



Project Summary

Texas Department of Transportation

0-4823-CT: Mechanical Anchors for Retrofit/Repair of Bridge Rails

Background

Bridge rails (also referred to as “barriers”) are a very important part of overall design for highway safety because they must withstand the impact of an errant vehicle and safely direct that vehicle back onto the roadway without injury to the vehicle’s occupants. The Federal Highway Administration requires that barriers meet the strict testing and performance standards of the National Cooperative Highway Research Program’s (NCHRP) *Report 350* (1993).

When an errant vehicle hits a barrier, the barrier may be damaged. While lightly damaged barriers can be repaired, those that are severely damaged must be rebuilt. The purpose of this research project was to develop designs of retrofit (replacement) barriers that satisfy the Texas Department of Transportation’s (TxDOT’s) performance requirements, using mechanical anchors. This approach is potentially much more cost-effective and much faster than replacing a damaged or obsolete section of barrier with the same type of new construction.

What the Researchers Did

The researchers:

- Designed, built, tested and verified an impact pendulum to meet the NCHRP *Report 350* requirements.
- Developed state-of-the-art computer models to simulate vehicle impact on real barriers.
- Developed retrofit designs for two common TxDOT barriers: the T203 barrier (an intermittent concrete barrier) and the T501 barrier (a continuous concrete barrier), using bolt-through mechanical undercut anchors.
- Used pendulum testing to verify that each kind of retrofit barrier could meet TxDOT performance criteria .
- Verified the state-of-the-art computer models and used them to predict the performance of the retrofit barrier designs under the impact of different kinds of real-world vehicles.

Research Performed by:

Center for Transportation Research (CTR),
The University of Texas at Austin

Research Supervisor:

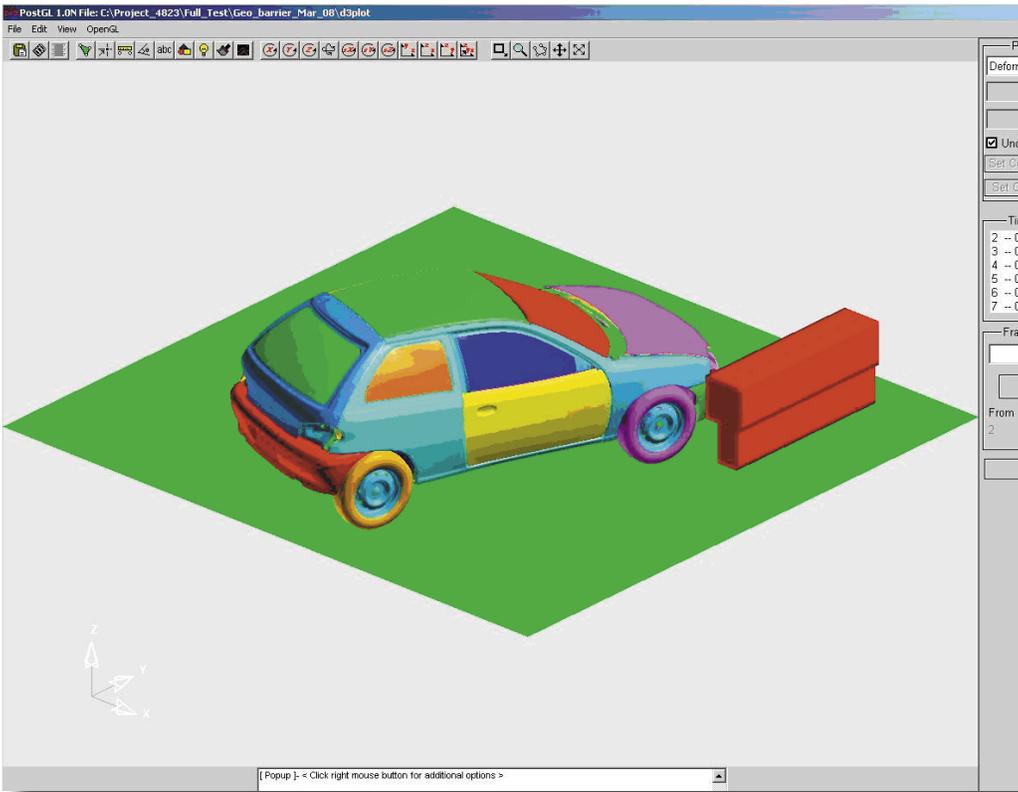
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Researcher:

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Project Completed:

8-31-06



State-of-the-art computer models used to predict the performance of retrofit barrier designs under the impact of different kinds of real-world vehicles.

What They Found

The researchers found that the proposed designs for the retrofit T203 and T501 barriers met the TxDOT-prescribed performance standards and can safely be used to replace severely damaged barriers.

What This Means

The findings of this research are important to TxDOT for two primary reasons:

- The retrofit (replacement) barriers, held to the deck with mechanical undercut anchors, are safe, cost-effective and fast to install.
- Instead of having to test or verify proposed barrier designs by expensive crash testing alone, TxDOT can use a combination of pendulum testing and computer simulation to get good initial designs in a very cost-effective way. Crash-testing is required only for proof testing of the design.

For More Information:

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