Highway Factors

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Introduction

• General highway information
  - Highway design
  - Accident history
• Cross-median crash risk
• Median barrier design
• Median barrier selection
General Highway Information

- I-65 had four lanes separated by a 60-foot-wide median
- Straight roadway with 2.6% grade
- Departed travel lane at 5 degrees
- Struck barrier at 15 degrees
Highway Design Information

- Speed
  - Design speed and speed limit 70 mph
  - 85th percentile speed was 76 mph
  - 85th percentile truck speed was 70 mph
- Truck was traveling at highway speed
- Average daily traffic (ADT) on I-65 was 36,800
- 35 percent of traffic was heavy trucks
I-65 Cross-Median Accident History

• Evaluation period 2003-2010
  – 123.9-mile segment
    • 50 cross-median crashes
    • 37 resulted in fatalities
  – 10.5-mile segment
    • 19 cross-median crashes
    • 4 resulted in fatalities

• First cross-median crash following installation of the barrier system
Fatal Cross-Median Accidents

Locations of fatal cross-median crashes on the U.S. Interstate System in 2006-2009 that involved truck-tractors

**Accident Locations**
- Truck-tractor did not cross
- Truck-tractor crossed
Cross-Median Crash Severity

- 2005-2009 fatal accidents (FARS)
  - 57 heavy truck cross-median crashes compared to
  - 574 passenger vehicles
- 2008 among all vehicles in cross-median crashes
  - 19.2% heavy trucks, even though they account for only about 1% vehicles registered and about 10% miles traveled
Barrier Design Information

- Test Level Four (TL-4) four-strand high-tension cable median barrier
- Placement on median slope reduced performance to TL-3
- 10-foot post spacing
- Alternating post design
- Anchor installation length 9,500 ft.
- Design deflection 6 ft. 8 in.
Damage to I-65 Barrier System
Median Barrier Standards

- Bridge hazard – railing required
- Roadside hazard – no standard
- Median barrier – no standard
  - Guidelines - *Roadside Design Guide*
  - Other state DOT guidelines
  - Application of engineering judgment
  - Minimum of TL-3 required
Median Barrier Guidelines

- Barrier Recommended
- Barrier Recommended (see notes)
- Barrier not normally considered except in special circumstances
Kentucky Median Barrier Guide

• Barrier recommended when:
  – 30 foot median and ADT of 20,000
  – 30 to 72 foot median and ADT of 40,000
  – 30 to 72 foot median, regardless of traffic, if crash rate is exceeded
    • Cross-median crash rate of 0.50 per mile per year
    • Fatal cross-median crash rate of 0.12 per mile per year
Issues

- Not designed to capture a heavy truck
- No guidelines for when to install a TL-4 or TL-5 median barrier
- No definition of “heavy truck traffic”
- No definition of “cross-median crash”
- Deflection distances in field installations may be greater than those found during testing