NCHRP 17-113 COUNTERMEASURES

Widen Shoulder

ROADWAY DEPARTURE

Wider 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 shoulders on rural roads, especially in areas with limited visibility or curved alignments, where run-off-road crashes are prevalent.
- Wider shoulders give drivers more space to recover control safely if they drift out of the travel lane, helping prevent crashes with roadside obstacles or steep slopes.
- Shoulder widening can be combined with other roadside safety improvements such as guardrails or clear zones for enhanced effectiveness.

Use in a Safe System Approach

Widened shoulders directly support the SSA by providing a physical recovery zone that reduces crash severity and likelihood. They serve as a buffer that accounts for human error, allowing drivers an opportunity to correct mistakes without leaving the roadway or encountering hazardous obstacles.

Key Stakeholders

State DOTs, Local Road Maintenance Agencies

Proactive Implementation

Shoulder widening should be prioritized in rural corridors with a documented history or high potential for run-off-road crashes, especially on segments with horizontal curves or limited visibility. Integrating widening projects into routine road maintenance or resurfacing programs maximizes cost-efficiency and safety benefits. Agencies should use crash and roadway data to identify critical locations for shoulder improvements.

Countermeasure Overview

Objective: Keep vehicles from encroaching on the roadside.

Strategy: Apply shoulder treatments (Widen and/or pave shoulders).

Selected Related Countermeasures

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

Cost: High

Service Life: 20 years

Targeted Solution

CONTRIBUTING FACTORS	▪ Reduced visibility ▪ Driver inattention/ distraction
TARGET CRASH TYPE	▪ Run-off Road
ROAD FACILITY TYPE (ARTERIAL, COLLECTOR, LOCAL)	▪ N/A
AREA TYPE	▪ Rural

Safety Linkage

NCHRP 500 Series

Run-off road

AASHTO'S TOWARD ZERO DEATHS

Safer Infrastructure

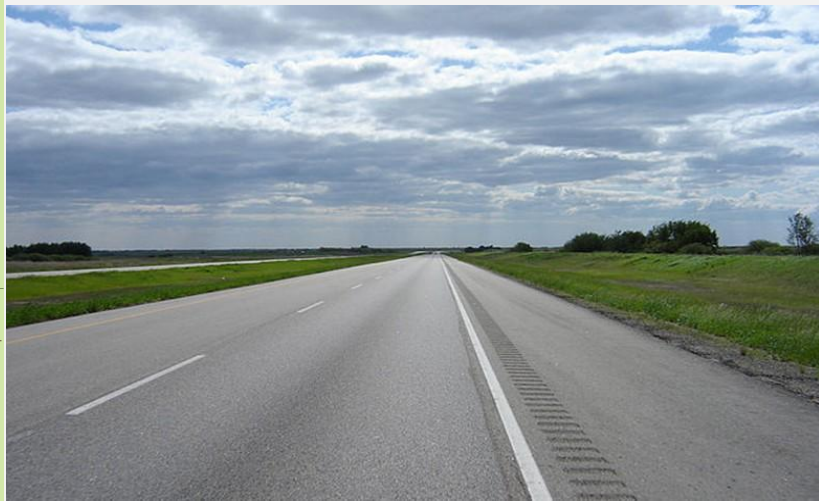
SAFE SYSTEM APPROACH

Safe Roads

SAFE SYSTEM ROADWAY DESIGN

TIER 1
TIER 2
TIER 3
TIER 4

Tier 1



Wide Shoulder on Road, Source: Wikipedia.

Safety Benefits

61% Reduces risk of run-off-road crashes of all severity types in rural areas[1]

40% Reduces single-vehicle run-off-road crashes on rural highways.[2]

[1] CMF ID: 7761
[2] CMF ID: 7759

Resources

- Safety Evaluation of Lane and Shoulder Width Combinations on Rural, Two-Lane, Undivided Roads
- Analysis of the Shoulder Widening Need on the State Highway System