Calibration of the Louisiana Highway Safety Manual

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Outline of Presentation

• Highway Safety Manual
• Part C Predictive Method
• Calibration Methods
• Objective of Calibration Effort
• Methodology
• Work completed to date
• Next steps
Highway Safety Manual

- Published by AASHTO in 2010
- Provides a quantitative method of predicting highway safety
- Can be used to forecast crash frequency based on various traffic and roadway characteristics
- Also useful for identifying “hot spots” - the locations that are most in need of safety improvements
Highway Safety Manual

• Part A: Introduction, Human Factors, and Fundamentals
• Part B: Roadway Safety Management Process
• Part C: Predictive Method
  – Rural Two-Lane Roads
  – Rural Multilane Highways
  – Urban and Suburban Arterials
• Part D: Crash Modification Factors
Part C Predictive Method

• Safety Performance Functions (SPFs) are used to predict average crash frequency under base conditions
• Crash Modification Factors (CMFs) are selected and multiplied by the SPFs to account for local variations from base conditions
• Because SPFs and CMFs were developed using national data, they must be calibrated to better reflect local conditions.
Calibration Methods

• A calibration factor can be calculated by dividing observed crashes by predicted crashes
• This calibration factor is then multiplied by the Part C SPFs and CMFs to predict average crash frequency
• Another method involves developing jurisdiction-specific SPFs instead of using the HSM Part C SPFs
Objective

- Calibrate the Part C predictive model for roadway segments in Louisiana for the following facility types:
  - Rural two-lane two-way roads
  - Rural multilane highways
  - Urban and suburban arterials

- Compare calibrated HSM SPFs with Louisiana-specific SPFs developed by others

- Recommend which calibration method should be implemented by LA DOTD
Methodology

• Identify facility types to be calibrated
• Select sites for calibration for each facility type (30-50 sites with 100 annual crashes minimum)
• Obtain data for each facility type for specific calibration period (2009-2011)
• Apply Part C model to predict total crash frequency for each site during calibration period
• Compute calibration factors for each facility type
Segment Types to Calibrate

- Rural two-lane undivided
- Rural multilane undivided
- Rural multilane divided
- Urban/Suburban two-lane undivided
- Urban/Suburban three-lane with TWLTL
- Urban/Suburban four-lane undivided
- Urban/Suburban four-lane divided
- Urban/Suburban five-lane with TWLTL
Required Data Elements

- Segment length
- AADT
- Horizontal curve data (rural two-lane)
- Lane width
- Shoulder type & width (rural)
- Presence of lighting (rural multilane)
- Number of driveways by land-use type (urban/suburban only)
- Among many more....
Work Completed

- Selected facility types for calibration
- Collected and collated roadway data and crash data from DOTD (may change)
- Selected segment types within ArcGIS by facility type
- Removed segments with coding errors
- Calculated base SPFs for each segment (rural four-lane)
- Initiated CMF calculations (based on lane width and shoulder width for rural segments)
ArcGIS Roadway Segments
Next Steps

• Site Selection (random 30 to 50 sites)
• Linking crash data with roadway data
• Calculating Calibration Factors (dividing observed by predicted)
• Comparing our results with results of state-specific SPFs (calculated by others using statistical methods)
• Recommending a calibration method to DOTD
Questions?