NCHRP 17-113 COUNTERMEASURES

ROADWAY DEPARTURE

Widen Shoulder

Widening paved shoulders on roadways can help reduce run-off road crashes, increase stability for vehicles, and improve maneuvering space for drivers.

Implementation Strategy

How and Where to Apply

- Widen paved shoulders on high-speed, limited-access highways, especially along segments with high run-off-road crash frequencies or restricted recovery zones.
- This provides additional recovery space for errant vehicles, improves lateral clearance for disabled vehicles or emergency stops, and offers increased space for maintenance activities.
- Best suited for rural high-speed roads or highways with high run-off risks, where wider shoulders provide recovery space and boost vehicle stability. Avoid where urban areas with limited right-of-way or steep slopes, as widening may increase costs and drainage issues.

Use in a Safe System Approach

Wider paved shoulders on roadways support the Safe Roads element of the Safe System Approach. They provide extra space to handle human mistakes and vulnerabilities, reducing run-off crashes and preventing deaths or serious injuries.

Key Stakeholders

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

Proactive Implementation

Widening shoulders should be integrated during planned resurfacing, reconstruction, or capacity improvement projects on interstates and high-speed arterials. Agencies should prioritize segments with narrow shoulders, high-speed limits, or elevated single-vehicle crash rates. Research emphasized that modest increases in shoulder width provided measurable safety benefits and extended pavement life by reducing edge deterioration.

Countermeasure Overview

Objective: Keep vehicles from encroaching on the roadside.
Strategy: Apply shoulder treatments.

Targeted Solution

CONTRIBUTING FACTORS	▪ Reduced visibility ▪ Driver inattention/ distraction
TARGET CRASH TYPE	▪ Run-off Road
ROAD FACILITY TYPE	▪ Principal Arterial Interstate
AREA TYPE	▪ All

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 Rumble strips on widened shoulders
- CM2 Guardrail upgrades
- CM3 High-friction surface treatments

Cost: $$ (Moderate)
Service Life: 20 years
Benefit-Cost Ratio: 1.2:1

Wide Shoulder on Road. Source: VHB.

Safety Benefits

16% Widen paved shoulder from 4 ft to 8 ft, reduces fixed object, head-on, run-off-road, and sideswipe crashes of K severity in urban multi lane roads (CMF ID : 6295)

7% Reduces fixed object, head-on, run-off-road, and sideswipe crashes and K severity in urban multi lane roads (CMF ID: 6213)

Resources

- Analysis of the Shoulder Widening Need on the State Highway System
- Potential Safety Effects of Lane Width and Shoulder Width on Two-Lane Rural State Highways in Idaho