# SafetyEDGE

Your Angle for Reducing Roadway Departure Crashes

ACPA 47th Annual Meeting
"Building on a Solid Foundation"


**Safety Edge Installation: Iowa**

**Chris Wagner, P.E.**
FHWA – Resource Center – Atlanta, GA

# Key Message

- Drop-offs are a safety challenge
- Safety Edge can mitigate shoulder drop-off

# Basic principle

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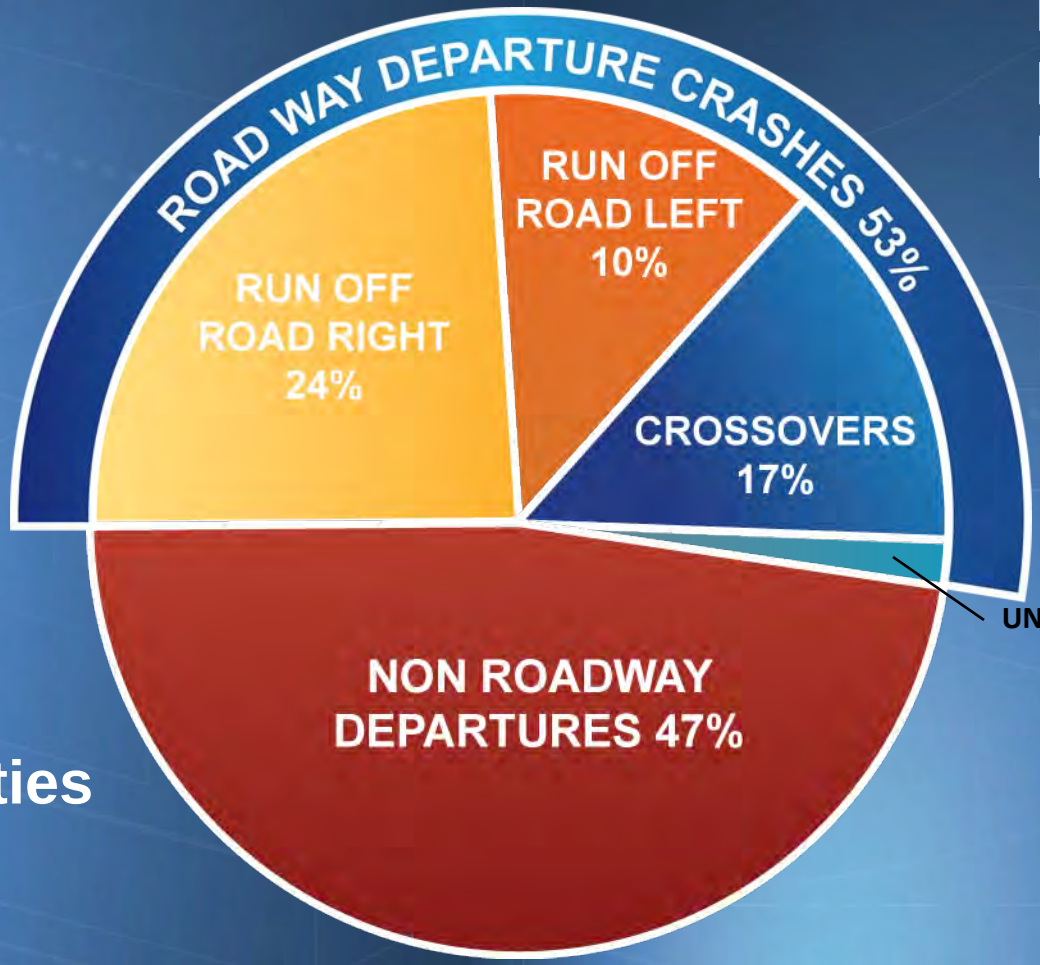
Conventional Paving


Paving with Safety Edge

Safety Edge Installation: Georgia

# 2009 Fatal Crashes (Based on FARS)

**18,087 U.S. Roadway Departure Fatalities**




**33,808**

**U.S. Fatalities**

# 1 ROR Fatality Every 29 minutes

50 people will die in a roadway departure crash in the United States today.

