

Temporary Portable Rumble Strips: Reduce Crashes in Work Zones



**CARSP
Conference
2017**

Presenter



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#Put

DOWN

the
Phone

**LEADING
KILLER ON
ONTARIO
ROADS**

Police Week 2017, May 14 - 20
Working Together for Safer Communities



Distracted Driving in Canada

Distracted Driving is now the number one risk on Canadian roads contributing to 8 in 10 collisions



13%



29%



35%



35%



47%

Talking on cellphone



51%

Talking on the phone with hands-free device



51%

Reaching for something in the backseat



60%

Looking and talking to passengers



71%

Adjusting iPod or radio



87%

Eating and Drinking

Research: Drs. Atchley & Strayer



Dr. Paul Atchley



Dr. David Strayer

“A Comparison of the Cell Phone Driver and the Drunk Driver”

“We found that people are as impaired when they drive and talk on a cell phone as they are when they drive intoxicated at the legal blood-alcohol limit...”

-Strayer, Drews, Crouch, 2006

Human Factors: The Journal
of the Human Factors and
Ergonomics Society
<http://hfs.sagepub.com/>

A Comparison of the Cell Phone Driver and the Drunk Driver
David L. Strayer, Frank A. Drews and Dennis J. Crouch
Human Factors: The Journal of the Human Factors and Ergonomics Society 2006 48: 381
DOI: 10.1518/001872006777724471

The online version of this article can be found at:
<http://hfs.sagepub.com/content/48/2/381>

Published by:

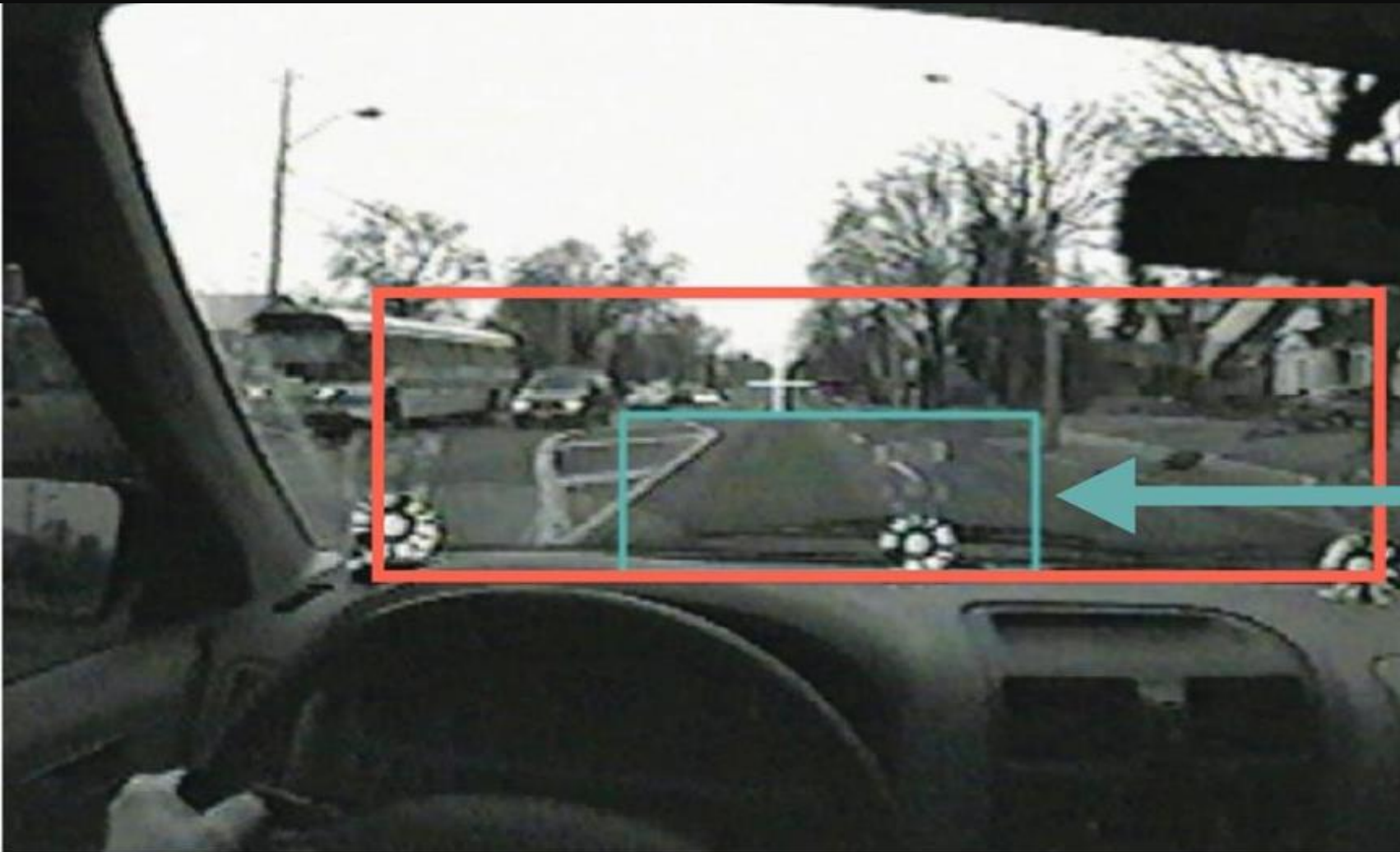

<http://www.sagepublications.com>

On behalf of:

