

Breakaway Sign Posts

Section 2A.19 of the Manual on Uniform Traffic Control Devices (MUTCD) states that, “Post-mounted sign and object marker supports shall be crashworthy (breakaway, yielding, or shielded with a longitudinal barrier or crash cushion) if within the clear zone.” The clear zone concept is used when working to minimize the number and severity of crashes involving vehicles running off the road. Simply stated, the clear zone is a desirable traversable area that starts at the edge of the traffic lane and extends laterally a sufficient distance to allow a driver to stop or return to the road before encountering a hazard or overturning. Typical desired clear zone dimensions for local roads are 7 feet on roadways without curbs and 1.5 feet for roadways with curbs, though there are many variables involved including design speed, side slope, and average daily traffic.

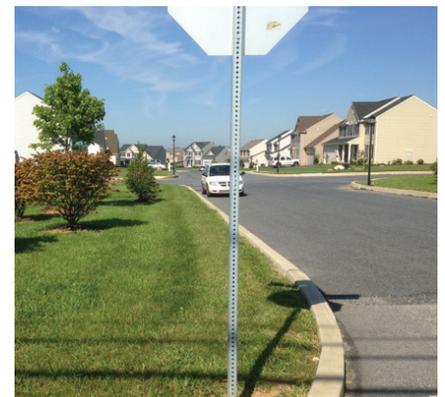
Therefore, municipalities throughout the state of Pennsylvania are required to use breakaway sign posts on all newly installed or replaced signs within the clear zone of their roadways. A typical breakaway post assembly consists of a sign support post, an anchoring post, and a breakaway component. A breakaway post is designed to lessen the impact to a vehicle if struck and thereby minimize injury to occupants and damage to vehicles.

Crashworthy Criteria

To be considered CRASHWORTHY, sign posts must meet criteria established by the American Association of State Highway and Transportation Officials (AASHTO) and must have Federal Highway Administration (FHWA) approval of its breakaway system. The AASHTO Manual for Assessing Safety Hardware (MASH) presents uniform guidelines for crash testing permanent and temporary highway safety features and recommends evaluation criteria to assess test results. MASH is an update to and supersedes NCHRP Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features, for the purposes of evaluating new safety hardware devices. MASH does not supersede any guidelines for the design of roadside safety hardware, which are contained within the AASHTO Roadside Design Guide. An implementation plan for MASH, adopted jointly by AASHTO and FHWA, states that all highway safety hardware accepted prior to the adoption of MASH — using criteria contained in NCHRP Report 350 — may remain in place and may continue to be manufactured and installed. In addition, highway safety hardware accepted using NCHRP Report 350 criteria is not required to be retested using MASH criteria. However, new highway safety hardware not previously evaluated must use MASH for testing and evaluation.

Therefore, posts that are crash tested and satisfy AASHTO criteria established in NCHRP-350 are considered breakaway posts and are acceptable for use adjacent to highways. AASHTO has summarized their specifications in *2001 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals*.

While many FHWA-approved breakaway systems exist, only those systems outlined in the Post-Mounted Signs sheets of *Publication 111 Traffic Control — Pavement Markings and Signing Standards TC-8600 and TC-8700 Series* are applicable for use in Pennsylvania. Based on the sign height, width, and distance above the ground, the tables in Publication 111 can be used to determine the proper sign post size and length. This is emphasized in Section 212.105 of Title 67 (Publication 212), which states: “Unless physically protected by guide rail or a barrier, or installed beyond the clear zone as defined in the Department’s Design



Manual, Part 2 (Department Publication 13M), all sign posts must be of a Department-approved breakaway design as listed in the Approved Construction Materials (Department Publication 35), and in accordance with the Signing and Marking Standards (Department Publication 111).”

Steel Channel Bar Post



Steel Square Tube Post

The square tube offers several advantages, including the ability to mount signs on all four sides, greater loading capacity, and greater torsional strength. The steel square tube post costs about 5 to 10 percent more than the channel bar but provides more sign-mounting options.

Breakaway Post Types

The three types of breakaway posts most commonly used by municipalities are the steel square tube, the channel bar, and the wood post. Each of these types has benefits and limitations associated with them. A few factors that municipal operations

4- by 4-inch Wood Post Without Holes



4- by 6-inch Wood Post With Holes

Wood posts tend to have a higher cost, but they can support larger size signs and can be used to give a more natural feel in parks, recreational areas, and other environmentally friendly areas. The desired use, cost, and location of the sign should be considered before deciding on a post type.

personnel should consider when selecting a post type are cost, durability, safety, maintenance, and aesthetics. These factors may influence a municipality to select one type over another. The channel bar post has the lowest cost and is easy to install, making it the most commonly used post. The disadvantage of the channel bar post is its lower loading capacity and the inability to mount signs at right angles on the same post.

Installation

TC-8702A through TC-8702E in PennDOT Publication 111 contain



all specifications and details related to installation of each sign post type. The first step in the installation process is to determine which type of base is required for installation. (Be sure to call PA One Call before digging.) A concrete base must be used when installing a wood post in Pennsylvania — no other base is acceptable according to the TC-8702 series. 4- by 4-inch wood posts are considered breakaway, whereas 4- by 6-inch posts are considered breakaway only after required holes are drilled perpendicular to vehicular travel.

An anchor post can be used as a base for the channel bar and steel square tube posts. It can be driven into the ground with a drive cap, allowing for quick and easy installation. The anchor post should be driven at least 3 feet deep leaving a maximum of 4 inches above ground for channel bar posts and 1 inch above the ground for steel square tube posts. The required breakaway hardware should then be used to connect the sign post to the selected base. The direct-bury method for channel bar, square steel, and wood post installation is not acceptable in Pennsylvania. All posts, hardware, and mounting bases should be periodically inspected to ensure that all pieces are tight and working properly.