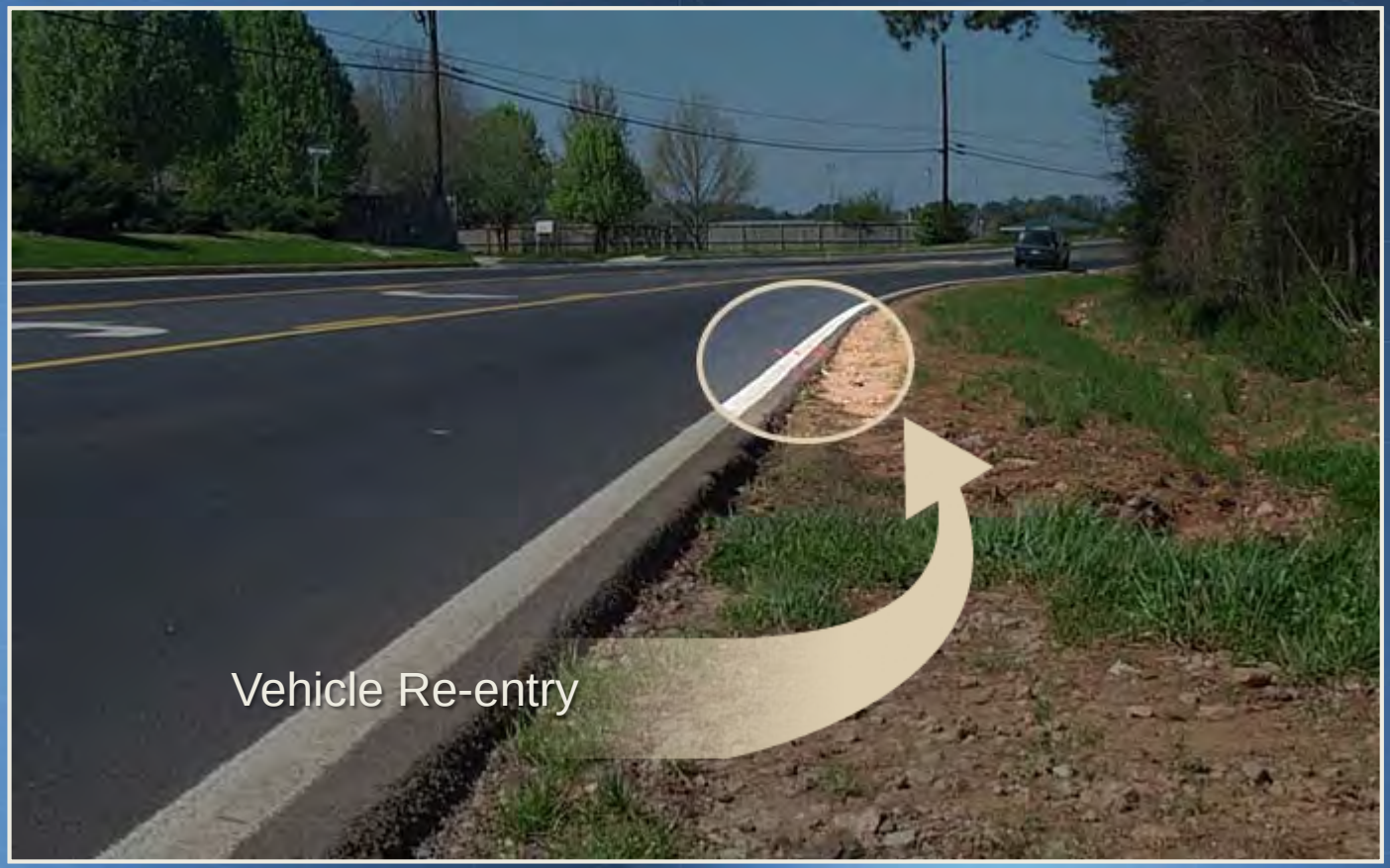
How many related to drop-offs ?

# 2006 AAA Drop-Off Study

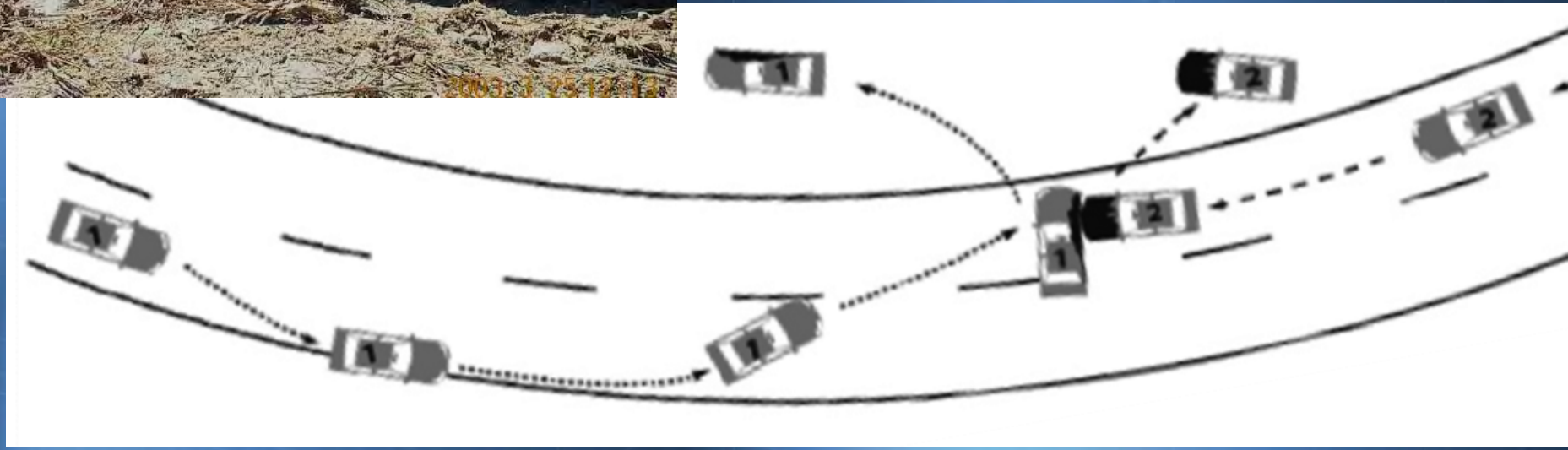
## (On rural paved roads with unpaved shoulders)

- Drop-off crashes were 17.7% of ROR crashes in Iowa
- Drop-off crashes were 24.5% of ROR crashes in Missouri
- Drop-off crashes in Iowa were four times as likely to be fatal as all rural crashes and twice as likely to be fatal as other rural ROR crashes
- Drop-off crashes in Missouri were twice as likely to be fatal as all rural crashes on similar roads

