimum sign reflectivity standards are required for all traffic vehicular control signs. The specific requirements of this sign type are not provided by this document.

7.1.4.5 Highway and Barricade Signs
Warn all vehicular traffic of a railway grade crossing under construction or repairs or road closures. These signs are normally used in the public way and should meet current U.S. Department of Transportation Manual of Uniform Traffic Control Devices (MUCTD) and/or applicable State, Provincial, and Municipal Department of Transportation Specifications. The specific requirements of this sign type are not provided by this document.

7.1.4.6 Power Operated Switch Signs
Warn pedestrian traffic of the presence of a power operated switch. This sign is especially desirable where non-railroad pedestrian traffic will pass close to a power operated switch.

7.1.4.7 Telecommunication Marker Posts
Warn everyone concerned that there exists, below grade, a cable crossing and/or longitudinal Fiber Optic/Telecommunication cable.

7.1.4.8 Utility Marker Posts
Warn everyone concerned that there exists, below grade, utilities within the Right-of-Way. (Flammable reference 7.1.4.2)

7.1.4.9 General Safety Information Signs
As an example and not limited to, these signs warn personnel of the existence of unexpected personnel defined as occupied camp car, non-controlled railroad crossing, track worker, live track, locations of moveable point frogs, and Remote Control Locomotive operation territory.

7.2 DESIGN CONSIDERATIONS

7.2.1 Shape
Uniform assignment of a defined sign shape for particular usage is suggested. This practice assists viewer to more quickly identify the purpose of the sign from a distance.

7.2.2 Dimension
Dimensions of various groups of signs may differ within limits determined by the legend and number of lettering characters required.

7.2.3 Background
As examples the sign background color that provides the sharpest contrast with the lettering is best. Black letters on “white” or “yellow” background show well, as do white letters on “green” backgrounds. The background may need to be varied to conform with local conditions. Backgrounds on speed control signs often conform in color to indications utilized by the particular railway for signal purposes.

7.2.4 Legends / Lettering
Legends on signs should be short, consisting of characters that are large, plain and widely spaced for legibility at the maximum required distance. Wording on signs should be minimized. Lettering with bold stroked capital letters using a font with limited serif are generally preferable. Consideration should be given to the proper spacing of characters to ensure readability from the desired distance. The ability for Legends and Lettering to be effective in both day and night viewing conditions is important and may require field tests.

7.2.5 Placement
To be effective, it is recommended that signs should be prominently displayed and placed in a manner that maximizes identification by the intended users. The horizontal offset from the track, as well as the vertical elevation and viewing angle relative to the typical position of the intended users should all be considered.

When considering placement relative to the track, appropriate horizontal and vertical offsets for side clearance, in accordance with applicable laws, regulations, and operating rules should be complied with.

Adequate viewing sight distance to the sign for the intended users should also be provided, with consideration given to the importance of type of sign being displayed. Sight distance may be impacted by operating speed, grade, curvature, structures, and the seasonal affects of vegetation or accumulated snows.
In addition, both horizontal and vertical placement should consider the effects of reoccurring natural conditions such as snow accumulation, drifting, or storage. Terrain, non-railroad generated light sources, and effects of weather conditions occurring in the background of signs should also be considered, as they may impact the visibility of signs by the intended users.

Signs and markers should be placed so not to create a hazard to employee movements while on the ground, and should be placed so not to restrict maintenance activities involving either the track and adjacent roadbed and ditches, signals, or facilities of other 3rd party right-of-way users.

In order to protect the Railroad right of way, and safely install sign posts, contact should be made with the national ‘Call Before You Dig’ (811) system as well as the owner Railroad to ensure approval and knowledge of subgrade utilities, prior to installation of posts or foundations.

7.2.6 Reflectivity

The design and specification of signage should consider the reflectivity that the sign surface provides. Backgrounds and Legends / Lettering may utilize different materials or surface treatments to achieve optimal reflectivity for intended purpose. In addition, considerations as to the use of the sign will help determine if it must perform well in both location with ambient lighting or non-lighted areas, as well as who the sign will principally be seen by (public or Railroad personnel), and when it will be observed.

In simplest terms reflectivity refers to the interaction of lighting, both ambient and use related (headlight generated) with the surface of the material being used for the sign surface, and the ability of the surface to absorb or return the light energy to the viewer. The reflectivity of a sign surface may range from minimal (‘flat’ surface coatings) to high (‘glossy’ surface coatings).