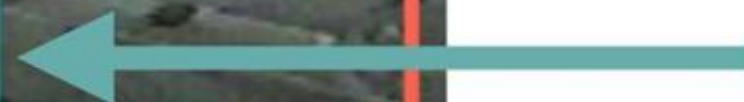


Human Factors and Ergonomics Society

Visual Processing-Eye Movement Restrictions

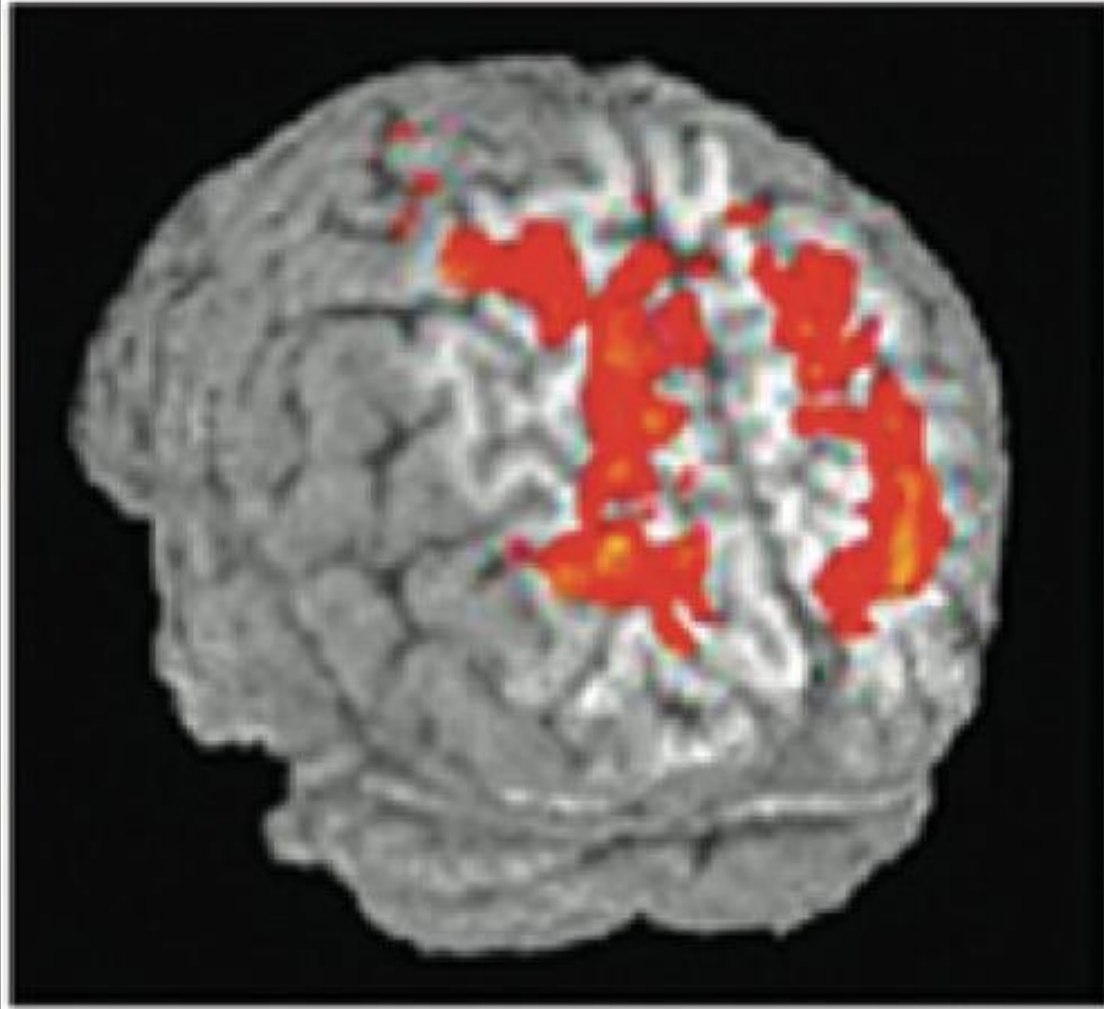


Not on phone...

