

## CRASH TESTING

### Description

Texas A&M Transportation Institute (TTI) researchers performing crash testing work closely with public agencies and private-sector companies on the design, construction, testing and evaluation of highway-safety and perimeter-security devices. TTI is recognized as a national leader, having conducted more than 2,000 full-scale crash tests, with vehicles weighing from 1,200 to 80,000 pounds.

Highway-safety devices, such as crash cushions, guardrails, breakaway signs and barrier systems, are developed to reduce injuries to occupants of vehicles that leave the road and could ultimately crash into a highway structure, tree or other roadside fixed object. Depending on the highway-safety device, it may be subjected to as many as eight different crash tests in accordance with the 2009 *Manual for Assessing Safety Hardware* (MASH).

Perimeter-security devices are developed to prevent or control vehicles entering or exiting sensitive sites, such as U.S. embassies, power plants, refineries and military installations. Homeland-security anti-terrorist, anti-ram structures are tested based on international standards, which were developed by American Standards and Testing International (ASTM), to prevent vehicle-borne terrorist threats.

In support of these research projects, TTI staff members fabricate prototype security devices and construct full-scale test installations. Researchers analyze and evaluate the data collected in the crash tests and prepare reports documenting the test procedures and results. Oftentimes, TTI's crash-test research products are used as marketing materials for the safety and security devices.

### Proving Grounds Research Facility

The crash tests are conducted at TTI's Proving Grounds Research Facility in Bryan, Texas. The facility was first established in 1965. Today, researchers conduct crash tests on a variety of new safety devices and barrier systems, with a wide spectrum of vehicles, ranging from subcompact cars and three-quarter-ton trucks, to 80,000-pound tractor-trailer rigs.

This facility is one of only three university-based centers of its kind in the United States. Researchers at the facility perform product testing for clients worldwide. An expanse of paved runways is ideally suited to perform full-scale testing of safety designs. Roadside devices, such as guardrails, crash cushions and barrier systems, undergo the substantial testing that is required before actual field implementation.

### Other proving-grounds facilities include:

- a 3.5-mile test track that permits simulation of freeway traffic conditions at speeds of up to 70 miles per hour and
- special pads designed for conducting tire-skid tests on road surfaces with various textures.



Homeland-security anti-terrorist, anti-ram structures and roadside safety devices are tested for durability at TTI's Proving Grounds Research Facility in Bryan.



High-tension cable rail



HEART® crash cushion



ET-Plus® guardrail treatment



Shallow-bollard barrier

## TTI-Developed Technologies

Texas leads the nation in highway-safety innovations along the interstate highway system, due in large part to the safety technologies developed through the years at TTI. These roadsides innovations save thousands of lives every year. Some notable devices include:

- The ET-Plus® guardrail treatment improves the chances of drivers surviving a run-off-the-road crash. This technology was commercialized by Trinity Industries, Inc.
- The TTI-developed breakaway sign support is designed to slip from its base at impact, allowing the vehicle to pass safely underneath.
- Cost-effective and easy to install, the ADIEM™ is a soft concrete crash cushion end treatment for concrete barriers that improves safety on busy roadways and in highway construction zones.
- The re-usable HEART® crash cushion is made of a group of “cells” that collapse on impact in an accordion-type fashion. After some crashes, the cushion expands back into place. As a result, the HEART® crash cushion is expected to have a longer life cycle than conventional crash cushions and require less maintenance.

The shallow-bollard, single-pier barriers and the surface-mounted wedge barriers, all developed for the U.S. Department of State, have simplified the construction of perimeter-security devices and allowed for easier installation around utility lines, sidewalks and other common obstacles.

## Cooperative Relationships and Sponsors

TTI conducts crash tests and evaluations for state highway agencies in a number of states, including but not limited to Texas, Florida, Washington, Pennsylvania, California, Louisiana, Minnesota, Ohio, Tennessee and Alaska. Projects are ongoing with a number of clients, including the National Cooperative Highway Research Program and organizations in several other countries.

To improve highway safety, TTI researchers work closely with the Office of Highway Safety at the Federal Highway Administration. In the area of homeland security, TTI conducts testing of anti-terrorist safety barriers for the U.S. Department of State, Bureau of Diplomatic Security, U.S. Army Corps of Engineers and private-sector companies.

## About TTI

TTI, established more than 60 years ago, is recognized nationally for its expertise in developing and testing highway-safety and homeland-security devices. The agency’s researchers have developed and evaluated a wide range of solutions to highway-safety problems, including crash cushions, breakaway signs, guardrails and barrier systems. In the last decade, TTI has expanded its research program to include barriers and structures designed to thwart potential terrorist attacks. TTI has successfully developed and evaluated new technologies resulting in the cost-effective implementation of devices and standards to improve roadway safety and keep our country safe from terrorists.

## TTI’S MISSION

*To solve transportation problems through research, to transfer technology and to develop diverse human resources to meet the transportation challenges of tomorrow.*

## Contacts

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