Roadside Safety Pooled Fund

Research Problem Statement

Project Title:	**Barrier Deflections at Lower Speeds – Phase I (**2023-02-LCB/LSRB**)**
Project Synopsis:	There is a need for State DOT's and other municipalities to have accurate deflection distances of barrier systems when a vehicle hits them at lower speeds. It stands to reason that if an impacting vehicle hits the barrier system at a lower speed then the barrier will deflect a shorter distance. This project will create a synthesis report compiling the deflection distances of MGS guardrail (semi-rigid) and F-Shape/New Jersey (rigid) barrier systems at posted speeds less than TL-3, 62 mph for Agency use. It is understood that there are crash tests/computer simulations/reports located in different reports/publications – the focus of Phase I of the project is to find and compile all known barrier deflections at lower speeds and provide recommendations for computer simulations/crash tests (if needed) for Phase II of the project for any missing deflection data. Phase I of the project will: • Conduct a comprehensive literature review of past crash tests/studies of MGS, F-Shape, and NJ barrier deflections at lower speeds • Conduct a survey with pooled fund states to determine what types of barrier they are most interested in finding deflection distances for, what lengths of concrete barrier segments they are most interested in, and at what vehicle impact speeds they are most interested in. Update project goals as needed depending on survey results. • Provide any known deflections of these three barrier types at lower speed limits found during the literature review, post member states survey results, and give recommendations for crash tests/computer simulations of low speed deflection distances for all barrier types chosen by the pooled fund states needed for Phase II of the project. Below are links to some literature concerning barrier deflections at lower speeds: MGS Guardrail: https://mwrsf.unl.edu/researchhub/files/Report307/TRP-03-314-15.pdf F-Shape Barrier: https://mwrsf.unl.edu/q&a/view.php?id=1505 F-Shape Barrier: https://mwrsf.unl.edu/reportResult.php?reportId=243&search-textbox=concrete%20barrier
Project Goal(s):	1.) If pooled fund survey supports, determine MGS guardrail deflection distances when impacted at speeds of 25 mph, 35 mph, 45 mph 2.) If pooled fund survey supports, determine temporary unanchored F-Shape Barrier deflection distances when impacted at speeds of 25 mph, 35 mph, 45 mph 3.) If pooled fund survey supports, determine temporary anchored F-Shape Barrier deflection distances when impacted at speeds of 25 mph, 35 mph, 45 mph 4.) If pooled fund survey supports, determine temporary unanchored NJ Barrier deflection distances when impacted at speeds of 25 mph, 35 mph, 45 mph 5.) If pooled fund survey supports, determine temporary anchored NJ Barrier deflection distances when impacted at speeds of 25 mph, 35 mph, 45 mph *** Note: Embedded Single Slope barrier has little to no deflection at speeds of 62 mph, therefore it is not necessary to include this type of barrier in the project.*

Project Background:	State DOT's and other municipalities are often required to permanently install barrier on lower speed roadways, and temporarily install portable concrete barrier in lower speed work zones. Low speed roadways or work zones are often located in constrained areas where there is little available clear space behind barriers to accommodate their deflections. Most, if not all, DOT's provide barrier deflection distances based off Test Level 3 high speed conditions (62 mph impact speed) and have policy to require clear areas behind barrier for deflection distances that are greater than what may actually be needed along a low speed roadway.
Proposed Work Plan:	1.) Task 1 – Literature review/research for crash tests, computer simulations, and reports of MGS guardrail, F-Shape barrier, and NJ Barrier at lower speeds than 62 mph 2.) Task 2 – Conduct survey with pooled fund states to determine which types of barrier are of most interest to them for the study, lengths of concrete barrier segments, and at what speeds are of most interest to them. 3.) Task 3 – Prepare a final report for Phase I. Compile listings of known barrier deflection at lower speeds from the past crash tests/computer simulations/studies. Provide recommendations for computer simulations and/or crash testing needed in Phase II of project to provide a complete compilation low speed barrier deflections
Deliverables:	Final project report compiling any known deflection distances of MGS guardrail, F-Shape barrier, and NJ Barrier at lower speeds which were found in past studies/computer simulations/crash tests, a summary of the survey to pooled fund states, provide recommendations for any required computer simulations/crash tests to complete the list of barrier deflections at various low speeds required for Phase II of project, and Phase II project estimated cost and schedule.
Urgency and Expected Benefit:	A successful project will give Agencies a comprehensive listing of barrier deflection distances at lower speeds available in a single document. If the deflection distances are lower as expected, it will give Agencies more flexibility in designing roadways/work zones in constrained areas.
Problem Funding and Research Period:	**Total Estimated Cost = TBD** **Research Period = TBD**
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