



Florida Department of Transportation

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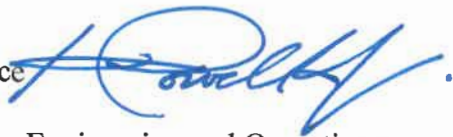
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JIM BOXOLD
SECRETARY

DISTRICT MAINTENANCE ENGINEER MEMORANDUM 17-01

DATE: January 17, 2017

TO: District Maintenance Engineers

FROM: Rudy Powell, Director, Office of Maintenance 

COPIES: Brian Blanchard, P.E., Assistant Secretary for Engineering and Operations
Courtney Drummond, P.E., Chief Engineer
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Tim Lattner, P.E., Director, Office of Design
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Mark Wilson, P.E., Manager, Program Management Office
Peter Loughlin, AMOTIA Executive Director

SUBJECT: Crash Cushion and Guardrail Approach Terminal In-Service Performance Evaluations

BACKGROUND:

On September 11, 2015, the Federal Highway Administration (FHWA) released the findings of the FHWA-AASHTO Joint Task Force in a report titled, "Report from Joint AASHTO-FHWA Task Force on Guardrail Terminal Crash Analysis." This report documents a joint effort between the FHWA and the American Association of State Highway and Transportation Officials (AASHTO) to assess the safety performance of extruding w-beam guardrail terminals. The press release and the report can be found using the following links.

<http://www.fhwa.dot.gov/guardrailsafety/safetyanalysis/>

<http://www.fhwa.dot.gov/pressroom/fhwa1561.cfm>

One of the recommendations in the findings was to conduct in-service performance evaluations of guardrail end terminals that have been installed on roads.

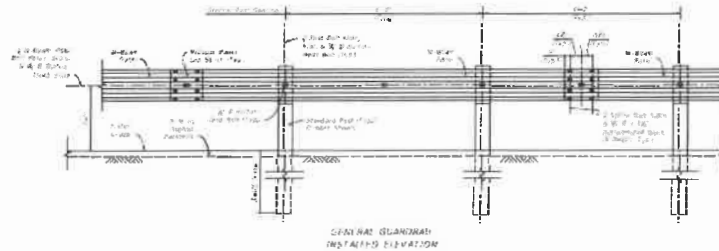
Guardrail terminals are frequently called guardrail end terminals, guardrail end treatments, guardrail approach treatments, and guardrail approach terminals. Based on the

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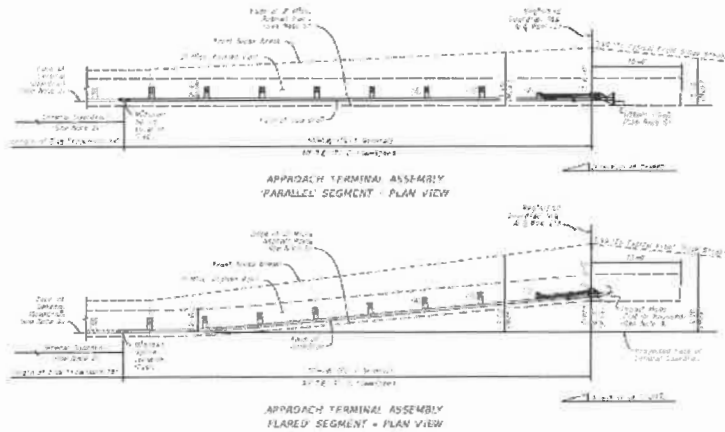
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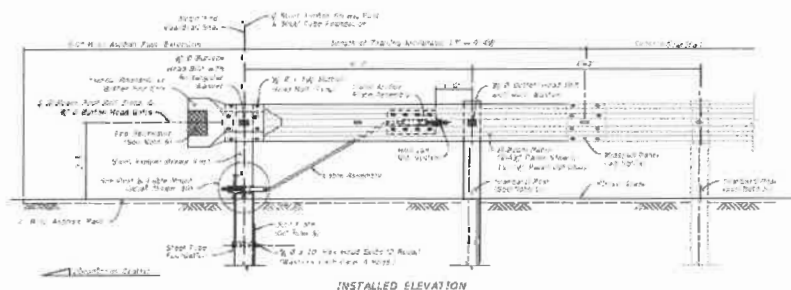
FDOT Design Standards, a typical guardrail system consists of a guardrail length of need segment or general guardrail; end treatments consisting of approach terminals, trailing anchorages, or both; and transition connections.



