NCHRP 17-113 COUNTERMEASURES

Install Shoulder Rumble Strips and Widen Shoulder

Installing shoulder rumble strips and widening the shoulder can improve the visibility and longevity of the pavement under adverse conditions.

Implementation Strategy

How and Where to Apply

- Install shoulder rumble strips on rural roads, especially in areas prone to run-off-road crashes and with limited visibility or horizontal curves. These rumble strips alert drifting drivers through vibration and noise, reducing lane departures.
- Widen shoulders to provide a safe recovery area that allows drivers space to regain control if they veer off the travel lane.
- Shoulder rumble strips with widened shoulders help on rural freeways and high-speed roads by reducing run-off crashes. In narrow urban corridors, they add noise, reduce cyclist space, and require costly widening.

Use in a Safe System Approach

Shoulder rumble strips with widened shoulders support the Safe System Approach by addressing human error and reducing crash severity.

Key Stakeholders

State DOTs, MPOs, engineering consultants, construction contractors, freight/trucking associations, safety advocacy groups.

Proactive Implementation

Prioritize installation in rural corridors with high incidences of run-off-road and head-on crashes, particularly on segments with horizontal curves or poor visibility. Integrate these measures during resurfacing or shoulder improvement projects for cost efficiency. Use crash data and roadway characteristics to target locations with the greatest safety needs.

Countermeasure Overview

Objective: Keep vehicles from encroaching on the roadside.
Strategy: Provide improved highway geometry for horizontal curves.

Targeted Solution

CONTRIBUTING FACTORS	▪ Reduced visibility ▪ Driver inattention
TARGET CRASH TYPE	▪ Run-off Road
ROAD FACILITY TYPE	▪ N/A
AREA TYPE	▪ Rural

Safety Linkage

NCHRP 500 Series	SAFE SYSTEM APPROACH
Run-off Road	Safe Roads
AASHTO'S TOWARD ZERO DEATHS	SAFE SYSTEM ROADWAY DESIGN
Safer Infrastructure	Tier 1

Selected Related Countermeasures

- CM1 Clear zone improvements
- CM2 Enhanced pavement markings
- CM3 Guardrails and barriers

Cost: $$$$ (High)
Service Life: 20 years
Benefit-Cost Ratio: 100.0:1

Safety Benefits

55% Reduces all types of crashes and severity levels K, A, B, and C on rural multi-lane roads (CMF ID: 6670)

39% Reduces run off road and single vehicle crashes and K, A, B, C severities on rural multi-lane roads (CMF ID: 6668)

Resources

- Study of KDOT Policy on Lane and Shoulder Minimum Width for Application of Centerline Rumble Strips
- Studies to Determine the Operational Effects of Shoulder and Centerline Rumble Strips on Two-Lane Undivided Roadways

Shoulder Rumble Strips and Widen Shoulder. Source: FHWA.