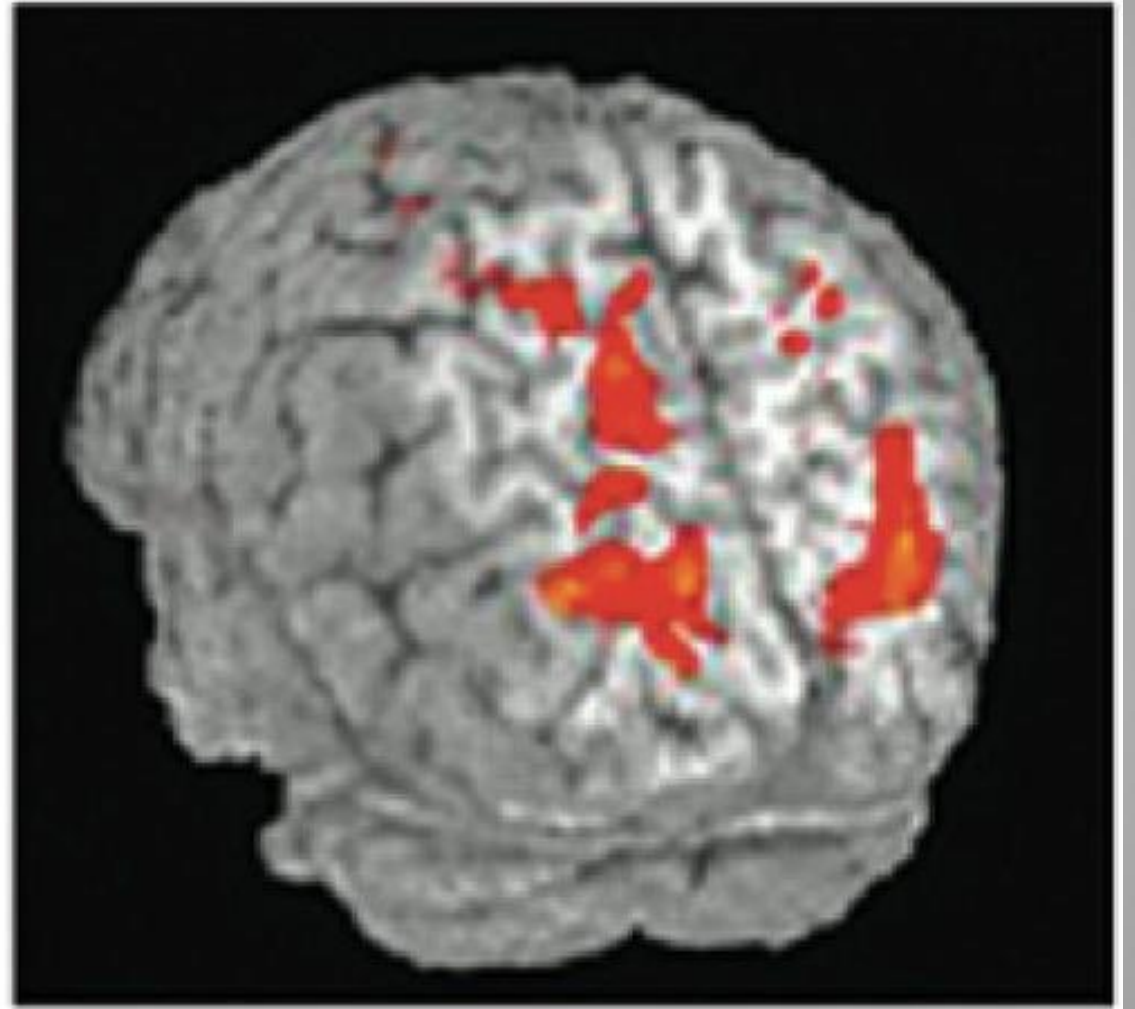


On phone...

More Visual Restrictions



Driving Alone



Driving and Listening

Work Zones: Planned Hazards



Construction Projects



Routine Maintenance

Mitigating a Killer

Driver Behavior

- **Vision Zero**
- **DIAD – Drop It And Drive**
- **National Work Zone Awareness Week**
- **Increased fines and points**

Engineering Solutions

- **Portable Changeable Message Signs**
- **Truck Mounted Attenuators**
- **Portable barriers – steel and concrete**
- **Temporary Portable Rumble Strips**

Countermeasure: Temporary Portable Rumble Strip (TPRS)



Research

- **Kansas U: sound & vibration = milled-in strips**
- **Ohio U: speed reduction 8-12 mph = alert drivers**
- **2 Case Studies**
 - **Pennsylvania Turnpike Commission**
 - **Texas A&M Transportation Institute I-35 Central Texas Expansion**



PA Turnpike Commission Study

Goals of Study:

- **Improve both work-zone and worker safety**
- **Determine if TPRS would increase driver awareness**



