

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

Position Paper for: Terminals for longitudinal traffic barriers
Last updated: June 3, 2009 AMENDED January 9, 2013

1. General.

- A. These products are subject to approval in accordance with NCHRP Report 350.
- a. Products submitted for approval as operational must have successfully completed the experimental phase of NCHRP Report 350 and the associated in-service performance evaluation reports must be included with the submittal.
 - i. The reporting agencies must be states or countries with climates, traffic velocities, environments, etc. such that the in-service performance evaluations were conducted in areas that represent the full range and diversity of the conditions found in Nevada.
 - ii. Differences will likely exist in the methods used by various agencies to conduct and report on in-service performance evaluations; the department will make a reasonable effort to use such information that is provided in an organized and verifiable format. The department reserves the right to accept or reject in-service performance evaluation reports and information at its sole discretion.
 - b. Products submitted for approval as experimental must be accompanied by a proposal that includes a detailed plan for conducting an in-service performance evaluation on Nevada's roads.
 - i. The department assumes no responsibility or obligation to participate in an in-service performance evaluation. In-service performance evaluations conducted on Nevada's roads are contingent on, and subject to, an agreement between the department and the vendor.
 - ii. In-service performance evaluations conducted on Nevada's roads must conform to NCHRP Report 490. Minor deviations can be stipulated in the in-service performance evaluation agreement as needed to accommodate law enforcement and departmental involvement.
 - iii. The costs of an in-service performance evaluation are solely the responsibility of the vendor.
 - c. Product submittals must include complete reports on the full scale crash testing required during the research and development phase. The associated videos must be provided on CDROM or DVD format; video tape will not be accepted.
- B. These products, when proliferated indiscriminately, have proven to be problematic with regard to the department's maintenance operations. Their evolutionary nature, combined with inherent similarities among the different products, makes it difficult for maintenance forces to correctly identify, repair and maintain the many different types of devices. A detailed description of this problem is contained in the department's 'Roadside Safety Hardware Selection Manual'.
- a. It is in the public interest to limit the types of this product allowed for use on Nevada's roads.
 - i. Keeping various types of these products in service is complex; limiting the types of these products appears to be the best, if not the only, way to overcome this complexity.
 - ii. These products must be correctly identified, repaired and maintained in order to function properly; otherwise, the product could exacerbate rather than mitigate a crash. The ability of the department's maintenance forces to effectively and efficiently accomplish this is relative to the number of different product types they must deal with.

2. Crash-cushions

- A. There are three basic types of proprietary crash-cushions:
- a. ~~Disposable crash-cushions are typically disposed of after a full impact; the sacrificial nature of the design requires replacement with another unit.~~
 - i. ~~Salvage and restoration operations are accomplished off-site.~~
 - ii. ~~Typically, the existing foundation or backing structure can be reused if replacing the device in-kind.~~
 - iii. ~~This type typically has low initial costs and high life cycle costs.~~
 - b. Rechargeable crash-cushions can typically be reused after a full impact; they are designed to be returned to full operational condition by replacing primary functional components (cartridges, etc.).
 - i. Full restoration can be completed on location with typical labor, material and equipment.
 - ii. This type typically has high initial costs and high life cycle costs.
 - c. Resettable crash-cushions can typically be reused after a full impact; they are designed to be returned to full operational condition without replacing primary functional components.
 - i. Full restoration can be completed on location with typical labor, material and equipment.
 - ii. The initial cost for this type varies from low to high and the life cycle costs are typically low.
- B. Nuisance damage from minor, or glancing, impacts can result in a performance failure of these products requiring a continuous monitor and repair program to preserve the investment.
- a. Products that are less prone to nuisance damage and/or are easier to repair than others are more desirable in this regard.

3. Guardrail end-terminals

- A. There are two basic types of proprietary guardrail end-terminals:
- a. Collapsible guardrail end-terminals are designed with components that break, bend, move, and otherwise yield in a sacrificial manner that prevents the guardrail from spearing the vehicle without exerting much resistance.
 - b. Energy absorbing guardrail end-terminals are typically designed to dissipate the energy of a vehicle by mutilating the guardrail beam as it's forced through an impact head.