# Are Drop-offs a Problem?



# Typical Drop-off Crash with Tire Scrubbing



# Edge Drop-off Crash Types

- Roll Over
- Head-on
- Opposing Sideswipe
- Roadside Object

Photo credit: Atlanta Journal Constitution

# Without a Safety Edge

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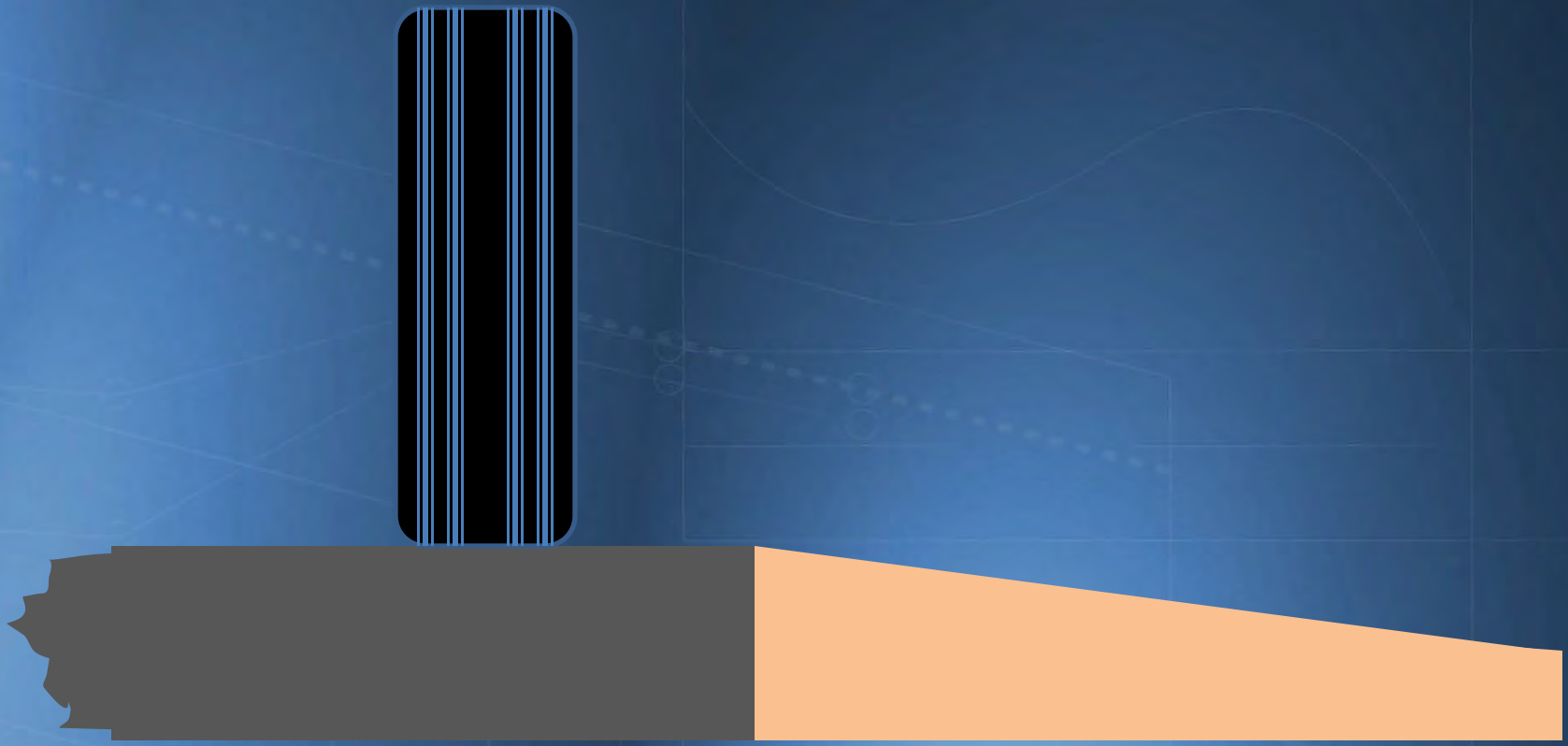

