

**Nevada Department of Transportation  
Specifications Division  
Standards and Manuals Section**

**Position Paper for: Metal Beam Guardrail Offset Blocks**

**Last updated: June 25, 2007**

**1. General.**

- a. All guardrail offset-blocks must conform to the AASHTO report titled "A Guide to Standardized Highway Barrier Hardware" and to the NCHRP350 testing requirements.
- b. The products used on Nevada's right-of-way for guardrail offset-blocks must provide a service life that will not create a maintenance problem and that is synchronized with our normal road maintenance schedules. While a minimum of twenty years would be costly in terms of continued maintenance such a life cycle may be acceptable. A service life of forty years or more seems to be reasonable for this type of product and should be considered the desired minimum service life for guardrail offset-block materials.
- c. The failure of 3-beam metal guardrail systems with a 6-inch metal offset-block to pass NCHRP350 testing indicates the critical nature of the offset-block in the performance of a metal beam traffic barrier system. Accordingly, the physical properties of untested offset-blocks must be obviously comparable to those used in actual testing in order to be considered as an acceptable option.
- d. Because offset blocks on 3-beam guardrail systems are attached with two bolts they do not require a notch to prevent rotation when used with metal posts.

**2. Wood offset-blocks**

- a. Wood, when properly treated, can be an acceptable material; however it is susceptible to splitting while in service. Splitting can cause undesirable conditions such as: [a] rotation of the block and [b] complete dislocation of the block. Wood blocks are also susceptible to shrinking that can result in loose fasteners and sagging of the system. When properly maintained the acceptable durability of wood in this application is field proven and provides adequate performance over a reasonable service life.
- b. Laminated wood has the added consideration of the potential for delamination during the service life. The ability of the bonding material to provide adequate performance for a reasonable service life under plausible conditions must be evaluated.

**3. Metal offset-blocks**

- a. The previous industry standard steel offset blocks failed NCHRP350 test level 3 testing for w-beam and 3-beam guardrail systems. A modified steel offset block was developed for 3-beam guardrail systems that passed the testing but requires that the guardrail system be installed at 34-inches in height instead of at 32-inches. Accordingly, the department considers the use of the modified steel offset block to be undesirable and is discontinuing its use.

**4. Plastic offset-blocks**

- a. Plastic offset-blocks are a widely adopted product, however, because they are relatively new, an acceptable service life has not been confirmed under actual conditions. Such products must be evaluated for their ability to provide adequate performance for the given service life and conditions. Vendors must have their products tested and include the test results with their submittal for the following tests:
  - i. D1.4 – Gravitation Pendulum from Appendix D of NCHRP report 350 with an impact equivalent to 35 mph or higher. The results must indicate that the product,

under service conditions, will maintain its structural integrity during initial vehicle impact.

Test

- ii. ASTM D6108 – Compressive Properties of Plastic Lumber and Shapes.  
Minimum acceptable strength = 280 lb/in<sup>2</sup> average of the specimens
  - iii. ASTM G90 – Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight and ASTM D256 – Determining the Izod Pendulum Impact Resistance of Plastics. Perform in sequence where D256 is performed on exposed samples and unexposed control samples from G90 to indicate the affect of natural sunlight on the impact resistance of the product.  
The minimum impact value for the lowest returned value on the unexposed specimens must be greater than 55 J/m.  
The minimum impact value for the lowest returned value on the exposed specimens must not be less than 75% of the lowest value returned for the unexposed specimens.
- b. When used with wood posts on w-beam guardrail systems there must be a suitable method for preventing rotation of the offset block such as toe-nailing it to the post.
  - c. Vendors must provide the ASTM D-4000 classification for their product; the department may require different or additional tests accordingly. Vendors should provide an explanation if substituting any tests for those listed above, however, such substitutions should be rejected if, at the sole discretion of the department, the original or another test is more appropriate