Guardrail Length of Need Segment



Guardrail Approach Terminal

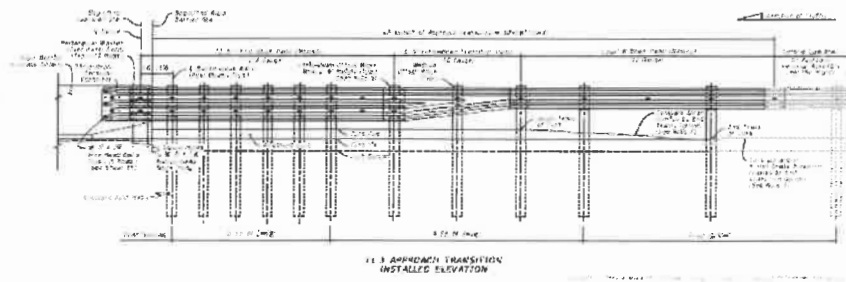


Guardrail Trailing Anchorage

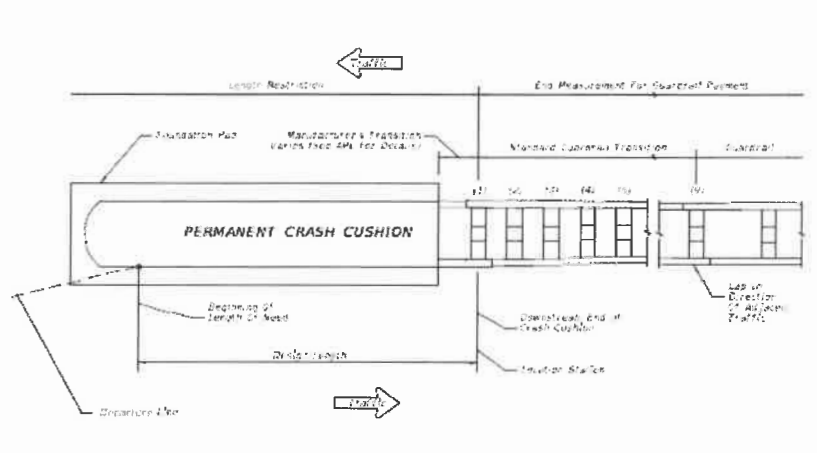
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Guardrail Transition Connection



Crash Cushion

Based on the recommendation in the FHWA-AASHTO Joint Task Force report, the Department will perform In-Service Performance Evaluations (ISPE) of crash cushions and guardrail approach terminals through the joint efforts of the Safety, Design, Program Management, Traffic Engineering and Operations, and Maintenance Offices.

ISPEs consist of three phases.

- Phase 1 is the collection of crash cushion and guardrail approach terminal inventory data.
- Phase 2 is the collection of incident data.
- Phase 3 is the evaluation of data collected from Phase 1 and Phase 2. This evaluation will be performed by a third party such as a university or research facility and is not anticipated to start for several years. No action is needed at this time.

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PROCEDURES AND IMPLEMENTATION:

This memorandum expands Procedure 850-050-003 Guardrail Inspection and Maintenance and Procedure 850-055-003 Attenuator Inventory and Inspection to incorporate the collection of guardrail approach terminal and crash cushion inventory and incident data as outlined in this memorandum. Both procedures will be updated accordingly following implementation and lessons learned from implementation. The implementation date for Phase 1 and Phase 2 of the ISPE process is February 1, 2017.

COLLECTION OF INVENTORY DATA:

Guardrail Approach Terminal Inventory Data. Initial guardrail approach terminal inventory data shall be collected by maintenance using in-house or contract forces as part of the guardrail inspection performed every two years. The inventory data to be collected is specified on the standard, statewide smart form and paper form developed by the Office of Maintenance. Maintenance in-house and contract forces shall use a mobile device and smart form to the largest extent possible. The paper form shall only be used as a back-up.

A district may choose to collect initial guardrail approach terminal inventory data using a separate activity if desired. The collection of inventory data is in addition to data collected as part of the Roadway Characteristics Inventory process. There are no changes to the Roadway Characteristics Inventory process.

The initial inventory data shall be updated when the guardrail approach terminal is replaced. The inventory data shall be reviewed and updated as needed during subsequent guardrail inspections.