# With Safety Edge

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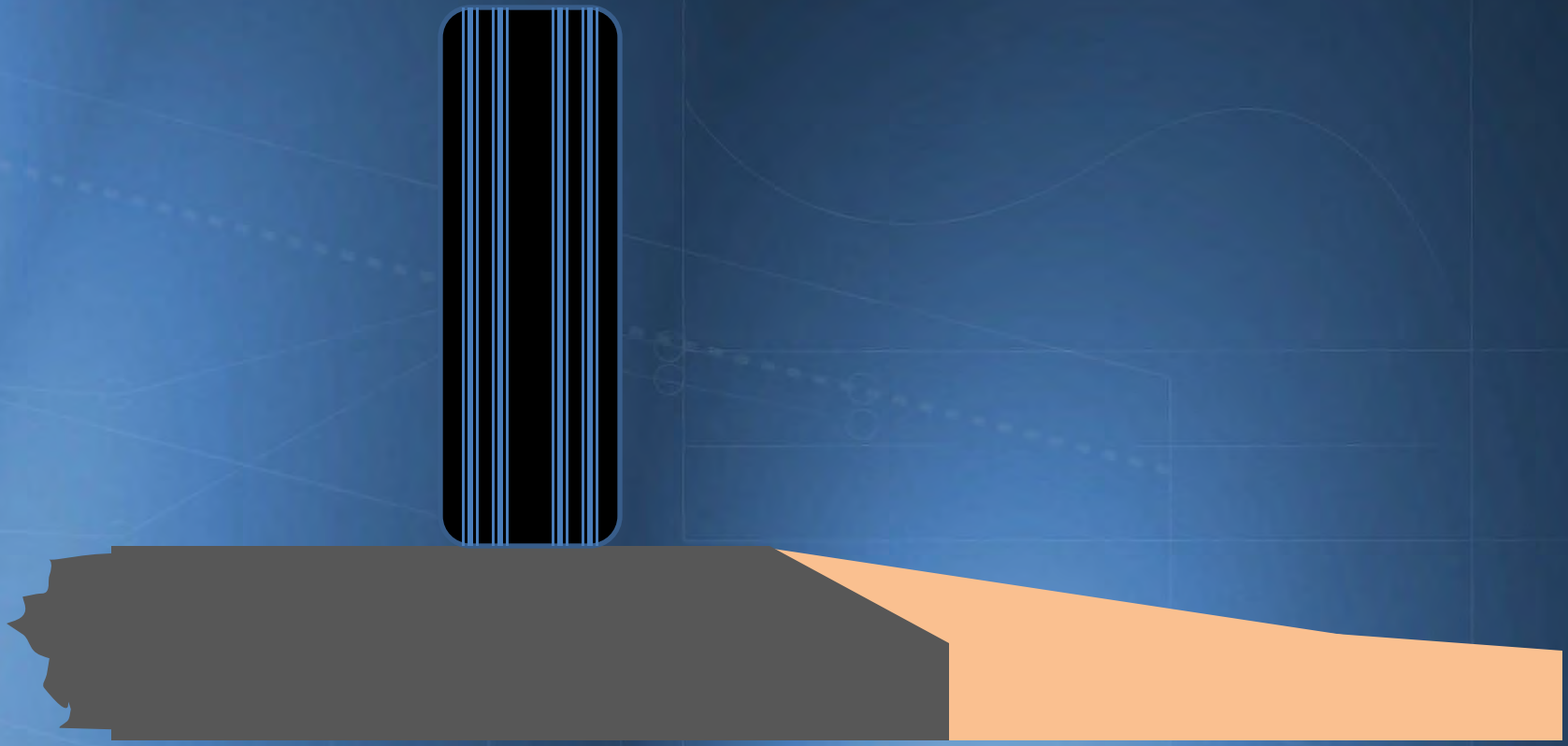

http://fhwa.na3.acrobat.com/safetyedgedrop

innovation ingenuity imagination invention Every Day Counts

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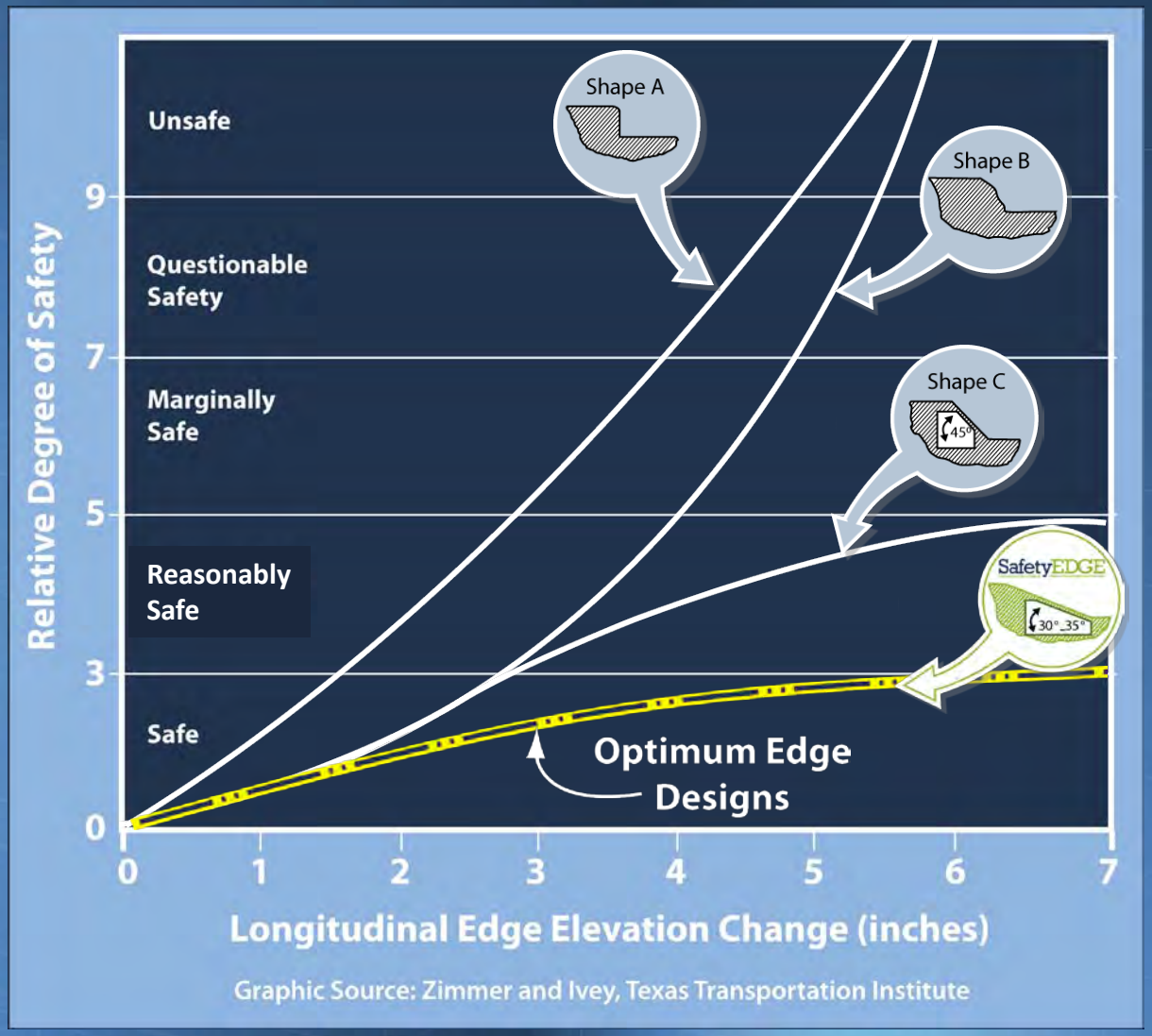


