UTC Project Information

Project Title	MPC-550 – Safety Support System for Highway-Rail Grade Crossing
University	North Dakota State University
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Total Project Cost	$150,336
Agency ID or Contract Number	69A3551747108
Start and End Dates	December 1, 2017 to July 31, 2023
Brief Description of Research Project	This research is to develop a safety support system for improvement-resource allocation decision making. There are several critical components. Defining safety performance index is essential, therefore, forecasting models or priority ranking techniques can be utilized to rank the crossings that are not only the "hazard" crossings but also can benefit the most from improvements. A systematic method for identifying and ranking crossings for safety or operational improvement is necessary for an explicit decision making process to improve HRGC. The most common approaches to identify the crossings for safety improvement is the hazard index technique. A hazard index is utilized to calculate a value that ranks crossing in relative terms with a higher index associated with a more hazardous crossing while evaluating mainly on fixed effects of traffic exposure factors, travel speed factors, and accident history. Few existing formula also looked at train tracks and lane count factor. Protection factors. None of the existing formulae takes into consideration of

	both crash frequency estimates and the severity of crashes. Moreover, the existing hazard index approach could not truly identify the most dangerous crossing with limited site indicator factors and could not identify the crossings, which will benefit the most from available improvement activities. In other words, few research aggregate frequency and severity forecasts to estimate crossing hazard. Even with the aggregated hazard measure, hazard alone cannot help decision maker to allocate resources effectively and efficiently. To understand how effective each engineering countermeasure to improve safety performance and reduce hazard at grade crossings is very critical for safety improvement decision-making. Therefore, analyze the potential effectiveness of crossing devices treatments based on specific attributes of each crossing is another critical research focus of the study.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	US DOT adopted the research results in the Crash Modification Factors (CFM) clearinghouse for railroad grade crossings at https://www.cmfclearinghouse.org/results.cfm?qst=. Our results are being shared under the 1) install stop sign, 2) install standard flashing lights, and 3) install audible devices category. The CMFs from this Feds hosted website are used by state and local agencies for their grade crossing safety improvement decision makings throughout the entire United States. In addition, the use of those factors from this website is recommended in USDOT's Benefit-Cost Guidelines and state or local agencies may use these factors for CRISI grant proposals for conducting the B/C analysis selection.
Impacts/Benefits of Implementation (actual, not anticipated)	Our results are being shared under the 1) install stop sign, 2) install standard flashing lights, and 3) install audible devices category. The CMFs from this Feds hosted website are used by state and local agencies for their grade crossing safety improvement decision makings throughout the entire United States. In addition, the use of those factors from this website is recommended in USDOT's Benefit-Cost Guidelines and state or local agencies may use these factors for CRISI grant proposals for conducting the B/C analysis selection. Our results will assist agencies to conduct analysis and make at-grade crossing safety improvement decision makings.

Web Links
    • Reports
    • Project Website
	• MPC Research Report – Safety Support System for Highway Rail Grade Crossings