2019 MINNESOTA TOWARDS ZERO DEATHS STATEWIDE CONFERENCE

CROW WING COUNTY CURVE ADVISORY SIGNING
Recent projects:

- Chevrons
- Grooved-in markings
- Flashing stop signs
- Dynamic speed signs

Due largely to lakes, straight roads are not a common occurrence in Crow Wing County.

Overall on roughly 650 miles of roadway, there are approximately 1,000 horizontal curves.

Along with pavement markings and chevrons, curve advisory speed limits represent an important safety measure for drivers.
Past Process:

• Two employees driving each curve multiple times.

• One driving, one “eye-balling” a slope meter and recording data.

• The process works, but has drawbacks – safety, accuracy, future data needs, etc.

New Process:
Curve Warning Evaluation

Mike Shomion

Curve Safety

- Roadway departures account for more than 50% of all traffic fatalities, over half of which occur at horizontal curves.
- There was an average of 18,779 fatalities between 2014 & 2016 due to roadway departure.
- 27%+ of all traffic fatalities deaths occur at horizontal curves in any year
- Advanced warning signs are the least expensive countermeasure, behind rumble strips, that can be used to reduce crashes at horizontal curves.
- 2012 Study showed that proper singing can reduce accidents
Curve Safety

MUTCD Mandate
Compliance Date: December 31, 2019

- MUTCD mandates that all horizontal curves with 1,000 ADT be assessed for curve warning signing by December 31, 2019
- Table 2C-5 changes the sign requirements, replacing 10 degree with 12/14/16 degree standard
- New chevron requirements
  - Require the radius of the curve
  - Lower speed differentials
  - New spacing requirements
- Incorrect signs to be removed
Past Experiences

**Sibley County**
- Aerial radius measurement with assumed cross slope
- Over 200 curves resigned

**North Dakota DOT**
- Over 1400 curves
- Digital Accelerometer
- GIS maps for tracking

We needed a better solution
We needed a process that provided:

- Safe curve advisory speed for horizontal curves
- Curve geometry and characteristics
  - Radius and super-elevation
- Simple graphical sign placement for warning signs
- Individual curve reports
- Calibration records to assure quality
- Secure data storage
- Cloud service

CARS Key Benefits

- Met all of our requirements
- Safety
  - Drive any speed with traffic
  - Continuous driving of roadway
  - No turning around
- Accuracy and Uniformity
  - Data collection and assessment is fully automated
- Future Proofed Solution
  - Protected from speed limit and standards changes
  - Cloud portal and individual curve reports for tort protection
Crow Wing County Contracts with:

WSB for County Wide Curve Evaluation

WSB’s Tasks
• Provide all data collection using the CARS system on county roads.
• Process collected data using the CARS system
• Deliverables
  • Curve reports for each curve
  • Simple spreadsheet with all curve outputs
  • Spreadsheets with all data collected
  • GIS map and database

Data Collection
• Minimum of 2 passes in each direction
• Continuous driving of corridors
• Rush Hour Driving
• Safety
Data Processing

- Intuitive system
- Best fit of curves
- Engineer reviewed

CARS Curve Report

- Data export of all collected and processed data
- Detailed graphs and tables, all customizable
- Administrative and project management tools
- Test speed
- Data fit
- Curve and grade classifications
- Chevron requirements and spacing
Crow Wing County Evaluation Results

- 600 miles of County roads evaluated
  - Paved and gravel
- 933 curves evaluated with reports
- Data collection was 2 weeks
- Data processing was 2 weeks
- Rob’s thoughts

Others who have used this new method

- Morrison County
- Stearns County
- Sherburne County
- Hennepin County
Questions?

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