Graphic Source: Zimmer and Ivey, Texas Transportation Institute

# Risk Factors

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What are the factors associated with pavement edge drop-off crashes?

- Speed
- Driver Experience
- Vehicle/Tires
- Drop-off Height
- **Shape Of Pavement Edge**

# The Safety Edge: Purpose and Need

Safety Edge Installation: Iowa

# Horizontal Curves

# Eroded Areas

# SafetyEDGE

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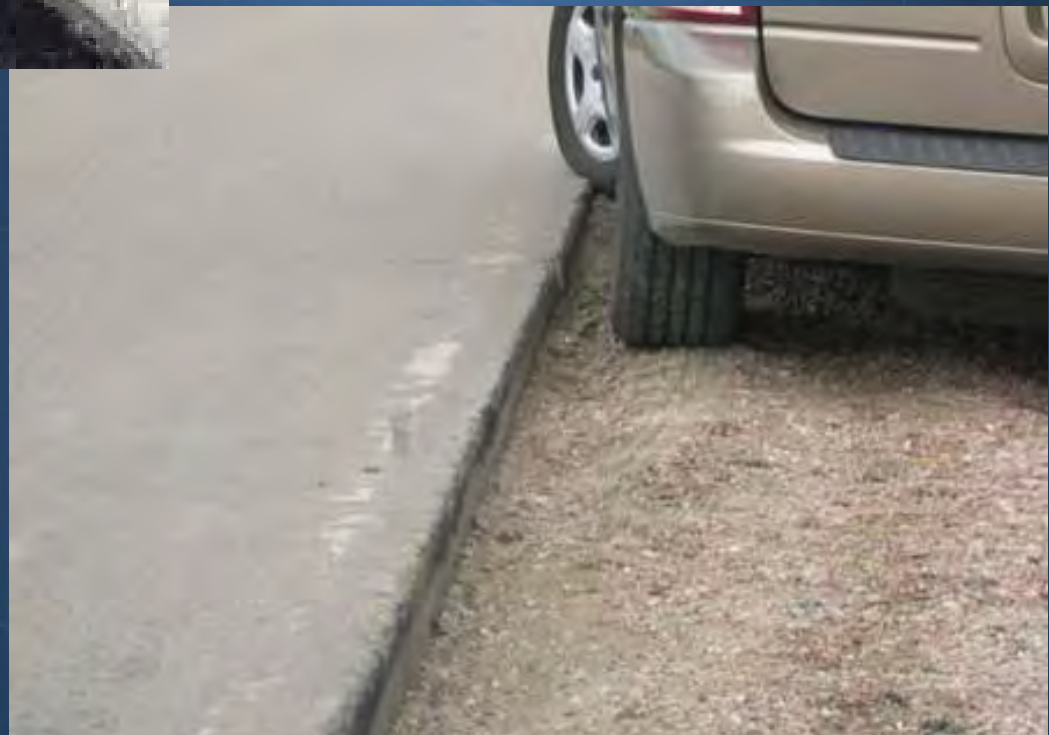

# Asphalt Overlay

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# Construction

Similar to Conventional Paving

- Establish Grade
- Construct Pavement
- Texture, Curing Compound
- Saw Joints
- Pull Shoulders Flush

