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In 2013, **13 fatalities** in Indiana work zones; **300+ injuries**

One work zone fatality occurs every 8.2 hours nationwide - 3 per day.

One work zone injury occurs every nine minutes nationally - 160 per day.

Crashes are the leading cause of death for Americans ages 3 – 34.

75% of work zone fatalities are not part of the work crew.
Top 5 Reasons / Workzone Crashes 2012

1. Tailgating
2. Inattention
3. Improper Lane Change
4. Failure to yield
5. Driving too fast for conditions
Paying attention?
The Problem

Distracted Driving Is An Epidemic
Distracted Driving costs

NHTSA – 2012

- **Human Cost**
  - 3,360 deaths
  - 421,000 injuries

- **Financial costs**
  - Value of life = $9 Mil
  - Hospitalization
  - Insurance/litigation
Taking your eyes off the road
Manual (and Cognitive)

Taking your hands off the wheel
Cognitive (and Visual)

Taking your mind off what you are doing.
Texting – Distracted Driving on steroids

- 660,000 drivers are using cell phone every second
- Texting - driver’s eyes off road 4.6 seconds
- 20% of teens text every time they drive
- 10% of adults text
The Temporary Portable Rumble Strip TPRS

A New Traffic Safety Countermeasure

Reinvented from an idea born in KS, 2004
US 50, Kansas May-June, 2004

1 Highway
9 Deaths
6 Weeks
2004 - Peabody, KS

- 22 mile asphalt paving project
- Shears Construction
- May 10
  - 2 fatalities
  - 2 injuries
- June 28
  - 2 fatalities
  - 2 injuries
- June 29
  - 5 fatalities
  - 2 injuries
“What the work zone needs is an advance strategy that is visual, audible, and physical… one that absolutely alerts the driver to an upcoming work zone.” – KS DOT, 2004
Peabody, KS – 7 years later

- 22 mile asphalt paving project
- APAC Shears
- Zero fatalities
- Zero crashes
- TPRS – temporary portable rumble strips
Conventional Countermeasure: Positive Protection
Conventional Countermeasure:
Truck-Mounted Attenuator
Conventional Countermeasure:
Portable Changeable Message Sign
Temporary Portable Rumble Strip

- **Alerts drivers** to changing road conditions, with audible and vibration alerts
- **Stays in place**
  - In traffic speeds up to 75 MPH
  - With high ADT,
  - Under 18 wheelers and motorcycles
- **Temporary**
  - no glue or adhesive required for installation
  - removes without damage to strip or road
- **Modular**: easy to store, transport, hand-carry

Unconventional Countermeasure
Applications

Flagging Operations
Applications

Pilot Car Operations
Especially where a lane is closed for a work shift, then re-opened after.
Applications

Maintenance
The Solution

RoadQuake 2

• Proprietary Design

• 44” L, 12” W, ¾” Thick

• Weighs 36 lbs.

• Both edges beveled

• 3 sections make 1 strip, 11’ long, which traverses an entire lane.

For posted speed limits up to 75 MPH and temperatures from 0°- 180°F.
The Solution – Part 2

RoadQuake 2 Folding

- 132” L, 13” W, ¾” Thick
- Weighs 110 lbs.
- Both edges beveled
- 11’ long, which traverses an entire lane.
Vibration:
- generated more vibration than adhesive
- improved “attention-getting” to drivers
- vibration matched milled rumble strips

Portable strips = same sound levels as milled strips.

Research: Kansas University, 2009
Research: Ohio University

Speed Reductions up to 13 MPH
The TXDOT Evaluation

TxDOT, Wichita Falls, TX May 2011

FM 122: 2 lane, 2 way, 55 MPH
US 82: 70 MPH

“Rumble Strips Ahead” signs
Alerted drivers & Flaggers
Little movement

“These would be a great addition in Work Zone Safety for Maintenance.”
Highway 64, near Tyler TX
Road-widening project; flagger, pilot car operation
Avg. 3 accidents per week, due to distracted drivers

“We haven’t seen an accident since we put the rumble strips up last July. They have made a lot of difference.”

The TXDOT Evaluation
I-35 Project Waco, TX:
Fall, 2012
The TXDOT Evaluation

“Interstate Reopened After Fatal Early-Morning Crash”

October 25, 2012:

Worker run over, killed by a crush truck that was hit by a semi…

Another worker’s lower leg severed…

Two more taken by ambulance…

Crush truck driver, minor injuries.

October 19, 2012:

Semi driver killed…

Hit the rear of an 18-wheeler that had slowed for construction.…

September 19, 2012:

Construction worker killed. Struck by an 18-wheeler, hit-and-run.

From KWTX.com, Oct. 25, 2012
Deployed 3 Countermeasures:
• RoadQuake 2 Rumble Strips
• PCMS
• New Speed Limit Signs

“When you drive at night, you tend to get complacent. I think the addition of rumble strips is a great idea. They certainly are an attention-getter.”
Tests Confirmed

RoadQuake 2:

• Alerts drivers to changing road conditions
• Sound & vibration levels = milled strips.
• Adheres to road without glue or nails
• Stable with little movement
  • speeds up to 75 MPH
  • high ADT
  • 18 wheelers and motorcycles
• Temperatures from 0° to 180° F
Components of a Temporary Rumble Strip Specification

- Array pattern: Number of strips & Spacing
- Number of Arrays for:
  - 2-lane 2-way
  - Lane drop on 4-lane divided
- Signage: “Rumble Strips Ahead”
TxDOT WZ(RS)-12 for Temporary Rumble Strips

1 Lane
2 Way Direction

Texas DOT
Standard Plan
May 2013 Lettings
Use Temporary Rumble Strips On:

• 1 lane, 2 way flagging operations, 70 MPH or less
• Or, where Portable Traffic Signals or AFADs used in place of flaggers
  • Lane closures on conventional highways, 70 MPH or less
• Effective with May, 2013 Construction Lettings
• District Maintenance to use upon receipt of inventory
Distracted Driving Kills in Indiana
Questions

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