In-Service Performance Evaluation Resources (ISPE)

Federal Highway Administration Pilot In-Service Performance Evaluation of Guardrail End Treatments

The Federal Highway Administration (FHWA) Office of Safety Research and Development is conducting a pilot ISPE of the most widely used energy absorbing guardrail end terminals (GETs) in the United States, specifically: ET-Plus, ET-2000, Flared Energy Absorbing End Terminal (FLEAT), Slotted Kinking Terminal (SKT), Manual for Assessing Safety Hardware Slotted Kinking Terminal (MSKT), X-Lite, X-Tension, and Soft Stop. For each device, the evaluation will address:

- Crash performance in terms of vehicle occupant risk.
- The sensitivity to varying effects such as environmental conditions, site characteristics, and impact conditions.
- The degree of sensitivity to improper installation, maintenance and repair.

Data are being collected at test sites in four States that have agreed to participate in this pilot study: Massachusetts, Pennsylvania, California, and Missouri. This work is being done in cooperation with the National Highway Traffic Safety Administration (NHTSA), the Resource Center's Safety Technical Services Team, the Office of Safety and the division offices in each of the data collection States. The study is not collecting data across the entire State. The pilot study is only collecting data in a few State-selected regions. NOTE: Crash data collection indicates association with guardrail end terminals, not causality.

Detailed onsite investigations are being performed for fatal and serious injury producing crashes, generally within 24 hours of receiving notification of the crash, by NHTSA's Special Crash Investigation teams. The division offices, in cooperation with their State department of transportation (DOT) partners, are collecting data for the minor and property-damage-only (PDO) crashes.

Data collection is currently scheduled to run to 2019. Based on the number of crashes expected and based on historic trends, the current timeframe for completion will likely be insufficient to collect enough data to draw statistically significant conclusions about the safety performance of the devices. However, the study will identify current challenges to conducting effective in-service performance evaluations and recommend best practices for 1) the collection of real-time data on crashes involving roadside safety hardware, 2) interagency communication at the State level regarding crash reporting, and 3) data management regarding hardware maintenance and inventory.

Data collection consists of photographs and forms. Subject matter experts can use the information from the photographs and forms for analysis. The tables below include data from the State-designed collection areas and do not reflect all guardrail and end terminal data across the entire State. To download the data, go to the Download page. The data files are available for each State.

*Data collection concluded on January 25, 2019. Final reporting period through January 25, 2019.

Crash Type Distributions by State*

State	Coordinating Agency	Serious/Fatal	PDO/ Minor	Pilot Study Start Date	Full Study Start Date
California	Caltrans	4	129	7/1/2016	1/25/2017
Massachusetts	MassDOT	28	88	5/24/2016	5/24/2016
Missouri	MoDOT	47	94	11/13/2015	11/13/2015

Pennsylvania	PennDOT	9	90	2/15/2016	2/15/2016
Pennsylvania	PTC	6	22	5/1/2016	5/1/2016
Totals, by Severity		94	423		
Aggregate Total		517			

Crash and End Terminal Distributions*

Crash Type	Trinity Highway Products, LLC					Road Systems, Inc.			Lindsay Corporation			Total
	ET-2000	ET-Plus Unk	ET-Plus 4"	ET-Plus 5"	Soft Stop	FLEAT	SKT	MSKT	X-LITE	X-Tension	Max-Tension	
PDO	21	12	94	27	11	18	109	5	79	0	0	376
Minor	4	5	14	2	1	0	10	1	10	0	0	47
Serious	9	0	14	2	10	0	15	5	17	0	1	73
Fatal	0	1	8	1	0	2	4	0	5	0	0	21
Total	34	18	130	32	22	20	138	11	111	0	1	517

Note: Serious/Fatal crashes are disaggregated as fatal until the final crash report is produced. This will account for crash-related fatalities occuring within 30 days.

Crash and End Terminal Distributions by Agency Partners*

Agency/ Partner	Trinity Highway Products, LLC					Road Systems, Inc.			Lindsay Corporation			Total
	ET-2000	ET-Plus Unk	ET-Plus 4"	ET-Plus 5"	Soft Stop	FLEAT	SKT	MSKT	X-LITE	X-Tension	Max-Tension	
Caltrans/ MAIT/SCI	0	1	1	0	0	1	0	0	1	0	0	4
Caltrans	2	0	27	8	2	9	48	1	32	0	0	129
MassDOT/ CARS	1	0	6	0	0	0	2	3	15	0	1	28
MassDOT	0	0	26	1	0	0	9	5	47	0	0	88
MoDOT/ SCI	8	0	12	2	10	0	9	2	4	0	0	47
MoDOT	12	1	38	11	10	0	15	0	7	0	0	94
PennDOT/ SCI	0	0	1	1	0	1	5	0	1	0	0	9
PennDOT	11	16	16	9	0	2	33	0	3	0	0	90
PTC/ SCI	0	0	2	0	0	0	3	0	1	0	0	6
PTC	0	0	1	0	0	7	14	0	0	0	0	22

Total	34	18	130	32	22	20	138	11	111	0	1	517

Notes: Types of data coding adjustments include the following.

- Reclassification of end terminals or injury severity, based upon additional documentation submitted by partners.
- Deletion, based upon arrival of additional information, such as: subject matter experts may find that cases do not qualify because the photographed end terminal was repaired, and there is no documentation of what existed before a crash; redundant case information; or subject matter experts may find that the damaged end terminal was not an energy absorbing design and therefore not included in this study.
- Disqualification, based upon a non-passenger vehicle impact, such as farm vehicles and tractor trailers, for which the end terminals are neither designed nor tested.

PROJECT MANAGER AND POINT OF CONTACT

Ana Maria Eigen, D.Sc
FHWA Office of Safety Research and Development
ana.eigen@dot.gov

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Related Links

- Office of Safety Guardrail Resources
- ISPE Pilot In-Service Guardrail Performance Data Downloads

Contact Us

Turner-Fairbank Highway Research Center
United States Department of Transportation Federal Highway Administration
6300 Georgetown Pike
McLean, VA 22101
United States
TFHRC.webmaster@dot.gov

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