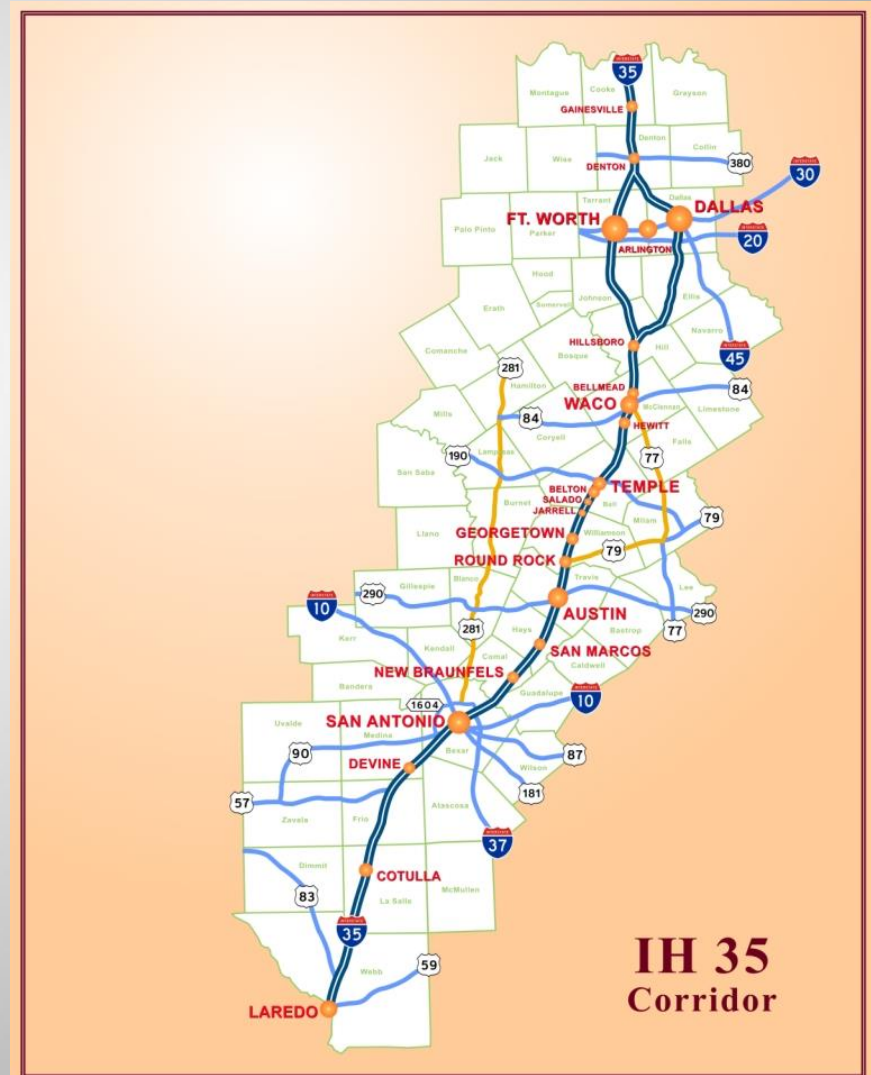
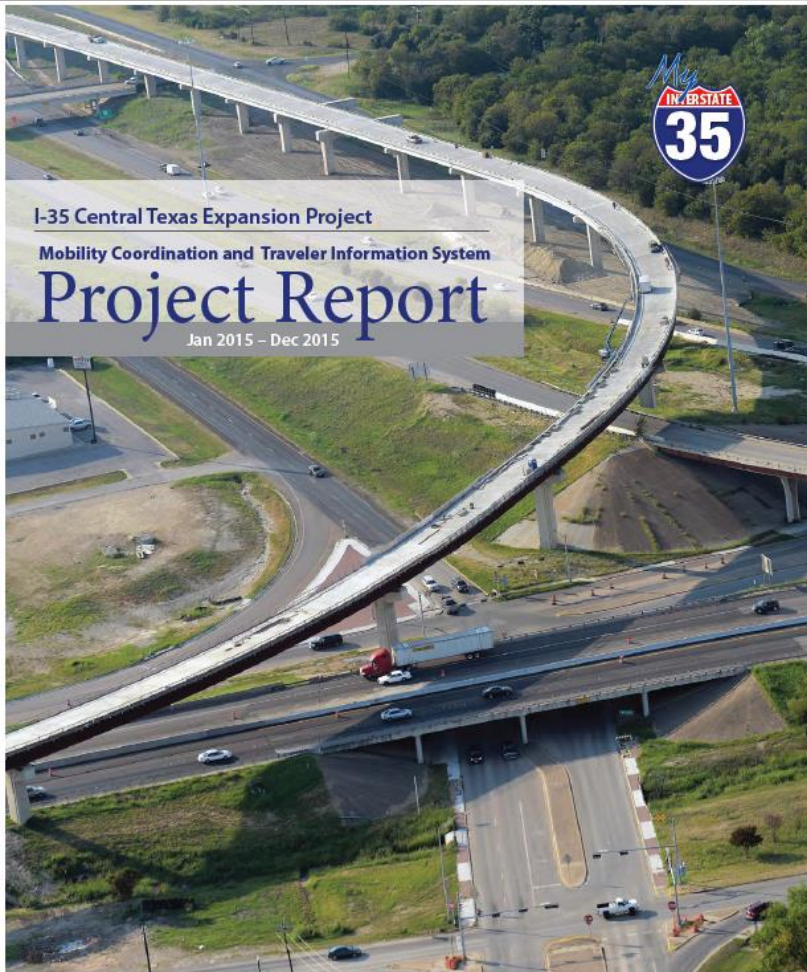
PA Turnpike: Conclusions

With TPRS arrays in place:

- Speed Reduction
 - 8% average
 - 4% 85th percentile
- Merge distance before lane closure
 - Base line – 90 M
 - TPRS + Trooper – 180 M
 - TPRS only - 210 M



