Texas A&M Transportation Institute

Texas Department of Transportation

PROJECT SUMMARY REPORT

0-6994: Develop a Retrofit Design for Guard Fence System to Enhance Motorcycle Safety

Background

Motorcyclists are among the most vulnerable users of the roadway system. The appropriate design of roadside safety systems plays an important role in the severity of injuries caused by motorcycle crashes. Recent data suggest that the number of fatalities related to motorcycle impacts against guard fences was greater than the number of fatalities recorded from passenger car impacts against the same roadside safety devices.

Although there are no guidelines addressing the proper testing and use of motorcycle retrofit barriers, there was a need to develop an appropriately designed guard fence system retrofit to address motorcycle-rider fatalities associated with barrier impacts in which the rider is either in a sliding or upright position. Guidance was also needed to identify the appropriate roadway locations for installation of a motorcycle-friendly device.

What the Researchers Did

A retrofit design was developed and evaluated to improve safety for motorcyclists impacting guard fence systems. Finite element computer simulations were used to evaluate and optimize the crashworthy performance of the design for motorcyclist and vehicle impacts. Full-scale crash tests were conducted to verify the performance of the system for motorcyclist and vehicle impacts.

An analysis of motorcyclist crash data was performed to identify characteristics associated with motorcyclist crashes involving guard fence contact. Based on this analysis, guidance was developed for placement of the retrofit system at appropriate high-speed roadway locations that are more likely to be associated with motorcycle impact fatalities and severe injuries.

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What They Found

The retrofit guard fence system met the performance criteria for *Manual for Assessing Safety Hardware* (MASH) TL-3 and indicated the ability to prevent motorcyclist interaction with sharp and blunt elements of a guard fence system during upright and sliding impacts.

Sites were identified for high-risk motorcyclist crash locations that would benefit from the implementation of the retrofit guard fence system.

What This Means

The developed retrofit guard fence system is suitable for implementation on roadways. The implementation of this device will improve motorist and motorcyclist safety. This device is being implemented through the development of new standard detail sheets.

For More Information

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