# Construction

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# The Hardware

# Iowa PCCP Safety Edge

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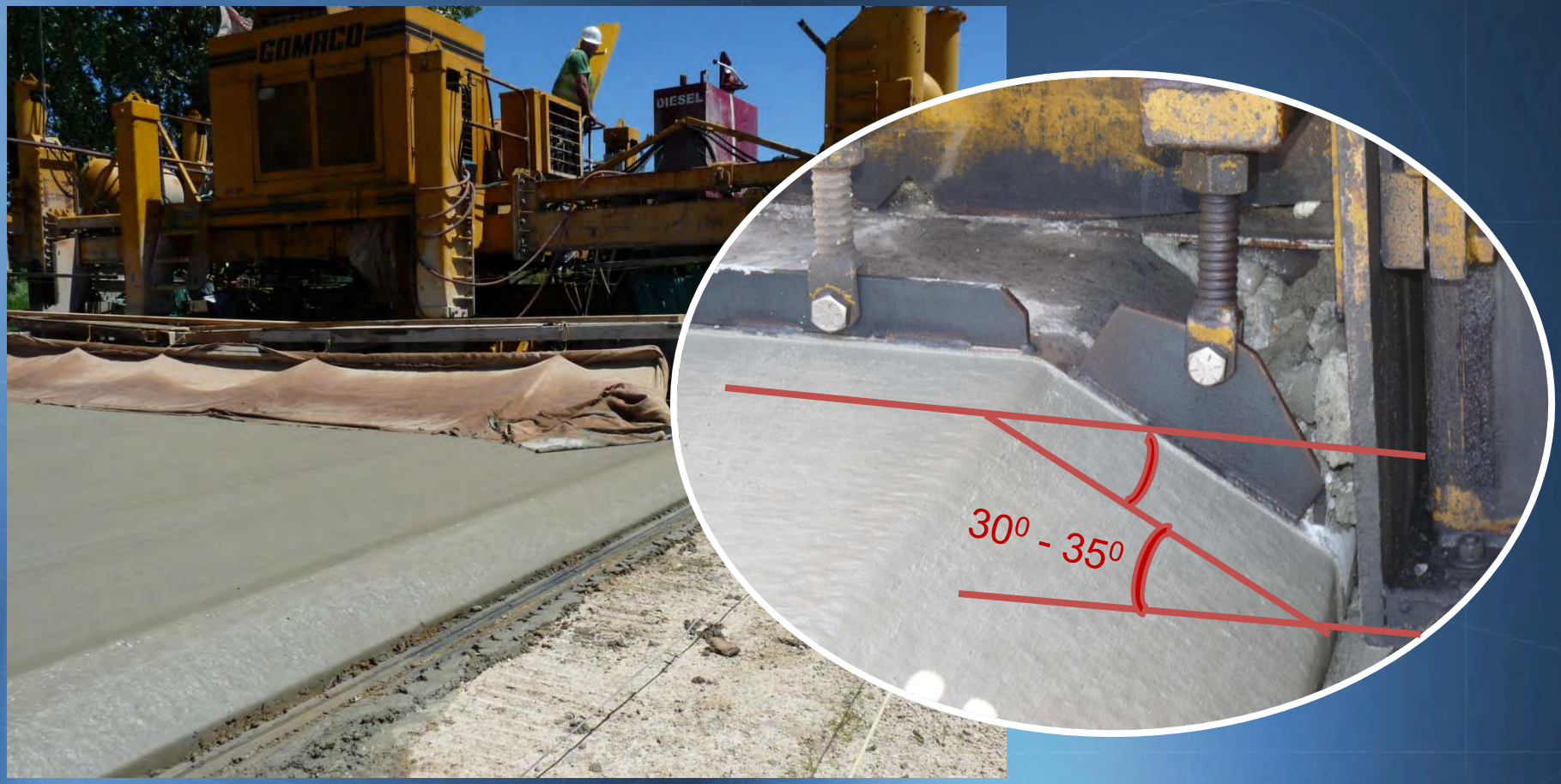
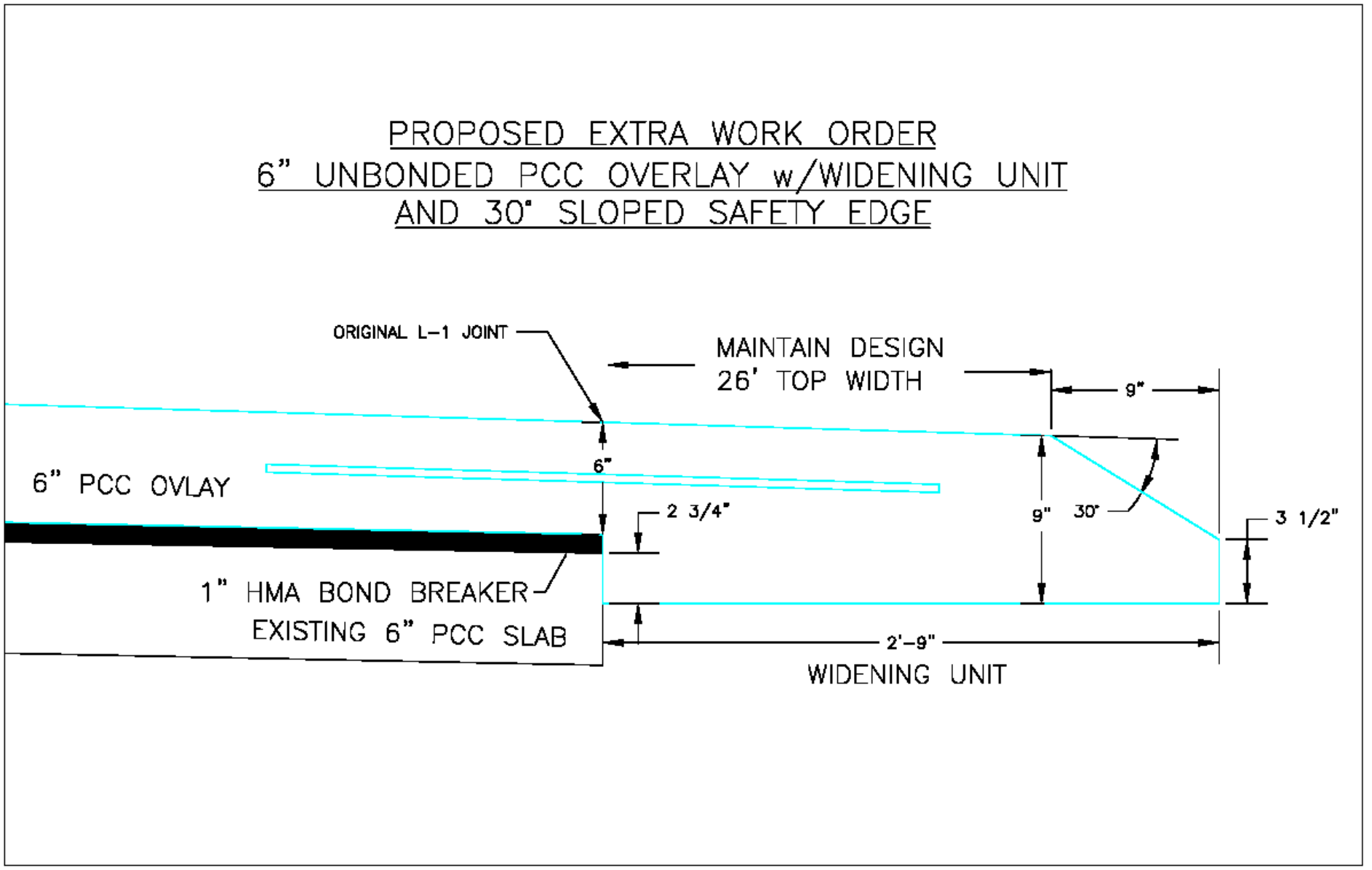


