



# INDIANA DEPARTMENT OF TRANSPORTATION

## *Driving Indiana's Economic Growth*

### Design Memorandum No. 15-03 Technical Advisory

March 13, 2015

Rev. June 3, 2016

**TO:** All Design, Operations, and District Personnel, and Consultants

**FROM:** /s/ David Boruff  
David Boruff  
Manager, Office of Traffic Administration  
Traffic Engineering Division

**SUBJECT:** Panel Sign Wide Flange Post Selection and Plan Detailing

**EFFECTIVE:** Immediately

This memo has been revised to reflect updates based on the 2015 AASHTO *LRFD Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*. Revised portions are highlighted. For convenience, deleted sections are retained, but struck through. The guidance and details may be used immediately and is required for contracts letting on or after December 01, 2016.

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The following guidance should be applied when determining the appropriate W-beam sizes and plan detailing for ground-mounted panel signs:

1. Determining Sign Area. The entire area of the sign, including any exit number panels, should be considered when selecting the W-beam size. Exit panel sizes may be converted into an equivalent area, i.e. partial height over the entire width of the sign, or more conservatively by considering that the panel width matches the width of the main part of the sign.
2. Beam Length and Exit Panels. Exit panels should be supported by at least one W-beam. At least one W-beam should extend to the top of the exit panels.
3. Supplemental Signs. Supplemental signs should not be mounted below the fuse plate/hinge plate connection.

4. Other Attachments. The equivalent surface area of flashing beacons or other attachments should be added to the height and or width.
5. Foundation Placement on Steep Slopes. Foundations on slopes 2:1 or steeper should be located at least 2.5 ft from the edge of ditch.
6. Wide Flange Post Size Selection.
  - a. Installation with Posts  $\leq$  24 ft. The Wide Flange Post Selection table given in Standard Drawing 802-SNGS-12 should be used only when the longest W-beam is no longer than 24 feet. The length of the post is measured from the top of the foundation to the top of the sign.
  - b. Installation with Posts  $>$  24 ft. For installations where any post is longer than 24 ft, a recommended post size selection and corresponding structural and installation details have been developed and may be used as plan specific details.

Effective with the revision date of this memo, the details have been updated in accordance with the 2015 AASHTO *LRFD Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*.

Until such details are incorporated into the INDOT *Standard Drawings*, the designer will need to review, sign and seal each of the detail sheets. The details may be found on the Y drive at: the Div. environment, Planning & Engineering\Interim Wide Flange Post. Consultants should contact their project manager for the details.

The following information pertains to post size selection, structural details, and installations details for posts  $>$  24 ft.

1. Breakaway Mechanism. The details for longer W-beams include an upper breakaway joint that consists of a perforated fuse plate on the approach side and a non-perforated hinge plate on the back side. This breakaway mechanism is applicable for shoulder side installations only and has been crash tested and is considered to be NCHRP 350 compliant.
2. Design Criteria. The post selection tables for beams  $>$  24 ft and the structural details have been developed for signs assuming a 90 mph wind velocity and a ~~25-year recurrence interval (service life)~~: **10-year mean recurrence interval**. A copy of the structural analysis is available upon request. The analysis method is in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* (AASHTO) and AISC *Manual of Steel Construction*.
3. Post Selection Tables. To select a post size the designer first needs to determine the height and width of the sign and the clear height. The clear height is the elevation difference between the top of the foundation and bottom of the sign. For multiple posts, the largest elevation difference should be used. Selection tables for clear heights ranging from 8 ft to

20 22 ft on 2 foot increments are available. Should a post size not be indicated for the sign dimensions and clear height combination then the designer may contact the Office of Traffic Design for recommendations on how to proceed.

4. Foundation Selection. The foundation selection is based on soil condition, either cohesive, drained sand, or undrained sand. So to prepare the most accurate plan and cost estimate the designer should gather information regarding soil type. This information may be obtained the geotechnical report or from the Office of Geotechnical Services, Athar Khan ([atkhan@indot.in.gov](mailto:atkhan@indot.in.gov))
5. Alternative Designs. The designer may develop an alternative design, provided the following are met:
  - a. The design meets the current AASHTO design standards. Structural analysis of the beams, foundations, and breakaway mechanism must be submitted to and approved by INDOT. ~~The recurrence interval (service life) should be 25 years.~~ **The mean recurrence interval should be 10 years.**
  - b. The design must be crashworthy and NCHRP 350 compliant (crash tested and approved).
6. Elevation differences. Special designs are required should the ground elevation at the sign location be 30 ft or greater compared to the adjacent land. See AASHTO Appendix C, Table 3C-1 for adjustment factors.

Please contact the Office of Traffic Administration, David Boruff ([dboruff@indot.in.gov](mailto:dboruff@indot.in.gov)) should you have any questions.

DB:ewp