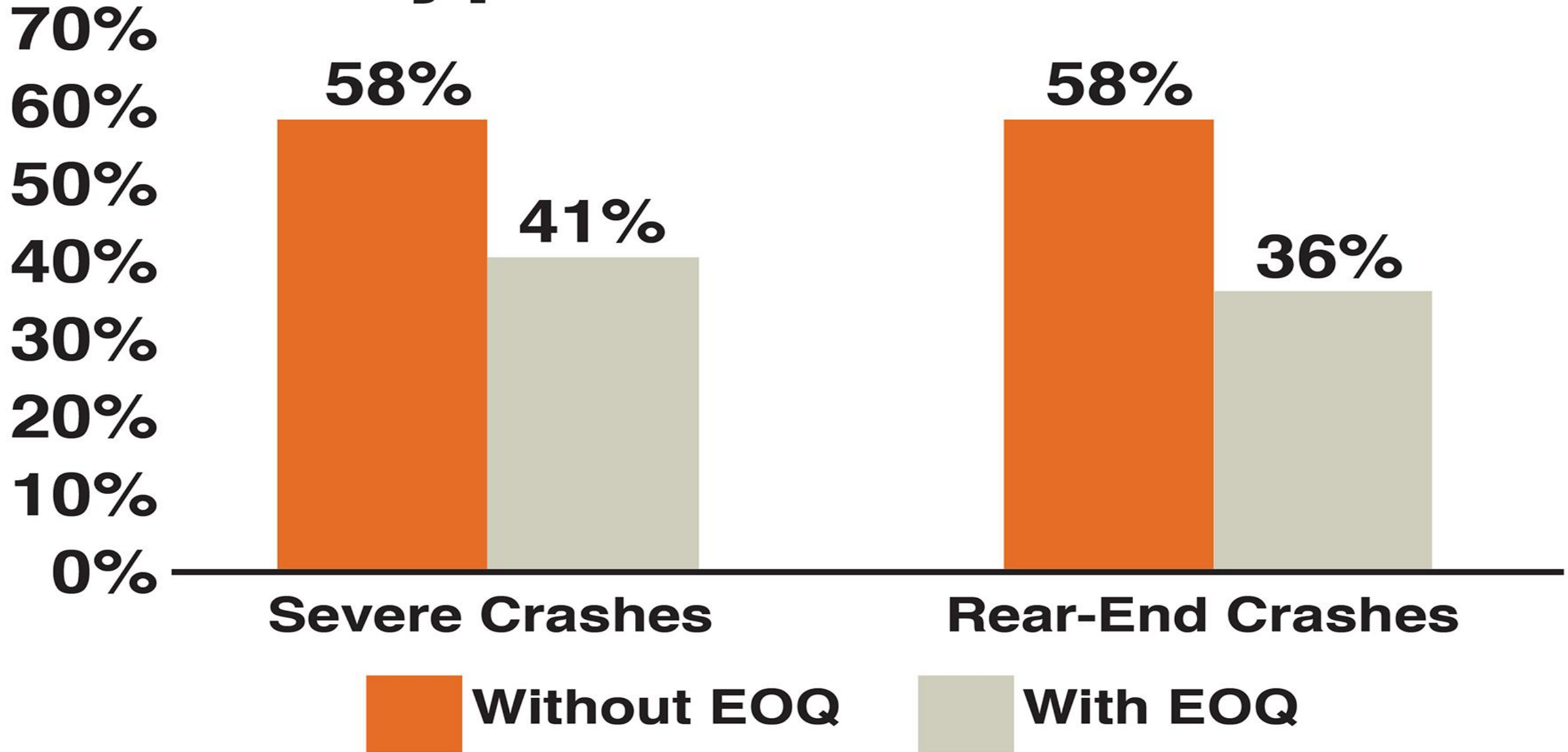
Case 2: I-35 Central Texas Expansion



End-of-Queue Warning System



Types of Crashes