Crash Cushion Inventory Data. Initial crash cushion inventory data shall be collected by maintenance using in-house or contract forces as part of the crash cushion inspection performed twice a year. The inventory data to be collected is specified on the standard, statewide smart form and paper form developed by the Office of Maintenance. Maintenance in-house and contract forces shall use a mobile device and electronic form to the largest extent possible. The paper form shall only be used as a back-up.

A district may choose to collect initial crash cushion inventory data using a separate activity if desired. The collection of inventory data is in addition to data collected as part of the Roadway Characteristics Inventory process. There are no changes to the Roadway Characteristics Inventory process.

The initial inventory data shall be updated when the crash cushion is replaced. The inventory data shall be reviewed and updated as needed during subsequent crash cushion inspections.

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COLLECTION OF INCIDENT DATA:

Incident data shall be collected by maintenance using in-house or contract forces as part of the typical incident response protocol. The incident data to be collected is specified on the standard, statewide forms developed by the Office of Maintenance. Maintenance in-house and contract forces shall use a mobile device and electronic form to the largest extent possible. The paper form shall only be used as a back-up.

If an incident occurs within the limits of a Traffic Management Center (TMC), the TMC shall determine if a crash cushion or guardrail approach terminal is impacted, and if so, shall notify the maintenance office contacts following the typical notification protocol and provide as much incident data as can be determined using the traffic cameras. The TMC shall capture still photo images of the incident using the traffic cameras and forward the photos to the appropriate maintenance contact via email within 24 hours. The TMC shall follow typical notification protocol for incidents not involving a crash cushion or guardrail approach terminal. The maintenance office shall follow typical incident response protocol.

If an incident occurs outside the limits of a TMC, law enforcement typically notifies the maintenance office contacts following typical notification protocol. The maintenance office shall follow typical incident response protocol.

Once at the incident scene, maintenance in-house or contract forces shall determine if a guardrail approach terminal or crash cushion is impacted and collect the incident data. The incident data should be collected before the vehicles involved in the incident are removed from the site, but at least prior to the repair or replacement of the crash cushion or guardrail approach terminal.

INVENTORY SMART FORMS AND INCIDENT ELECTRONIC FORMS:

The Office of Maintenance has developed two standard, statewide smart forms for the collection of inventory data using mobile devices. One smart form is used for the collection of guardrail approach terminal inventory data and one smart form is used for the collection of crash cushion inventory data. Both inventory smart forms use the Survey123 application for ArcGIS. The Office of Maintenance has also developed two standard, statewide electronic forms for the collection of incident data using mobile devices. One electronic form is used for the collection of guardrail approach terminal incident data and one electronic form is used for the collection of crash cushion incident data. Both incident electronic forms use the Collector application for ArcGIS.

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These smart forms and electronic forms allow inventory and incident data to be collected more efficiently in a paperless environment and to be submitted in real time to a statewide database in the cloud with reporting capabilities. These smart forms and electronic forms are device neutral so any mobile device, laptop computer, or desktop computer can be used.

The Office of Maintenance will develop and update standard smart forms and electronic forms for statewide use in the same manner standard paper forms are currently developed and updated. District specific forms shall not be created and used.

The Office of Maintenance is currently limited to 100 users of the smart forms and electronic forms as part of the FDOT ArcGIS Maintenance Group. This includes in-house and contract forces. The Office of Maintenance will work with each district to identify in-house and contract users. Individuals not identified as a user shall collect inventory and incident data using paper forms.

INVENTORY AND INCIDENT PAPER FORMS

The Office of Maintenance has developed one standard statewide paper form for the collection of inventory data when there is no mobile device, or specific to incident data collection, when there is no data plan or poor service. The paper form is available on the E-Maintenance website at <http://www.fdot.gov/maintenance/E-Maint/ISPE.shtm>.

SUPPORT FOR MOBILE DEVICES

Contact the Office of Information Technology (OIT). OIT will provide support for issues with or questions about mobile devices.

SUPPORT FOR PERFORMING INVENTORY AND INCIDENT DATA COLLECTION AND SMART FORMS

Contact the District Champion and refer to the online resources at <http://www.fdot.gov/maintenance/E-Maint/ISPE.shtm>. The District Champion is the first point of contact for issues with or questions about performing in-service performance evaluations. The Office of Maintenance is available to provide statewide support.