Seismic Connection Bridge Detail for Across-the-Board Soil Site Class

Dr. Thomas Attard, University of Alabama at Birmingham, 205 - 934 - 8436, thoma1@uab.edu

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Abstract/ Objectives:
The objectives of this funded research are to:

1. Develop seat width reinforcement detail, including width detail, that utilizes new generation Hybrid-polymeric Matrix Composite system (HMC) formulated to provide tremendous energy dissipation and ductility, thus accommodating necessary plastic hinge length development for any soil site class and satisfying AASHTO LRFD in Alabama highway earthquake bridge design.

2. Identify appropriate horizontal connection design forces in substructure-superstructure reinforcement details for any SDC value and soil site class using proposed HMC system in Objective 1.

The research is directly related to previous studies by PI Attard with a ready-to-use design methodology for manufacturing the suggested new generation HMC system to add energy absorption/dissipation and ductility to seat width detail and recalculate smaller horizontal design load. Previous related work includes:

a) “Development and Application of HMC Composite for Structural Damage Mitigation and for Sustainable High Strength and Energy Dissipation”

b) “Multi-scale modeling and testing of a multi-phased hybridized polymeric matrix composite tuned to achieve optimal impact resistance, damping, and fracture toughness in the design of various structural systems in compliance with standards for safety and performance metrics”

c) “Continuation of HMC Composite to Seismic Damage Mitigation of Wood-Frame Structures and Extension to Storm Shelters in Level-5 Tornado Regions utilizing a tremendous Energy Dissipation Mechanism to Resist High-Impact and Debris Loading”