



VISIBILITY RESEARCH LABORATORY

According to the Federal Highway Administration (FHWA), about half of traffic fatalities occur at night, though only about 25 percent of all travel occurs after dark. Although driving while intoxicated or fatigued contributes to the high rate of nighttime crashes, nighttime driving is inherently hazardous because of reduced visibility for the driver.

About the Laboratory

Since 2009, the Texas A&M Transportation Institute (TTI) has provided advanced visibility testing through its one-of-a-kind Visibility Research Laboratory, part of the Institute's world-class research facilities. The lab is located in TTI's State Headquarters Building at The Texas A&M University System's RELIS Campus. The lab features a 140-foot-long by 15-foot-wide corridor for testing retroreflective materials as well as coatings, lights and other technologies designed to provide nighttime visibility. The lab also has ventilation systems to allow full-size vehicles to run in the lab while conducting human factors testing and evaluating installed headlamp illumination.

For the last 50 years, TTI researchers have conducted full-scale, closed-course nighttime driving studies at the A&M System's RELIS Campus. This outdoor facility allows for static and dynamic visibility and human factors research at speeds of up to 70 mph. The Visibility Research Laboratory complements this full-scale testing facility.

Using advanced technologies such as high megapixel imaging colorimeters and light detection and ranging (LIDAR), researchers perform photometric and color measurements of sign sheeting, raised retroreflective pavement markers and other retroreflective devices. The lab is equipped with a four-axis photogoniometer to rotate devices to specific measurement geometries. These instruments also allow photometric characterization of vehicle lighting systems.

About TTI's Visibility Research

TTI has a distinguished record of research and service in the areas of advanced traffic control materials and highway safety measures for nighttime travel. From more legible traffic signs to pavement markings visible at night in rainy conditions, TTI's research results are visible everywhere on our nation's roadways. TTI's research in these areas led to a new federal regulation for maintained retroreflectivity levels of traffic signs on all roads open to public travel.

Researchers at TTI also tested the only alternate font approved by the U.S. Department of Transportation (USDOT) for highway signs other than the original font developed more than 50 years ago. Scientists are also researching materials to find brighter and longer-lasting pavement marking materials that can withstand snow plows, studded tires, de-icing chemicals and pavement temperatures that can reach well above 150 degrees.



TTI's Visibility Research Laboratory enables testing of the retroreflective characteristics of signs and markings under standardized and real-world conditions.



LIDAR evaluation of traffic control devices.

Representative Sponsor List

- 3M
- AASHTO
- ASTM International
- Advanced Mobile Asset Collection
- American Glass Beads Manufacturers Association
- American Traffic Safety Services Association
- Avery Dennison
- DELTA
- Ennis Traffic Safety Solutions
- Evonik Industries
- FAA
- FHWA
- Potters Industries, Inc.
- State Departments of Transportation
- Trinity Industries, Inc.
- USDOT

Testing Opportunities

Private-Sector Examples

The Visibility Research Laboratory has been used to measure the visibility of traffic control devices (TCDs), retro-reflective and luminescent materials, and light sources such as work-zone lighting, light-emitting diodes (LEDs) and vehicle headlamps. Human factors studies have been performed in the laboratory to better understand how drivers interpret various TCDs, particularly new and innovative devices such as those enhanced with special visibility coatings or LEDs. Through the capabilities of the laboratory, TTI researchers can now build and calibrate unique data collection equipment to use in the field to evaluate in-situ nighttime visibility using measures such as retroreflectivity, illuminance, luminance and glare.

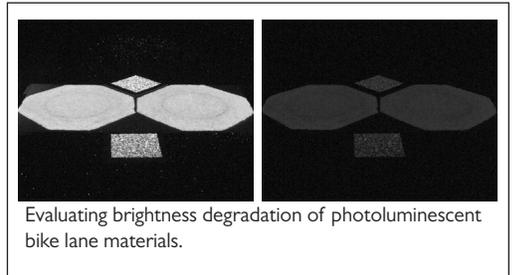
TTI has done a variety of testing for private-sector sponsors, such as measuring the performance of innovative coatings to enhance nighttime visibility and the performance of various retroreflective optics at standard and non-standard measurement geometries. The laboratory has also supported the testing of mobile pavement marking and sign retroreflective technologies. Public-private partnerships have emerged as a result of testing conducted in the laboratory.

Public-Sector Examples

State agencies also use the laboratory in their visibility research efforts. The Texas Department of Transportation has sponsored several research projects, including the study of LED-enhanced TCDs. The Florida Department of Transportation sponsored a project in which researchers measured the effectiveness of steady-burn work-zone channelizer lights. For the Alaska Department of Transportation, researchers built, tested and calibrated specialized data collection equipment to assess the visibility of pavement markings along lit and unlit sections of roadways. Other research conducted in the lab has included an accelerated pavement marking wear protocol as well as a new test method for assessing glass beads.

The FHWA has used research findings from the laboratory to support new regulations on minimum maintenance levels of retroreflectivity for traffic signs. Federal pavement marking and sign sheeting specifications have been updated with research results produced in the laboratory. Testing results from the laboratory have also been used to support the development of ASTM International and AASHTO specifications.

Researchers recently supported the Federal Aviation Administration's work developing a mobile phone application to assess pavement marking visibility by evaluating pavement markings at a range of airplane geometries.



About TTI

The Texas A&M Transportation Institute, established in 1950, seeks solutions to the problems and challenges facing all modes of transportation. The Institute works on over 700 research projects with over 200 sponsors in the United States and abroad at all levels of government and in the private sector. TTI is recognized as one of the finest higher-education-affiliated transportation research agencies in the nation. TTI has saved the state and nation billions of dollars through strategies and products developed through its research program. TTI research has a proven impact — resulting in lives, time and resources saved.

TTI's Mission

TTI delivers practical, innovative and sustainable solutions to improve the movement of people, data and goods through research, education and technology transfer.

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Evaluating TCDs in the lab.