The term Retroreflectivity is often used in conjunction with reflectivity to define the ability of certain surface treatments to reflect light to the user in a highly focused manner through the use of specialized prismatic surface treatments. These materials are typically produced in sheets and adhered to the surface of a sign surface. When properly utilized, these retroreflective surface treatments can have the effect of illuminating the sign and thus significantly increasing its visibility. Retroreflective surface treatments are designated by ASTM method D4956-04, and range from Type I to Type X. The classification is not a ranking of relative effectiveness or reflectivity, but rather a classification of function and potential usage. It is not the intent of this section to provide full design guidance, but rather to alert the railway engineer to properly review and consider appropriate materials for signage based on a variety of factors.

Assessment of the intended use, the proposed life-span, the environmental conditions where placed, the availability of ongoing maintenance for the sign, and user
specific cost considerations, will assist the engineer in determining the appropriate reflectivity to consider in when specifying sign materials.

The U. S. Department of Transportation’s Manual of Uniform Traffic Control Devices (MUTCD) and the Federal Highway Administration design guides provide excellent base reference information for reflectivity and retroreflectivity.

7.3 MATERIALS

7.3.1 Wood
When wood is utilized for sign posts or sign frames / supports, only preservative treated wood is recommended. The use of untreated dense tropical hardwoods may be considered. If untreated wood is utilized for the body of the sign, dense exterior grade material should be utilized and all exposed surfaces should be fully primed and painted, or covered by impervious reflective sheeting.

Wood posts are usually tamped solid into ground, and tops are sloped or otherwise protected to reduce water infiltration.

State and Federal Environmental Regulations should also be considered when preservative treated wood is used as sign post material.

7.3.2 Concrete
In certain moisture intensive regions waterproofed reinforced concrete is commonly used as post material for permanent signage. Certain type of signs or ‘permanent’ markers may also be fully cast using waterproofed reinforced concrete. Appropriate consideration should be given to the specification of concrete mixture, reinforcement, and curing process, especially in areas subjected to numerous freeze/thaw cycles.

When metal sign posts are used for permanent signs, or for signs whose position is desired not to be casually repositioned, concrete is commonly used as post foundation material.

7.3.3 Metals
Galvanized steel channels, tube, and rods with sharpened ends make serviceable sign posts. Metal sign posts are especially useful for usage with temporary signs. The use of break-away posts may warrant consideration in areas where there is a high potential for damage by maintenance activities or vehicles such as snow plows.

Galvanized steel sheet or Aluminum alloy sheeting are the most commonly used materials for the body of signs. The specified gauge of steel should be specified with
consideration to the intended use, the needed life-span, and the environmental conditions where it will be placed. The U. S. Department of Transportation’s Manual of Uniform Traffic Control Devices (MUTCD), as well as Federal Highway Administration (FHWA), State, Provincial, and Local agency design specifications all can be utilized to aide the engineer in developing a proper and regionally appropriate specification for sign material.

Due to theft concerns the use of Aluminum material in remote or theft prone areas should be considered by the engineer.

7.3.4 Composites
For purpose of this section, Composites include Fiberglass/Resin, Plastic, and materials comprised of engineered mixtures of plastic and wood.

Composite posts are frequently utilized as Telecommunication Markers and conjunction with the marking of cathodic protected underground pipes. These light weight posts typically designate the existence of underground facilities.

Composites, in particular high-strength, temperature resistant plastics, may also be effectively used a sign face base material for certain applications. However size limitations and the reflectivity of the base material need to considered.
7.4 APPENDIX (Under Development)

Introduction to Sign and Marker Appendix

The following appendix list of signs (now under further development) will be provided as an example for consideration by the engineer. It includes many of the signs that are in common use, but not all inclusive or exclusive to, railroads in North America. The requirements of specific railroad operating practices, as well as Federal, State, and Provincial regulations must be considered in the design, placement, and usage of signs.

This list (now under development) will not be all-inclusive, nor is it intended to be prescriptive, but rather is intended to provide a general overview of common styles, sizes, and legends and wording. This would include commonly used horizontal or vertical lettering of signs.

The U.S. Department of Transportation Manual of Uniform Traffic Control Devices (MUCTD) and/or applicable State, Provincial, and Municipal Department of Transportation Specifications should be referred to for detailed information on standard traffic control devices, including signs for highway approaches to railway grade crossings, and for railroad owned roadways utilized by the public.