





Rumble Strips

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The Problem

Run-off-road crashes cause one-third of all traffic fatalities and two-thirds of those crashes occur in rural areas. The main causes of run-off-road crashes is that we're sleepy. Too many drivers are falling asleep at the wheel, the problem is compounded because we drive too fast. Alcohol and drugs can contribute to both fatigue and speed, but most often it's drowsy drivers who think they can "make it home," or that they have to "make it home," who become run-off-road crash statistics. In 1995, the crashes caused by drivers who fell asleep at the wheel caused 1,500 deaths and 71,000 injuries.

Noise and vibration produced by shoulder rumble strips are effective alarms for drivers who are leaving the roadway. They are also helpful in areas where motorists battle rain, fog, snow, or dust. Rumble strips also help reduce highway

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The Solution? Rumble Strips!

Rumble strips are raised or grooved patterns constructed on, or in travel lane and shoulder pavements. The texture of rumble strips is different from the road surface. Vehicle tires passing over them produce a sudden rumbling sound and cause the vehicle to vibrate. Road agencies use rumble strips to warn motorists of an upcoming change that may require them to act. For example, the need slow down for a toll plaza ahead, change lanes for a work zone around the curve, stop for a traffic signal, or steer back onto the roadway. Rumble strips in travel lanes often precede intersections, especially dangerous ones. They are used primarily on expressways, interstate highways, and parkways, although some States install them on 2-lane rural roads that have high numbers of single-vehicle crashes.

What Do the Experts Say?

Peter Gustafson, New York State Thruway, talks about the overall worth of rumble strips as a run-off-road solution

Peter Gustafson, New York State Thruway, discusses the effectiveness of rumble strips on a 1-mile test zone

John Watson,
New York State DOT
makes a single statement on
the safety value of rumble strips



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The Costs vs the Benefits of Rumble Strips

Run-off-road crashes carry a high price tag. The estimated annual cost of this type of crash is \$80 billion. In addition to the lost lives and health care costs of those injured, there is property damage and the untold cost of emotional distress and family disruption.

Several State DOTs have analyzed the benefit/cost ratios of shoulder rumble strips. The analysis involves assumptions based on installation and maintenance costs and the effect of protecting travelers versus the savings in fatalities, injuries, and property damage crash costs. These values are based on the FHWA's *The Cost of Highway Crashes* (Publication No. FHWA-RD-91-055, available in hardcopy through the FHWA's Turner Fairbank Research Center).

Peter Gustafson,
New York State Thruway
talks about the overall worth of
rumble strips as a run-off-road solution.



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Rumble Strip Effectiveness


How effective are rumble strips as a safety enhancement? Let's do the numbers. Motor vehicles running off the road (ROR) account for one-third of all traffic fatalities nationwide and about two-thirds of these ROR fatalities occur in rural areas. It has been estimated that 40 to 60 percent of these crashes are due to driver fatigue, drowsiness or inattention.

Many studies of the effectiveness of shoulder rumble strips indicate that they can reduce the overall rate of run-off-road crashes by 15 and 70 percent. And there's more. By reducing the number of crashes, shoulder rumble strips also effectively reduce the number of injuries and fatalities.


See what the following States report on the effectiveness of rumble strips:

- California
- New York
- Pennsylvania
- Wyoming

John Watson, New York State DOT tells about driving in a snowstorm and how rumble strips helped guide him back to the roadway.



Chuck Benson, Professional Truck Driver tells how rumble strips helped him during a snowstorm on I-78 in Pennsylvania.



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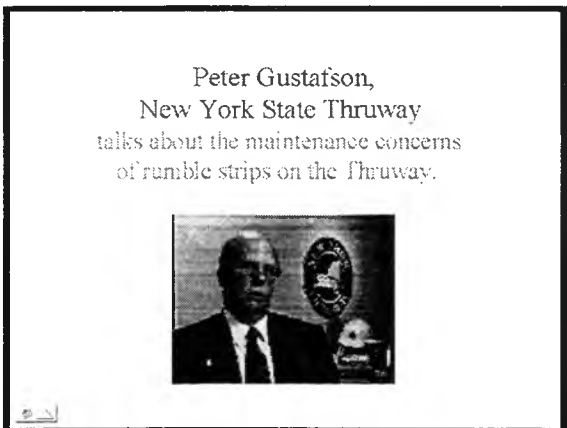
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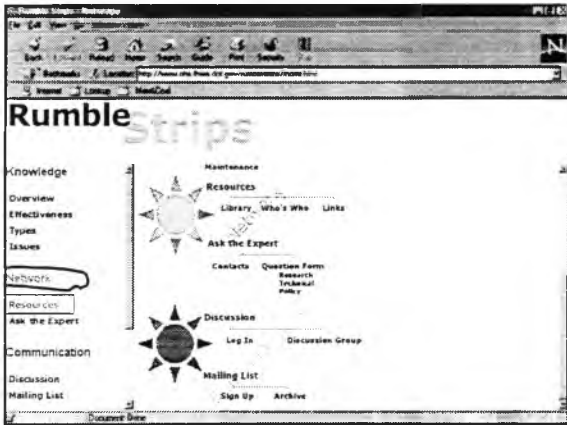
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The Costs vs the Benefits of Rumble Strips

