Safety Improvements for Horizontal Curves

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Horizontal Curve Safety

• Curves are challenging for drivers

→ Crash rates are 3 to 4 times that in tangents

→ Crashes are more severe
  About 25% of all fatalities happen in curves
Horizontal Curve Safety

- Fatalities in Horizontal Curves (2006-2008)
  - ~10,000 nationally each year
Horizontal Curve Safety

• Longitudinal Rumble Stripes- 2 lane non-divided highways
  Combination of corrugations and edge line pavement markings
Horizontal Curve Safety - Rumble Stripes (cont.)

• Issues Addressed: Exterior Noise - bothersome to property owners
  • Revised spec to sinusoidal pattern for asphalt pavements

What were getting out of the change:
• interior noise level higher
• much lower exterior, 5 to 10 decibels
Horizontal Curve Safety - Rumble Stripes (cont.)

- Center line rumbles - lane widths should be at least 10 ft

- Edge line rumbles -
  - Need at least 2’ of paved shoulder
  - Gaps should be provided for bicycles (edge lines)
    - INDOT specs: 12’ gap every 60’
  - May not be advisable if horse drawn vehicle are prevalent
• INDOT has installed ~ 2000 miles

• Average cost- $2500 per mile
  • Cost has varied based on the amount being installed

• Safety benefit:
  • ~50% reduction in crashes
  • Run-off the road, head-on, side swipe
Horizontal Curve Safety

• Other Mitigation Measures such as
  • Pavement markings
  • Reflectors to delineate guardrail, trees, utility poles
  • Safety Edge
  • High Friction Surface Treatment
  • Signing, MUTCD compliance date is approaching

• See FHWA's website:
  https://safety.fhwa.dot.gov/roadway_dept/countermeasures/horicurves/cmhoricurves/

• Crash Modification Factors:  http://www.cmfclearinghouse.org/
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