

CHAPTER 1 – INTRODUCTION

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1.1—SCOPE

The following shall supplement *A1.1*.

DOTD Permanent Sign Design

The safety, efficiency and operation on a highway depends a great deal upon the placement of permanent highway signing as a means of informing, warning and controlling drivers. The signing of highways may include the following sign types: roadside or median breakaway ground mounted signs, large overhead ground mounted signs, large overhead structure mounted signs, bridge fascia mounted signs and other structure mounted signs attached to the side of the bridge.

The DOTD Traffic Engineering Development Section coordinates the plan development of permanent signing plans into the project plans. This includes sign quantities, sign pay items, sign layout sheets that indicate the sign types, and sign locations.

The DOTD Bridge Design Section is responsible for the structural design, crashworthiness and **Standard Plans** for the breakaway ground mounted signs, overhead signs and structure mounted signs. Permanent signing construction plans can be let as a project by itself or can be placed in projects also containing roadway and bridge construction plans. The Bridge Design Section maintains **Standard Plans** for both overhead and roadside breakaway sign details, which can be requested from Bridge Design Section website.

A request shall be made to the Bridge Design Section task manager early in the preliminary plan stage to perform any structural design required for the permanent signs and to provide the DOTD signing **Standard Plans** or project specific details to be included in the construction plans during the final plan stage. Permanent signs mounted to an existing bridge or new bridge or to another structural component require special designs and details. A special design request should be made early in the design process for these sign types.

The location, messaging, and reflectorization of sign panels are important considerations in signing. DOTD standards and the Manual on Uniform Traffic Control Devices (MUTCD) provides guidance and ensures uniformity of traffic

control devices across the nation. The use of uniform messages, location, size, shapes, and colors for signs helps to improve the efficiency of the surface transportation system and also helps reduce the cost through standardization.

Roadside ground mounted signs shall be placed outside the clear zone, behind longitudinal barriers or on bridge structures protected by barriers. If these measures are not feasible, the roadside sign supports must be breakaway and follow the latest DOTD **Standard Plans**. Typically large overhead sign supports must either be outside the clear zone or protected by longitudinal barriers since the supports are fixed and not breakaway.

1.4—TYPES OF STRUCTURAL SUPPORTS

1.4.1—Sign

The following shall supplement *A1.4.1*.

Permanent Breakaway Roadside Sign Design and Details

Breakaway signs shall meet the current requirements for NCHRP Report 350 or AASHTO MASH. Roadside ground mounted signs generally consist of single post or multiple post breakaway systems. Most breakaway posts consist of rolled or round tube/pipe steel shapes that use either unidirectional or multidirectional slip base designs. Unidirectional breakaway posts are generally used when a vehicle can impact the sign in only one direction. Multidirectional single breakaway posts are used when a vehicle can impact the sign from any direction such as two way traffic or at intersections.

The DOTD roadside ground mounted breakaway slip base details are designed for both vehicular impact and wind loading. The designs are limited to the maximum sign areas indicated in the DOTD **Standard Plans** for each specific sign type. If a larger sign area is needed, a special design must be initiated for the roadside ground mounted breakaway sign or consideration should be given for using a large overhead sign.

In certain situations, small roadside signs may

be needed to structurally mount to a bridge or another structural highway component. These sign types shall be individually designed based on a fixed (non-breakaway) structural connection using specific sign areas and shall be protected from impact by a roadway or bridge barrier.

Refer to the DOTD **Standard Plans** “Roadside Traffic Signs” and construction specifications for further information.

Permanent Overhead Roadside Sign Design and Details

Overhead signs consist of the following types: ground mounted trusses, structure mounted trusses, ground mounted cantilever trusses, structure mounted cantilever trusses and structure fascia mounted signs. For ground mounted trusses, driven pile or drilled shaft foundations are typically used.

For structure mounted signs, structural connections for each sign location must be individually designed and specific details developed to meet the individual site characteristics. In some cases, the truss and post details for structural mounted signs may have to be individually designed depending on the specific site characteristics such as sign height or sign area. The structure (bridge, retaining wall, etc.) that the sign is attached to must also be analyzed for the additional loading (wind, dead, etc.) on an individual basis. This could affect the bridge superstructure design for the deck or girder, substructure or other structural component.

Member sizes are shown in the details based on the specific sign area, span distance and other limitations noted in the details. For each project a design data table shown in the **Standard Plans** shall be filled out by the designer along with determining the pay item and quantities for all signs. If the design requirements noted in the **Standard Plans** are not met, individual designs shall be done to meet the specific site requirements.

During the construction phase, structural shop drawings shall be submitted to the engineer of record from the general contractor prior to fabrication of the overhead and fascia signs for review.

Refer to the DOTD **Standard Plans** “Overhead Traffic Signs” and construction specifications for further information.

1.4.2—Luminaire

The following shall supplement *A1.4.2*.

Bridge Design Section maintains special structural details for High Mast Lighting, which can be requested from Bridge Design Section website. For electrical design information concerning typical high mast or low mast roadway lighting details and specifications, contact the DOTD Bridge Design Electrical group.