NCHRP 17-113 COUNTERMEASURES

Install Periodic Passing Lanes on Rural Two-lane Highways

ROADWAY DEPARTURE

Periodic passing lanes are strategically placed additional lanes on rural two-lane highways that allow faster vehicles to safely pass slower-moving traffic without entering the opposing travel lane.

Implementation Strategy

How and Where to Apply

- Passing lanes are typically installed on rural two-lane highways with high volumes of mixed-speed traffic and few safe passing opportunities.
- Ideal locations include long grades, limited sight distance, unsafe passing crash histories, and segments balancing construction costs with safety benefits.
- Best applied on rural highways with heavy trucks and unsafe passing crashes; avoid low-volume roads or environmentally constrained corridors.

Key Stakeholders

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

Proactive Implementation

Signal visibility upgrades can be applied proactively at intersections with known risk factors, identified through systemic safety analysis or regular signal audits. Locations with aging infrastructure or non-compliant signal equipment may also be prioritized. Improvements may be implemented as part of larger signal retiming or corridor safety projects.

Use in a Safe System Approach

This countermeasure aligns with Safe System principles of crash risk reduction, separation, and human error tolerance. It lowers the likelihood of head-on crashes caused by unsafe passing and encourages more predictable driver behavior by reducing pressure to take unsafe risks.

Countermeasure Overview

Objective: Minimize the likelihood of crashing into an oncoming vehicle
Strategy: Use alternating passing lanes or four-lane sections at key locations

Targeted Solution

CONTRIBUTING FACTORS	▪ Driver frustration leading to risky overtaking behavior
TARGET CRASH TYPE	▪ Head-on
ROAD FACILITY TYPE	▪ Principal Arterial Other
AREA TYPE	▪ Rural

Safety Linkage

NCHRP 500 Series

Head-On Collisions

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

Selected Related Countermeasures

- CM1 Install Climbing Lanes on Long Grades
- CM2 Add Turnouts for Slow-Moving Vehicles
- CM3 Improve Passing Zone Striping and Signage

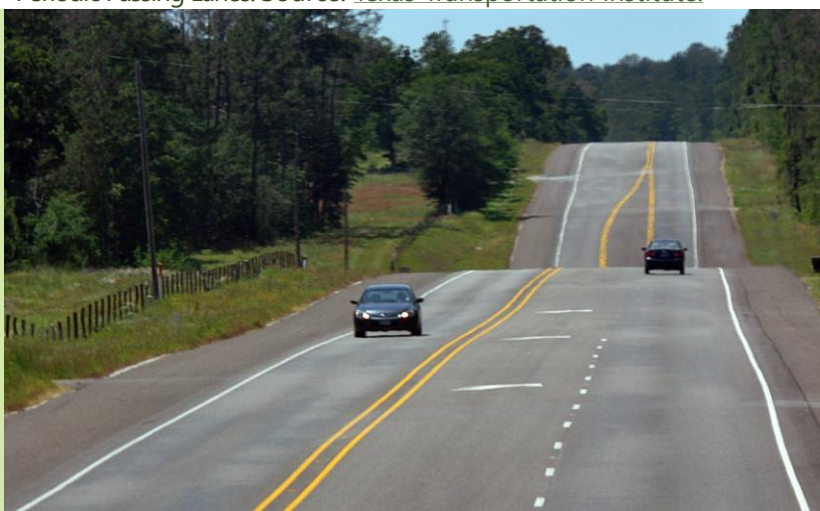
Cost: $$$ (Moderate to High)
Service Life: 20 years
Benefit-Cost: 0.4:1 to 3.5:1

Periodic Passing Lanes. Source: Texas Transportation Institute.

Safety Benefits

42% Reduces crashes of all types and severity levels K, A, B, and C on rural undivided two-lane principal arterial roads (CMF ID: 4083)

35% Reduces crashes for non-intersection and K,A, B, C severities on rural undivided two-lane principal arterial roads (CMF ID: 4082)



Resources

- FHWA Signalized Intersections: Informational Guide (FHWA-HRT-04-091)
- MUTCD Chapter 4D: Traffic Control Signal Features
- NCHRP Report 491: Crash Reduction Factors for Traffic Engineering and ITS Improvements