# PCC Applications

- Jones/Linn County project – 6” Overlay & shoulder widening
- Keokuk – 8” new Paving

# Jones County Overlay



# Jones County

# Iowa DOT PCC Paving

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## PCC Pavement

For PCC pavements with safety edge, the nominal dimensions are as follows:

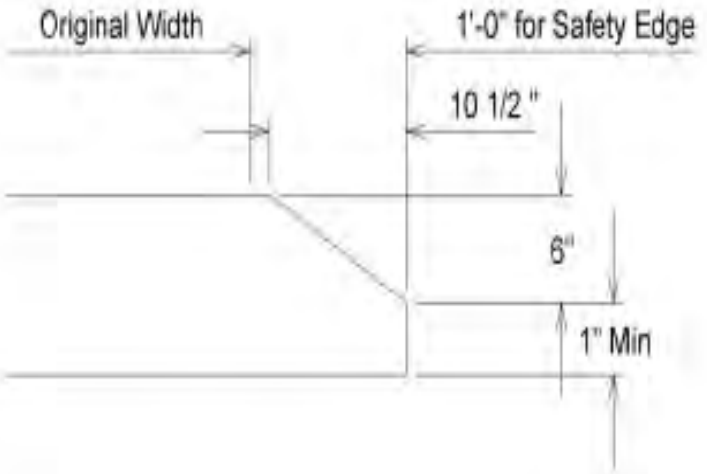


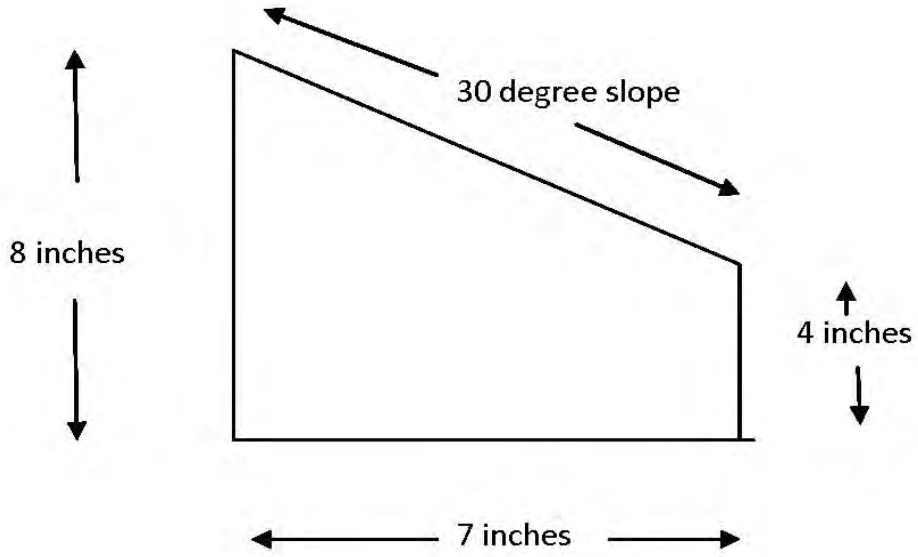

Figure 3: Safety Edge Dimensions for PCC Pavements

For all PCC pavements, these details prescribe a 1 foot widening to accommodate the safety edge, and for the safety edge to be 6 inches deep.

# InTrans Suggested Design

**Proposed Safety Edge Design Detail**

Keokuk County Road V-63




Proposed Method of Measurement and Basis of Payment Notes

"Pavement width to be used for the quantity calculation (S. Y.) for 8" PCC Pavement will be the nominal out to out width of the total pavement section. (ie. 23'-2" including safety wedge on both sides).

Payment for that bid item shall include all costs associated with the addition of the safety edge to the normal pavement slab."

