ARDOT TRC TRANSPORTATION RESEARCH COMMITTEE

**Problem Statement No.** 10

## Research Problem Statement

**Date:** 10/19/2021 **Project Area:** Planning

**Title:** Development of Quantitative Approach to Systemic Safety Analysis

**Problem Statement:**

Recognizing the complex character of road safety causes and effects, today more and more indicators are used to measure factors contributing to traffic accidents. Traditional approaches to address safety issues, followed by ARDOT's Highway Safety Improvement Program (HSIP), focus on identifying high-crash location, or "hot-spots", and implementing projects to address predominant concerns at these locations. Highway safety managers find that the search for "hot-spots" leads to identification of locations that experience multiple crashes due to random occurrences. The issue is that for random occurrences it is difficult, if not impossible, to identify mitigative solutions that transportation agencies can address. Many short-term (one to three years) crash patterns would not recur, even if no improvement were made. On the other hand, transportation agencies are interested in and can have more impact by addressing locations where crashes occur due to systemic design, operations, and/or management issues related to safety. This problem is not unique to ARDOT, and, in fact, the Office of Safety of FHWA has developed a systemic safety analysis method. However, their developed method does not address the Arkansas specific needs. The purpose of this project is to develop quantitative approaches to systemic safety analysis that focus on identifying locations at which ARDOT can make the most impactful investments in design, operations, and management. As an alternative (or supplement) to the "hot-spot" approach, the proposed approach to be investigated in this work is intended to help ARDOT make safety investment decisions that are based on estimates of long-term average crash frequencies rather than short-term random fluctuations in crash frequencies.

**Potential Solution to Problem:**

The objectives of the project are to: i) develop data-driven quantitative approaches to systemic safety analysis, ii) develop tools to support quantitative systemic safety analyses. The tasks associated with these objectives are to: (a) gather historical crash data, (b) estimate multiple regression models to predict crash occurrence based on locational factors, (c) develop new tools (e.g., spreadsheet based) to allow for data entry, report output, and integration with other ARDOT's safety management approaches, and (d) test new tools with the Transportation Planning and Policy Division/Traffic Safety Section. The research will be implemented as a tool that takes roadway inventory, traffic volume, and crash data and will be adaptable based on available data. A user-manual detailing tool protocols will also be developed.

**Estimated Project Duration:** 24 **Months**

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| Standing Subcommittee Ranking | Advisory Council Ranking | Statement Combined with Statement Number(s) |
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