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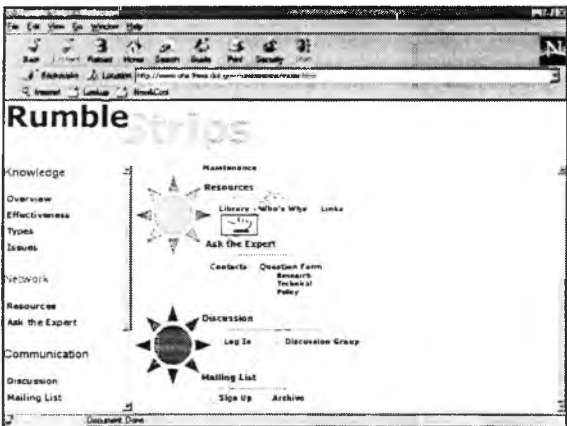
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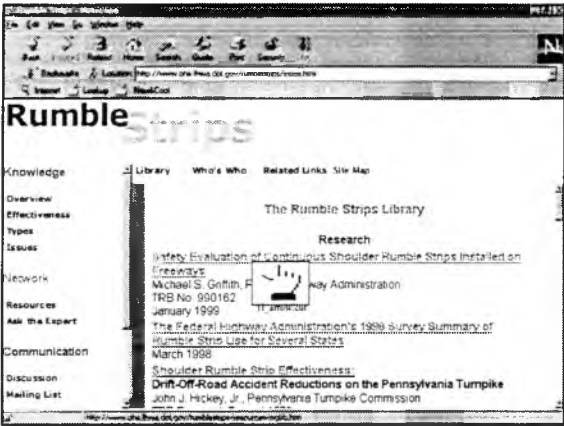
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Safety Evaluation of Continuous Shoulder Rumble Strips Installed on Freeways

Michael S. Griffith

Abstract

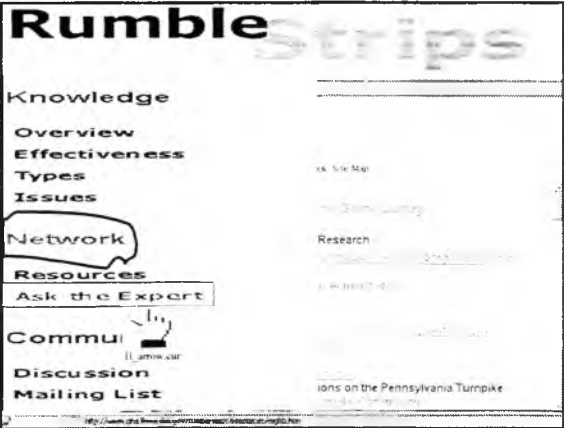
Single vehicle run-off-the-road crashes result in approximately one-third of all highway fatalities and one-half million people injured annually, with a societal cost of \$80 billion each year. Continuous shoulder rumble strips (CSRS) are one countermeasure used to address this significant safety problem. This study extracted data for two States (California and Illinois) from the Highway Safety Information System (HSIS) to estimate the safety effects of CSRS on freeways. Before-after evaluations of CSRS projects with the use of different comparison groups were conducted. The results from the evaluations estimate that CSRS reduce single-vehicle run-off-the-road crashes on average by 18.3 percent on all freeways (no regard to urban/rural classification) and 21.1 percent on rural freeways. Two types of potential adverse effects related to safety with CSRS were analyzed. The first type pertains to the crash risk that CSRS may present due to driver startle/panic responses. The second potential adverse effect of CSRS is crash migration. The research findings show that these potential adverse effects are insignificant.

Keywords

Continuous shoulder rumble strips, freeways, before-after evaluations, accident analysis, crash migration

Acknowledgments


I acknowledge Yusuf Mohamedshah for the tremendous amount of computer programming he provided to format and extract the HSIS data. I thank Forrest Council for all the advice he contributed during the study. I recognize Ezra Hauer as a teacher who has made me a better student of highway safety research.