# Keokuk Photos

# PCC Summary

- Fabricated Safety “shoes” (modified pan) was apparently easily made
- Proper installation yields excellent and very consistent results on the slope angle
- ICPA very interested in technology and process
- There is some additional cost (with out to out slab measurement).
  - 5.3% with 22’ slab and 7” SE each side
  - 8.3% with 24’ slab and 1’ (DOT) SE each side

# IOWA IS FIRST STATE TO USE SAFETY EDGE TECHNOLOGY ON CONCRETE

By CCJ STAFF
Published August, 05 2010

The Iowa Department of Transportation is using an existing paving technique in a new way to make County Road E-34 in Linn and Jones counties safer. The project was paid for with $863,000 from the U.S. Department of Transportation under the American Recovery and Reinvestment Act.

Safety Edge is a paving technology that helps prevent fatal crashes. It was invented to combat the dangers associated with returning to the road over deteriorated shoulders. Most commonly used when paving with asphalt, Iowa is the first state to use this technology on concrete roads. This application will help bring a needed safety technique one step closer to standard practice since concrete is used more widely for highway construction and repair.

"Safety is our number one priority, and we hope more states will use this low-cost low-risk technology that helps protect drivers," says U.S. Transportation Secretary Ray LaHood. "The Recovery Act helped make this project a reality faster – delivering jobs and a much-needed safer roadway for Iowans in this region."

Safety Edge is also one of five featured technologies in Federal Highway Administrator Victor Mendez's Every Day Counts Initiative, which seeks to identify and help quickly deploy innovations aimed at enhancing the safety of our roadways shortening project delivery. "Incorporating Safety Edge technology into highway planning is a great example of what our Every Day Counts Initiative is trying to do," Mendez says. "This technology is easy to use and extremely cost-effective – and, most importantly, it will save lives."

A rural secondary road, County Road E-34 is a high-crash corridor, making it an ideal candidate for additional safety investment. Safety Edge prevents pavement edge dropoff, one major cause of roadway departure crashes. The dropoff is the vertical distance between the paved travel lane and the unpaved shoulder. By attaching a simple device to a paving machine to angle the asphalt or concrete, a safer and more durable pavement edge can be created, allowing drivers to regain control more easily after leaving the travel lane.

Iowa received $358 million of the $26.6 billion in Recovery Act highway funds available for road and bridge projects nationwide. As of July 23

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POLL

How's your business doing through the first six months of 2010 compared to 2009?

- Much better (more than 25% improvement)
- Somewhat better (up to 25% improvement)
- About the same
- Somewhat worse (up to 25% decrease)
- Much worse (more than 25% decrease)

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# Things to consider……

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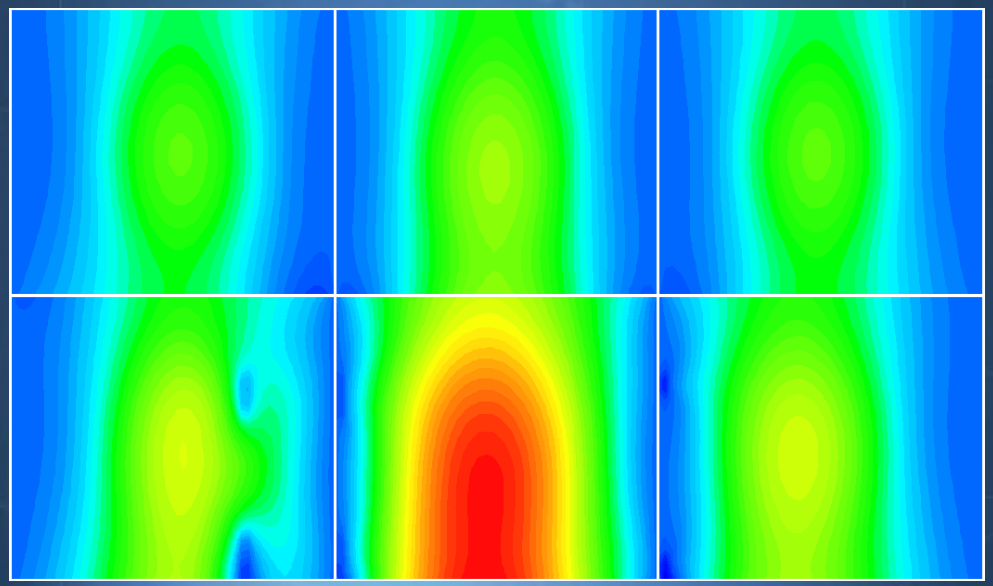
- Minimal upfront cost for hardware
- Additional material for 7”-12” Safety Edge
  - Factor into bid item
- Additional width will aid in reducing edge stress



# FHWA's Goal

- Work with both industries to promote Safety Edge
- Promote Safety Edge detail as a standard practice
- Document construction best practices

Asphalt Safety Edge Installation: Georgia

# Benefits of the Safety Edge

- Providing "Due Care"
- Aid vehicle re-entry
- **Reduction of Edge Stress**
- **Reduced Crashes Over Life of the Pavement**
- **Positive Public Relations**

# Other safety measures

- Build 2 foot shoulders
- Install rumble strips/stripe
- Periodically rebuild/maintain shoulders
- Use aggregate, or RAP shoulders

# Help save lives

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- Look for projects where the Safety Edge can be used
- Work with your state/local agency
- Let FHWA know about upcoming projects
  - Christopher.Wagner@dot.gov
  - Andy.Mergenmeier@dot.gov

# Every Day Counts

Innovation Initiative

## Contact Information

For training or more information on this Every Day Counts Initiative, please contact your local FHWA Division Office.

**To learn more about EDC, visit:**

*http://www.fhwa.dot.gov/everydaycounts*

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