Adding Faculty in the Areas of Transportation – Engineering Management

by

Brian Smith
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| 16. Abstract           | This funding enabled the project entitled, “USING HISTORICAL CRASH DATA AS PART OF TRAFFIC WORK ZONE SAFETY PLANNING AND PROJECT MANAGEMENT STRATEGIES” to address the following:  
- Evaluate current organizational strategies with respect to work zone management  
- Identify factors that improve work zone safety for both work zone personnel and general public.  
- Statistical Analysis of Historical Crash Data |
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USING HISTORICAL CRASH DATA AS PART OF TRAFFIC WORK ZONE SAFETY PLANNING AND PROJECT MANAGEMENT STRATEGIES

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Project Introduction

- Evaluates current organizational strategies with respect to work zone management
- Identifies factors that improve work zone safety for both work zone personnel and general public.
- Statistical Analysis of Historical Crash Data
Project Task Presented

• Hazard and risk analysis using historical data
  – Analysis of crash records from 2009 - 2011
  – Descriptive statistics and ANOVA

• Integrated with other tasks to create organizational management strategy for MoDOT and other transportation management agencies
Work Zone Safety in Missouri

• From 2009 to 2011
  – 40 work zone crashes resulting in fatalities
  – 239 work zone crashes resulting in disabling injuries
Greatest Contributing Factors to Work Zone Crashes Involving Fatalities and Serious Injuries in Missouri

- Run-Off-Road
- Horizontal Curves
- Intersection
- Tree Collisions
- Head-On

Percent

Fatalities
Serious Injuries
Driver Characteristics of Work Zone Crashes Involving Fatalities and Serious Injuries in Missouri

Fatalities  Serious Injuries

Percent

Unrestrained Occupants
Distracted Drivers Involved
Young Drivers Involved (15-20)
Substance-Impaired Drivers
Unlicensed, Revoked, or...
Lighting Conditions of Work Zone Crashes in Missouri

- **Percent**
  - Daylight
  - DarkLt. On
  - DarkLt. Off
  - DarkNo Lts.
  - Indet.

- **Crashes**
  - Fatal
  - Disabling Injury
  - Minor Injury
  - Property Damage Only
  - Severe Crashes
Type of Work Zone Crashes in Missouri

- Fatal
- Disabling Injury
- Minor Injury
- Property Damage Only

Percent

Collision Inv. Animal  | Collision Inv. Pedalcyle  | Collision Inv. Fixed Object  | Collision Inv. Other Object  | Collision Inv. Pedestrian  | Collision Inv. Motor Vehicle in...  | Collision Inv. MV on Other Roadway  | Collision Inv. Parked MV  | Overturning  | Other Non-Collision
Type of Collisions in Work Zone Crashes in Missouri

- Fatal
- Disabling Injury
- Minor Injury
- Property Damage Only

Bar chart showing the frequency of different types of collisions in work zone crashes in Missouri.
Circumstance Leading to Work Zone Crashes in Missouri

- Fatal
- Disabling Injury
- Minor Injury
- Property Damage Only
Population Area of Work Zone Crashes in Missouri

Severity

- Fatal
- Disabling Injury
- Minor Injury
- PDO

Urbanized
Urban
Rural
Vehicle Speed in Work Zone Crashes in Missouri

- Fatal
- Disabling Injury
- Minor Injury
- Property Damage Only

Chart showing the frequency of vehicle speed in work zone crashes in Missouri, categorized by severity of injury and property damage.
Next Steps

• What strategies can we suggest to reduce work zone crashes?
• Focus on the characteristics of the work zones
• Regression analysis to determine significant factors for crash type
  – Fatality
  – Serious injury
  – Minor injury
  – Property damage only
Initial ANOVA

- Work zone characteristics coded as independent variables

- On or Off Road
- Road Alignment (straight or not)
- Road profile (level or not)
- Light Condition (daylight or other)
- Weather Condition (clear or other)

- Road condition (dry or other)
- Traffic Condition (level of congestion)
- Vision Obscured (level of obscurity)
- Accident Type
- Road Surface
Conclusions

• It is possible to determine causal relationships between crash types and crash severity in work zones
• These causal relationships can be used to develop work zone management strategies designed to mitigate driver behaviors
• These findings can be used as criteria for future MoDOT tracker measures and project selection