Highway-Rail Grade Crossing Safety and Prioritizing Model Development

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INTRODUCTION

- The United States Department of Transportation (USDOT) provides funding assistance to state departments of transportation to implement highway-rail grade crossing improvement programs;
- There is a variety of formulas developed for ranking highway-rail grade crossing hazard indices or collision prediction;
- Efforts to enhance prioritization programs have led to investigation into the efficiency of current methods employed by state DOTs;
- Using the accident prediction model, employed by TDOT, two different approaches will be developed.

LITERATURE REVIEW

1) 3 States conducted a comprehensive research on accident prediction used by DOTs: Virginia (1996), Illinois (2000), Missouri (2003);
2) Review of scientific research in three categories: accident prediction formulas; countermeasures; resource allocation.

FRA PROCEDURE

FRA procedures include:
- Accident prediction equations;
- Accident severity equations;
- Resource allocation procedure;
- GradeDec Software and equations;
- There is a variety of formulae developed for ranking highway
- Fatality

Mathematical Model (MM)

MODEL DEVELOPMENT

All Tennessee public at-grade rail crossings are considered (information from TRIMS database).

Two different approaches are proposed:
- Sorting Algorithm (SA);
- Mathematical Model (MM);

The sorting procedure (SA) included the following: a single objective function: a) e/c ratios;

The mathematical model (MM) is more efficient than SA, because MM provided greater accident reduction than SA. Sensitivity Analysis has been conducted for the budget range $200,000-$4,200,000.

SENSITIVITY ANALYSIS

For a given input data with budget available of $2,500,000 MM outperformed SA. Sensitivity Analysis has been conducted for the budget range $200,000-$4,200,000.

Mathematical Model (MM)