UTC Project Information

Project Title	MPC-651 – Development of LRFD Recommendations of Driven Piles on Intermediate Geomaterials
University	University of Wyoming
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Start and End Dates	May 7, 2021 to July 31, 2022
Brief Description of Research Project	Many piles in the Rock Mountain region are driven on Intermediate Geomaterials (IGM). IGM is a transitional geomaterial between soil and hard rock, which is not well defined for the design and construction of driven piles. Reliable static analysis methods have not been developed to estimate the pile resistance on IGM. The resistances of piles driven on IGMs are currently determined using dynamic analysis or static load test methods during construction. These limitations reduce the accuracy of pile resistance estimation, result in lower LRFD resistance factors, and eventually increase the construction cost. The proposed research is to develop the Load and Resistance Factor Design recommendations of driven piles on IGMs. The research objectives are to 1) develop advanced static analysis methods for pile resistance estimation on IGM, 2) validate and improve the accuracy of dynamic analysis methods, 3) develop LRFD resistance factors for piles on IGM, and 4) recommend changes and improvements to current pile design and construction practices. The research objectives will be accomplished from seven

	tasks: data collection, electronic database development, data assessment, pile resistance estimation, LRFD resistance factor calibrations, LRFD recommendations and reporting.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	The research outcomes in terms of geomaterial classification methods, new static analysis methods to predict pile resistances in IGMs, improved wave equation analysis method and calibrated LRFD resistance factors will be implemented by the state DOTs to improve the design and construction of driven piles in IGMs.
Impacts/Benefits of Implementation (actual, not anticipated)	The recommendations developed from this research will improve the design efficiency of the driven pile foundations for bridges. Also, the outcomes will improve the construction control of driven piles during construction and reduce the events of unacceptable piles, early refusal, cost overrun due to longer pile penetration and unpredictable variation orders. The discrepancies between design and construction can be minimized.

Web Links
    • Reports
    • Project Website
	• MPC Research Report – Development of LRFD Recommendations of Driven Piles on Intermediate Geomaterials
	
	• Journal Paper – Driven Piles in Fine-Grained Soil-Based Intermediate Geomaterials
	
	• Journal Paper – Improved Wave Equation Analysis of Steel H-Piles in Shales Considering LRFD and Economic Impact Studies
	
	• Journal Paper – Prediction of Driven Pile Resistances in Shales Considering Weathering and Time Effects