NCHRP 17-113 COUNTERMEASURES

ROADWAY DEPARTURE

Transverse Rumble Strip

Raised or grooved patterns placed perpendicular across a lane to alert drivers through noise and vibration of upcoming hazards and encourage speed reduction.

Implementation Strategy

How and Where to Apply

- Installed perpendicular across the full lane width at locations such as rural stop-controlled intersections, curves, pedestrian crossings, and work zones.
- Installed during road resurfacing or as retrofits using materials like thermoplastic, milled asphalt, or epoxy, transverse rumble strips help reduce approach speeds and improve driver reaction times at critical decision points.
- Best suited for high-speed roads near hazards like intersections or pedestrian zones, where rumble strips alert drivers and reduce speeds. Avoid where quiet residential areas or roads with heavy bike traffic, as noise and vibration may disturb residents or unsettle cyclists.

Use in a Safe System Approach

Raised or grooved patterns support the Safe Speeds and Safe Roads pillars of the Safe System Approach. They alert drivers to hazards and reduce speeds, addressing human errors and vulnerabilities to prevent crashes and serious injuries.

Key Stakeholders

State DOTs, local law enforcement agencies

Proactive Implementation

Transverse rumble strips should be installed at high-risk locations during resurfacing or new construction before crashes occur. This includes using materials optimized for durability and visibility, strategically spacing strips to create effective deceleration cues, and combining them with enhanced signage and pavement markings. Implementation is guided by traffic data and integrated within broader safety programs like the SSA.

Countermeasure Overview

Objective: Warn drivers from encroaching on the roadside.

Strategy: Install rumble strips across the entire lane.

Targeted Solution

CONTRIBUTING FACTORS	▪ Lane departure ▪ Driver inattention
TARGET CRASH TYPE	▪ Head-on
ROAD FACILITY TYPE	▪ Two-lane or multilane roads
AREA TYPE	▪ Rural

Safety Linkage

NCHRP 500 Series	SAFE SYSTEM APPROACH
Head-on Crashes	Safe Roads
AASHTO'S TOWARD ZERO DEATHS	SAFE SYSTEM ROADWAY DESIGN
Safer Infrastructure	Tier 4

Selected Related Countermeasures

- CM1 Shoulder Rumble Strips
- CM2 Centerline Rumble Strips
- CM3 Edgeline Rumble Strips

Cost: $ (Low)

Service Life: 5 years

Benefit-Cost Ratio: 2.1:1

Transverse Rumble Strip. Source: ITE

Safety Benefits

Alerts drivers to hazards and encourages speed reduction through vibration and noise.

Resources

- FHWA Longitudinal Rumble Strips
- Centerline rumble strips on secondary highways
- Traffic safety bulletin 20-07: rumble strip guidelines
- Benefit-cost Ratio
- FHWA-SA-24-033