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Rumble Strip Experts

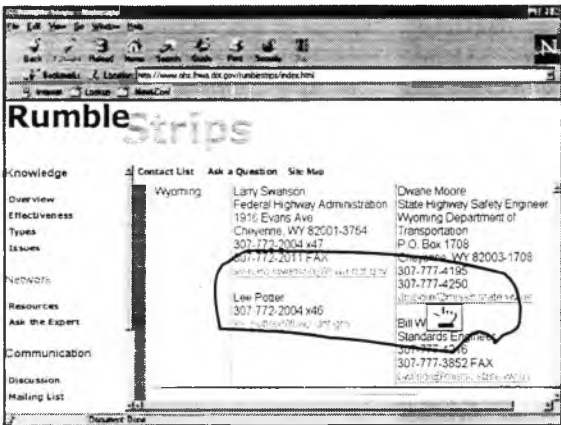
How do you install rumble strips? What are the most effective rumble strips? Who in my State knows about these and other rumble strip questions?

The answers to these and any other rumble strip questions you may have are just a click away...

Go here for a [list of your local FHWA and State DOT rumble strip experts](#).

Need a little more advice? Contact one of the experts [by e-mail or form](#).

- For technical and policy-related rumble strip questions, or any field



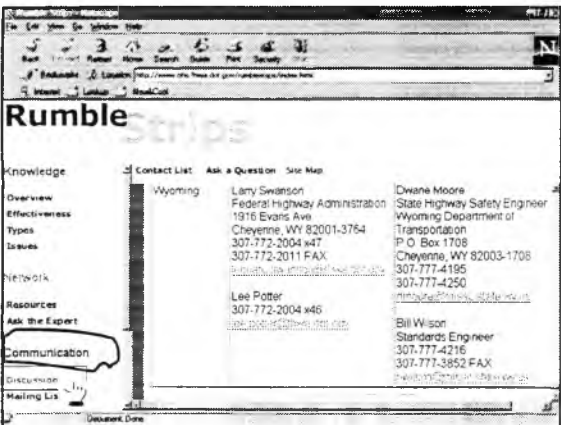
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Wyoming

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Wyoming

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Rumble Strips and Freezing Conditions

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Rumble Strips and Freezing Conditions Miguel B. Gahalden 01/15/99
 RE: Rumble Strips and Freezing Cond Doug Johnson 01/20/99
 RE: Rumble Strips and Freezing Cond Doug Johnson 01/20/99
 RE: Rumble Strips and Freezing Cond Emmett Rodewitt 01/25/99
 RE: Rumble Strips and Freezing Cond Ron Erickson, Minnes 02/24/99

[Posts Reply]

Title: Rumble Strips and Freezing Conditions
 From: Miguel B. Gahalden Jr.
 Date: 01/15/99

Have anyone had situations where the rumble strip holds water and then freezes? How has anyone addressed this issue to prevent or mitigate this condition? New Mexico is just beginning to utilize milled rumble strips and this concern has recently surfaced.

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RE: Rumble Strips and Freezing Conditions
 From: Doug Johnson
 Date: 01/20/99

Miguel,

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My company has cut thousands of miles of rumble strips in many heavy snow states since 1992. These states include Colorado, Utah, Wyoming, Montana, Maine, New Hampshire, New York, Pennsylvania, and so on.

Freezing is always a concern, but none of these states have yet to report the situation you describe as a problem. You may want to contact those states yourself.

The slope of the road will cause about 70% of the water to drain from the rumble strip immediately (this will vary according to the slope). The upward sloping edges of the rumble strip that NDM has adopted will remain dry.

This leaves only a small portion of the rumble strip that can actually hold water. I commonly observe about an 1/8-inch of water across a 3-inch width. I have observed some freezing, but not enough to generate any adverse handling of the vehicle.

Massachusetts Turnpike, the New York Thruway, and the Pennsylvania Turnpike have been through a number of hard winters using the 7-inch milled rumble strip that NDM has adopted. They have had that rumble strip design in use longer than any other US highway authority. You may want to contact those authorities directly.

Sincerely,
 Douglas Johnson

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RE: Rumble Strips and Freezing Conditions
 From: Ron Erickson, Minnesota DOT
 Date: 02/04/99

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We have milled in many miles of rumble strips and I have never heard of a problem. I do hear concern expressed by our Material Engineers in the District but still no evidence that we are having any deterioration. We will be adding them in two-lane roadways as standard practice starting this year.

Reply to Message

Title: RE: Rumble Strips and Freezing Conditions