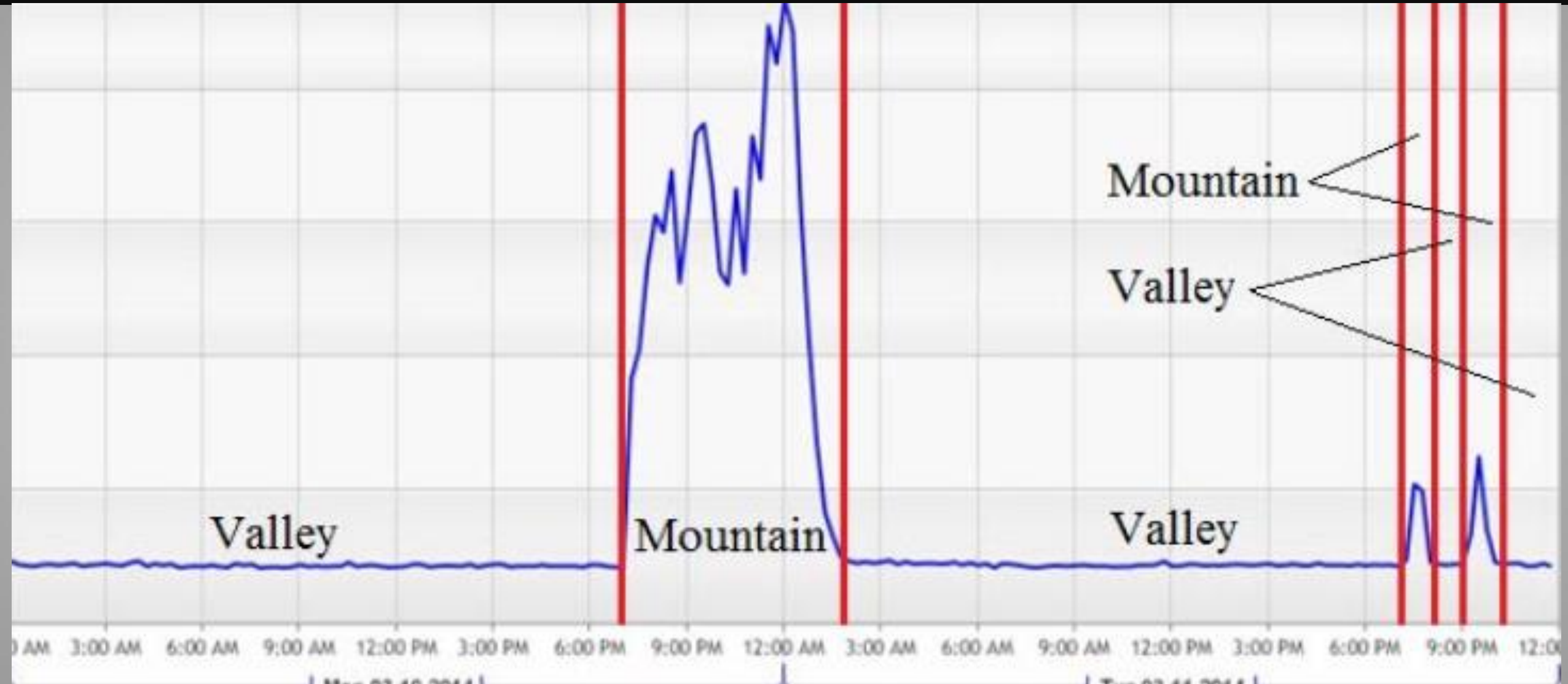


Average Crash Cost Savings with EOQ System



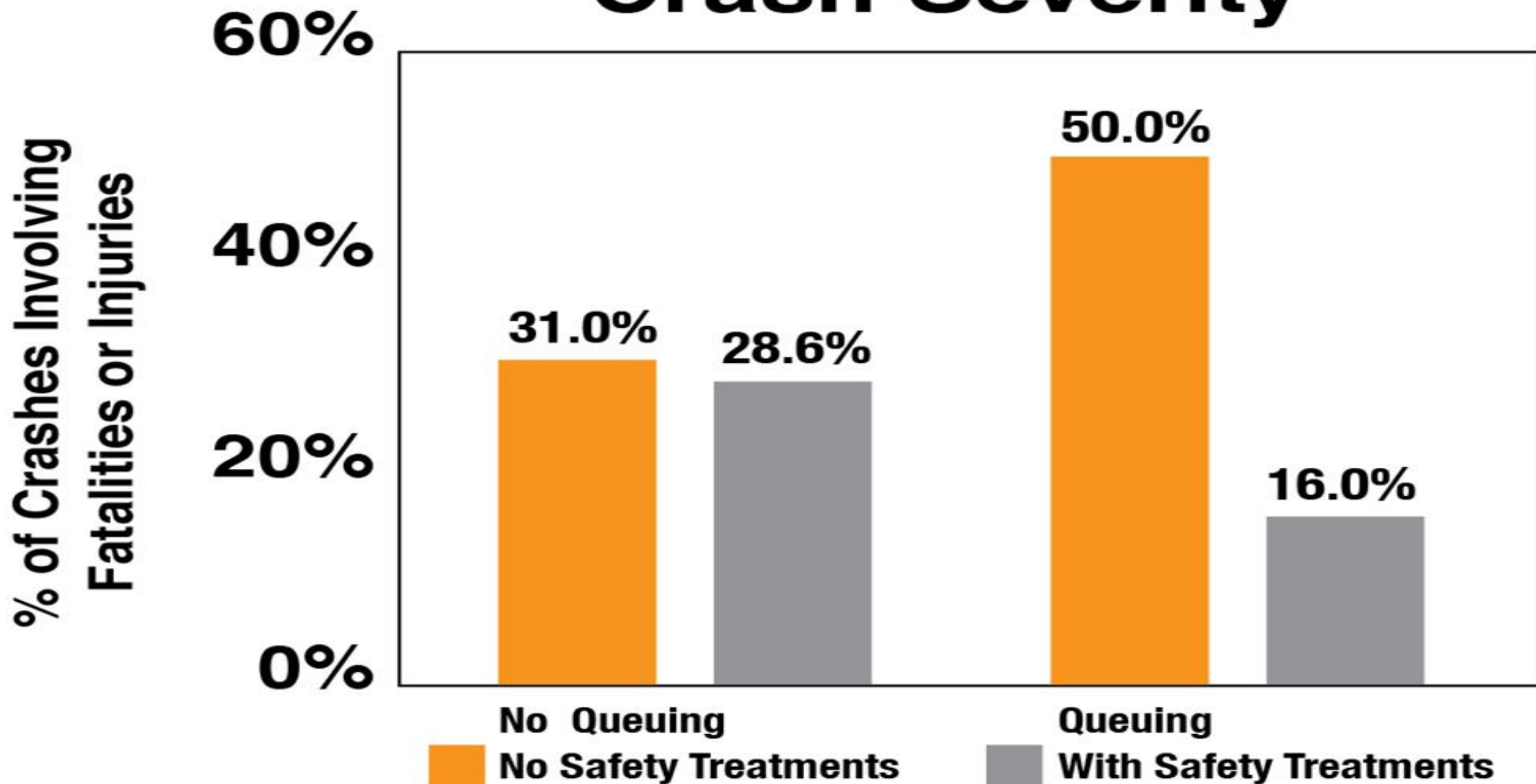
\$6,300 Per Night

TTI: Update!

