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| **Roadside Safety Pooled Fund Program** **Problem Statement/Research Proposal** | State:  Louisiana 2015 – **LA-77** |
| Title:  MASH Simulations and Full-Scale Crash Testing of Stacked W-Beam Transition for 31” Guardrail | |
| Problem Statement:  A stacked W-Beam guardrail transition to a bridge rail has been successfully tested in accordance with the NCHRP Report 350 criteria with a guardrail height of 27 5/8” (FHWA Eligibility Letter B-65). This transition uses a nested w-beam to stiffen the rail and a w-beam rub rail to reduce the potential for snagging on the end of the bridge rail. Many states are raising the height of their w-beam guardrails to 31” to improve its performance. Several transitions have been tested for the 31” guardrails that use a thrie beam rail and a thrie beam to w-beam reducer section. A Stacked w-beam transition is desired for the 31” guardrail systems as it a simpler method of transition without unique rail elements. In a previous effort, the height of the original 27 5/8” stacked W-beam transition was raised to 31” and crashworthiness of the article was evaluated through finite element analyses according to NCHRP Report 350 criteria. Two possible designs were investigated through computer simulations and results in both cases suggested that both designs might not meet the NCHRP Report 350 crashworthiness requirements due to severe snagging of the vehicle against the rigid parapet to which the transition is connected. Snagging occurrence was related to the relative height of the vehicle frame rail which did not allow the frame to fully engage with the top nested rail sections during the impact event.  Due to the difference in frame rail height geometry, researchers suggest investigation of the 31-in stacked w-beam transition designs crashworthiness with the 2270P MASH pickup truck vehicle model. The 2270P frame rail top height is approximately three inches higher than the 2000P frame rail. That could suggest that the 2270P frame rail might be able to better engage the top nested w-beam section of the article, reducing the probability of vehicle snagging against the rigid parapet. Such investigations would have to be evaluated under a study using MASH criteria. This would have the potential to suggest a 31-in stacked w-beam transition prone to meet MASH crashworthiness criteria.  If needed, design modifications would be applied to the test article and evaluated according to MASH criteria through FE analysis.  Results of computer simulations will suggest 31” stacked w-beam transition design for full-scale crash testing according to MASH criteria to pursue FHWA eligibility letter on the test article. | |
| Objectives of the Study:  Finite element computer analyses and full-scale crash testing of the 31” Stacked W-Beam transition in accordance with MASH criteria. | |
| Expected Benefits:  This analysis would provide a stacked w-beam transition option as a candidate to meet the current MASH crash test criteria. This transition would be simpler than thrie beam designs and would not have the unique reducer section. | |
| Description of the Proposed Feature to be Tested: *(Be as detailed as possible. Include drawings and/or plans, if available.)*  See detail from WSDOT Standard Plan C-25.18-02 | |
| Estimated Cost *(of the feature per linear foot installed):*  $xx,000 | Total Estimated Cost of Crash Test:  $xx,000 |
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