Title:	Development of a MASH Test-Level 4 Compliant Guardrail
The Problem:	Guardrails are commonly used to shield the motoring public from roadside hazards (e.g., drops, ditches, trees, poles) and prevent errant vehicles from impacting them. In case a vehicle leaves the roadway, they contain and redirect the vehicle. Guardrails are designed to meet crash safety requirements specified in AASHTO's Manual for Assessing Safety Hardware (MASH). Due to differences in the types of vehicles, roadway volume, and roadside hazards, MASH provides different test levels for assessing safety hardware such as a guardrail. For typical high-speed roadways with mostly passenger vehicles, Test Level 3 of MASH is used. This involves crash testing the guardrail with a small passenger sedan and a pickup up truck. However, for roadways that experience high percentage of freight vehicles such as single unit trucks, MASH Test Level 4 (TL-4) or higher should be used. MASH TL-4 requires testing the guardrail with a single unit truck in addition to the small passenger sedan and the pickup truck. TxDOT currently requires that all bridge rails meet MASH TL-4 requirements. This is due to greater hazard of a vehicle overriding the bridge rail. Other than the bridges, high-speed roadways generally use guardrails that are designed and tested for MASH Test Level 3 (TL-3). Currently, there is a lack of public domain MASH TL-4 guardrail. Some concrete barrier designs, which can also be used on roadsides, are MASH TL-4 compliant; however, being significantly more expensive than metal beam guardrails, these designs are generally very cost prohibitive for large scale implementation. Several corridors in Texas are known to experience a larger percentage of freight and truck traffic. In these corridors, safety of the motoring public can greatly benefit from the use of a MASH TL-4 compliant guardrail system.
Technical Objectives:	The objective of this research is to develop a metal beam guardrail system that meets MASH TL-4 testing requirements. The researchers shall address the following: 1. Develop three preliminary design concepts of guardrail systems with potential to meet MASH TL-4 testing requirements for a small car, pickup truck, and single unit truck. 2. Simulate all three impact test scenarios required by MASH TL-4. 3. Using the results of the simulations, make changes to the new guardrail design, if needed. 4. Construct prototypes of the new guardrail for crash testing. 5. Conduct crash tests with a small car, pickup truck, and single unit truck under MASH TL-4 testing requirements. The expectation of this project is that the end product will obtain a TRL level 8.
Desired Deliverables:	1. Technical memorandum for each task completed. 2. Monthly progress reports. 3. Value of Research (VoR) that includes both qualitative and economic benefits, to be included in the final research report. 4. Research report documenting the findings of the research, including detailed engineering drawings of the new MASH TL-4 guardrail system. 5. Project Summary Report.
Proposal Requirements:	1. Utilize the “Proj/Agre” and “PA_Form” templates located at the TxDOT RTI website. 2. Proposals will be considered non-responsive and will not be accepted for technical evaluation if they are not received by the deadline or do not meet the requirements stated in RTI's University Handbook, which is also located at the RTI website. 3. Proposals should be submitted in PDF format, 1 PDF file per proposal. File name should include project name and university abbreviation. 4. This project will be tracked during the life of the project using a Technology Readiness Level (TRL) scale. For more information about the use of a TRL, click.