

In-service Evaluation of Roadside Safety Features



Tennessee

CATEGORY: Design

ISSUE: Before a traffic barrier, a barrier terminal, or a crash cushion can be installed on any public road in Tennessee, these features must have passed standardized crash tests and be included on TDOT's Qualified Products List (QPL). Even so, each barrier type, terminal, and crash cushion has unique installation requirements, different crash performance, and varying degrees of required maintenance/repair during its service life. Unless information on these variables is uniformly collected and analyzed statewide, it is possible that the most cost-effective devices are not always selected for use at specific locations and that some devices may not be performing as well in the field as expected.

OBJECTIVE: To alert field personnel on the importance of collecting data on the performance and repair costs associated with safety hardware involved in a crash, as well as an assessment of possible installation issues. This in-service performance data should be routinely collected and summarized at the District level and periodically sent to the central office for review and analysis.

METHODOLOGY: TDOT currently requires a field review at locations where any serious crash involving roadside hardware has occurred. A similar review should be made at all sites where a barrier, terminal, or crash cushion requires repair following an impact. The type of information to be collected varies, depending on the type of feature impacted. Suggested data items to record for each feature are listed below.

TRAFFIC BARRIERS:

The primary traffic barriers used in Tennessee that require repair after a crash are cable barriers, W-beam guardrail, W-beam with rubrail, and Thrie-beam / Modified Thrie-beam. Each system can be used as a roadside barrier or as a median barrier. The following data items should be recorded when these barriers are damaged:

- Identify the type of barrier that was damaged.
- If there is a crash report available, obtain a copy to determine the extent of occupant injuries, the vehicle type and impact conditions (i.e., estimated speed and impact angle), and the final resting position of the vehicle. (If there is no police report, one may conclude the impact was minor and the vehicle was driven from the scene).



U.S. Department of Transportation
Federal Highway Administration



EXPECTED RESULTS:

The data collected in this state-wide effort will enable Design engineers to determine the effectiveness of current design standards and policies regarding the selection and placement of traffic barriers and end treatments, and the life-cycle costs of the numerous crash cushions approved for use in Tennessee.

- Did the barrier contain and redirect the impacting vehicle?
- Measure the distance from the edge of the travel lane to the face of the barrier and record any slopes from the edge of the shoulder to the barrier face.
- Record the height of the barrier upstream and downstream of the damaged area. For cable rail, identify the type of rail (manufacturer) and measure the height of each cable adjacent to the damaged section.
- If the barrier was shielding a vertical fixed object, record the available deflection distance.
- Record the extent of damaged rail to be replaced and the estimated cost to do so.

BARRIER TERMINALS:

The primary barrier terminals found in Tennessee include the BCT, the MELT, the SRT, the ET2000/Plus, the SKT, and the FLEAT. Note that the BCT is not a crashworthy design and the MELT is appropriate for use on new construction only on roads posted for 45 mph or less. The following data items should be recorded when these terminals are damaged:

- Identify the type of terminal damaged and obtain a copy of the crash report if one was completed.
- If there is a crash report available, determine the extent of occupant injuries, the vehicle type and impact conditions (i.e., estimated speed and impact angle), and the final resting position of the vehicle.
- Determine if terminal was installed as per manufacturers' instructions and TDOT specifications (e.g., flare rate, grading, runout area behind terminal, etc.).
- Identify any secondary impacts or rollover that may have occurred after impact with the terminal.
- Record the estimated cost to repair or replace a crashworthy terminal, or to upgrade any outdated terminal design.



BCT



MELT



SRT



ET2000/ Plus



SKT



FLEAT

CRASH CUSHIONS:

There are several types of crash cushions currently in use in Tennessee. Each is designed to decelerate a vehicle safely in an end-on crash and to direct a vehicle away from the shielded object in a side impact. The following data items should be recorded when a crash cushion is hit:

- Identify the type of crash cushion damaged and see if a crash report was completed.
- If there is a crash report available, obtain a copy to determine the extent of occupant injuries, the vehicle type and impact conditions (i.e., estimated speed and impact angle), and the final resting position of the vehicle.
- Identify any secondary impacts or rollover that may have occurred after initial impact.
- Record the estimated cost and time required to repair or replace the unit. Temporary shielding may be required.