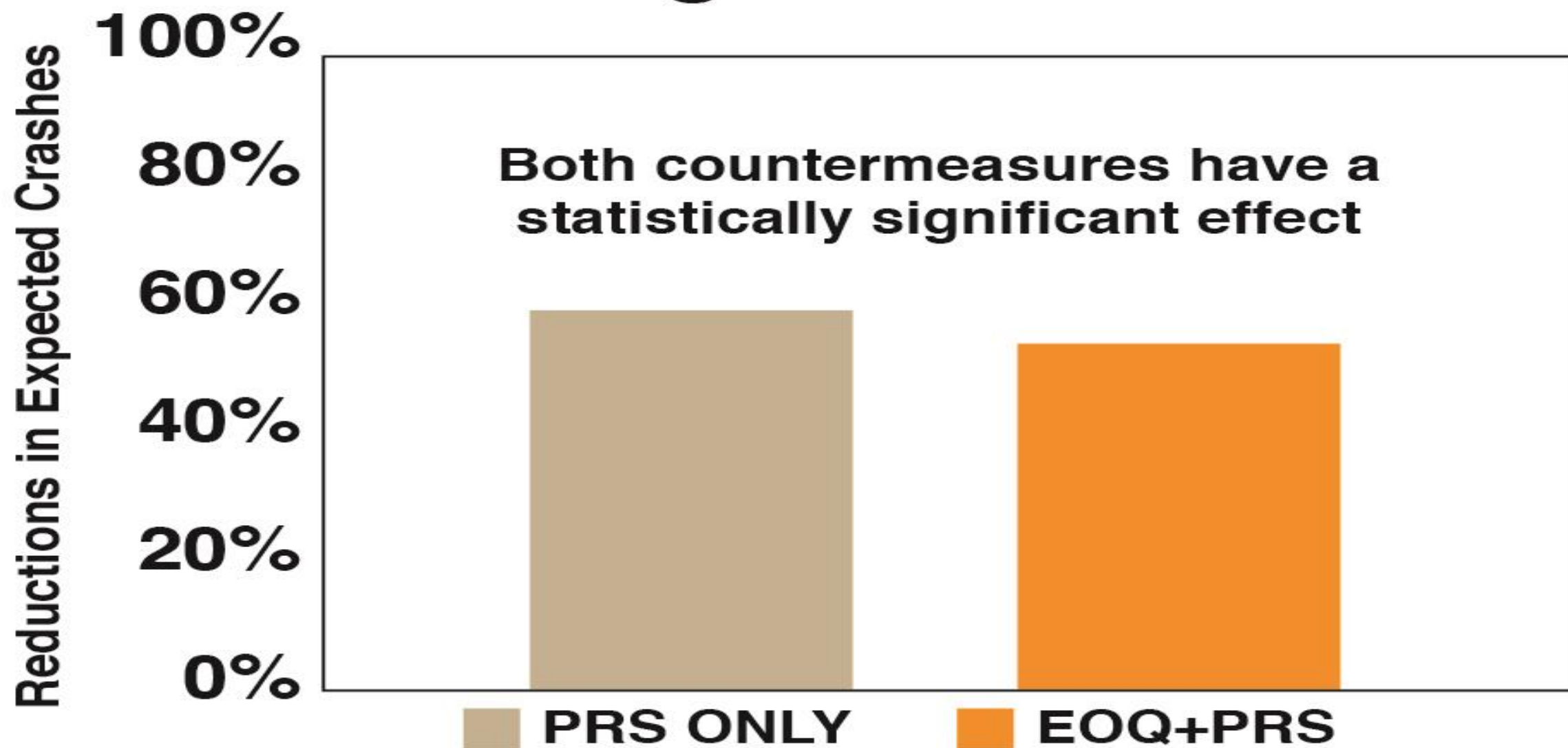


Queues developed during nighttime closures, 6 PM – 3 AM

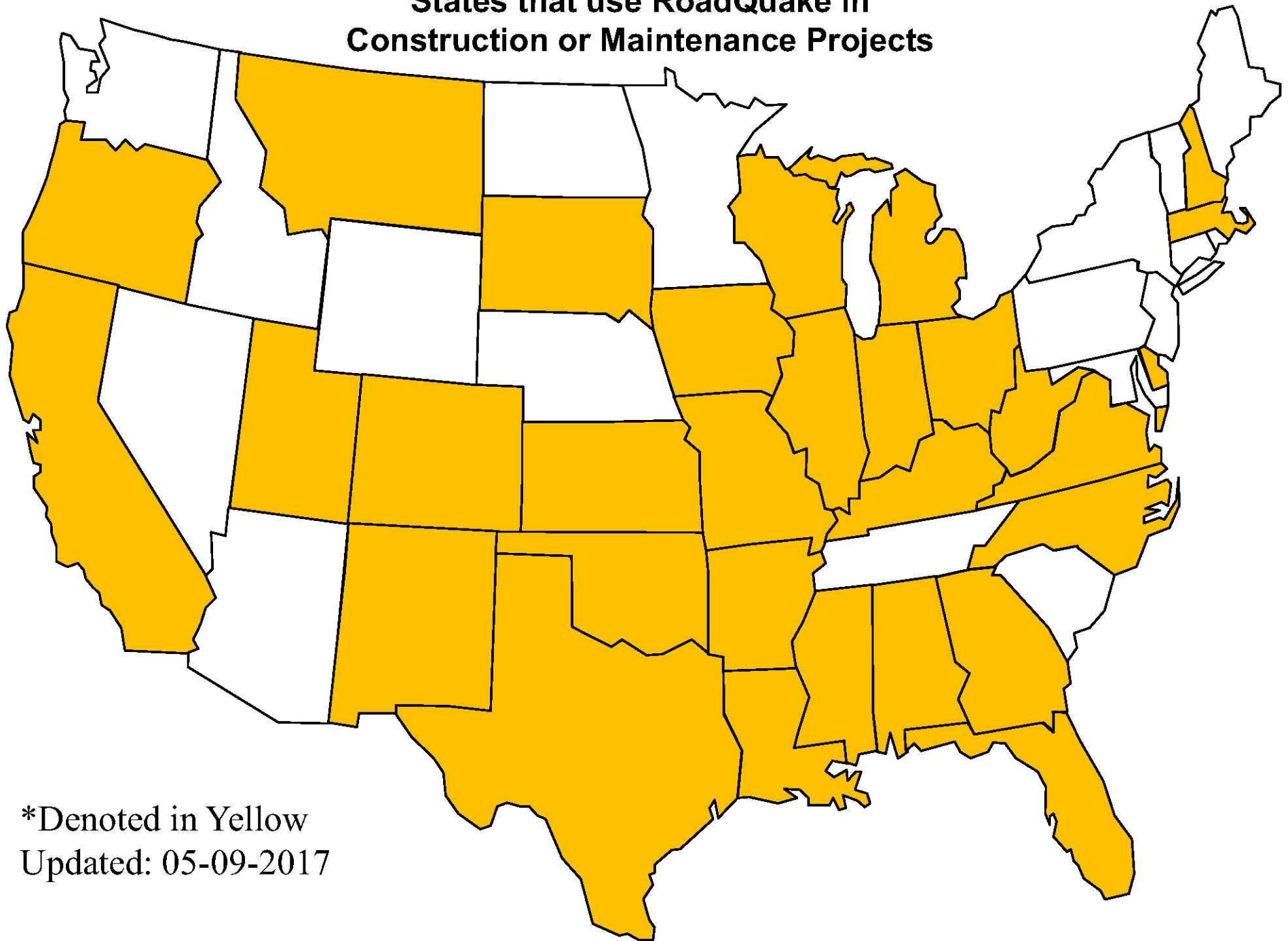
Crash Severity



Countermeasure Effects When Queuing is Present...



States that use RoadQuake in Construction or Maintenance Projects



*Denoted in Yellow
Updated: 05-09-2017

Experiences in Canada

TPRS in Western Provinces

- **Saskatchewan**
 - Ashley Richards dies - August 2012
 - Conditional Requirement – May 2013
- **British Columbia**
 - Field trial – July 2015
 - Included – 2016 Traffic Mgmt Manual
- **Alberta**
 - Field trials - 2016
- **Manitoba**
 - Field trials - 2017



Ashley Richards

References

- 1.) **Canadian Distractions Behind the Wheel, Rates.ca:** <http://ww1.prweb.com/prfiles/2014/10/07/12216393/Distracted%20Driving%20Inforgraphic.jpg>
- 2.) **Dr. Paul Atchley:** <https://psych.ku.edu/paul-atchley/link2>
- 3.) **Dr. David Strayer:** “A Comparison of the Cell Phone Driver and the Drunk Driver”, Human Factors: The Journal of the Human Factors and Ergonomics Society”, David Strayer, et al, Jan. 2006
http://www.csus.edu/indiv/m/merlinos/pdf/human%20factors_%20the%20journal%20of%20the%20human%20factors%20and%20ergonomics%20society-2006-strayer-381-91.pdf
- 4.) **PA Turnpike:** “RoadQuake Temporary Portable Rumble Strip Pilot Project”, Gibson-Thomas Engineering Co., Camp Hill PA, for Pennsylvania Turnpike Commission, May 13, 2016, Unpublished; contact PSS.
- 5.) **Texas A&M Transportation Institute (TTI):** “Safety Effects of Portable End-of-Queue Warning System”, Gerald Ullman, et al, Transportation Research Board (TRB), Jan, 10, 2016, <http://docs.trb.org/prp/16-3587.pdf>

Thank You



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