NCHRP 17-113 COUNTERMEASURES

Install Profiled Thermoplastic Pavement Markings

ROADWAY DEPARTURE

Profiled thermoplastic pavement markings are raised, reflective lines that enhance visibility and provide tactile-auditory feedback to reduce nighttime and wet-weather lane departures.

Implementation Strategy

How and Where to Apply

- Install during resurfacing or upgrades where markings deteriorate quickly or visibility is poor in wet or dark conditions.
- Apply on freeways, rural arterials, curves, and ramps with a documented history of run-off-road or lane-departure crashes, especially under low-visibility conditions.
- Work well on high-speed highways to improve visibility and lane discipline. On low-speed urban or residential roads, they can create excess noise, disturb nearby land use, and wear quickly under turning traffic.

Use in a Safe System Approach

Supports the Safe System Approach by improving Safer Roads and Safer People. It addresses human error by reinforcing lane discipline and providing early feedback to reduce crash frequency and severity.

Key Stakeholders

State DOTs, MPOs, engineering consultants, construction contractors, safety advocacy groups.

Proactive Implementation

Incorporate profiled thermoplastic markings during planned resurfacing, restriping, or safety improvement projects—especially on corridors with documented lane-departure crashes or low nighttime visibility. Prioritize sites with recurring wet-weather incidents and ensure compatibility with snowplows and local noise considerations. Use systemic safety analysis to identify candidate road segments before crashes occur.

Countermeasure Overview

Objective: Keep vehicles from encroaching on the roadside.
Strategy: Install edge line profile marking, edge line rumble strips or modified shoulder rumble strips on section with narrow or no paved shoulders.

Targeted Solution

CONTRIBUTING FACTORS	▪ Reduced visibility ▪ Driver inattention/ distraction
TARGET CRASH TYPE	▪ Run-off-road ▪ Head-on
ROAD FACILITY TYPE	▪ 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

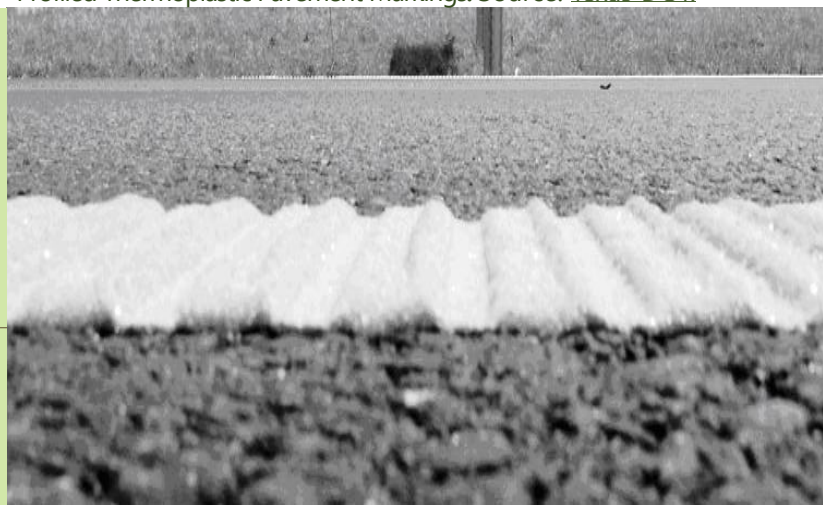
SAFE SYSTEM ROADWAY DESIGN: TIER 1, TIER 2, TIER 3, TIER 4 — Tier 4

Selected Related Countermeasures

- CM1 Reflective Raised Pavement Markers
- CM2 Wider Longitudinal Pavement Markings
- CM3 Wet-Reflective Pavement Markings

Cost: $ (Low)
Service Life: 5 years
Benefit-Cost Ratio: 3.65

Profiled Thermoplastic Pavement Markings. Source: Texas DOT.



Safety Benefits

10% — Reduces crashes of all types and severity levels K, A, B, and C on all rural roads (CMF ID: 9812)

03% — Reduces crashes of all types and severity levels K, A, B, and C on all rural roads (CMF ID: 9799)

Resources

- FHWA MUTCD (11th Edition)
- Manual on Uniform Traffic Control Devices (MUTCD), Part 3