NCHRP 17-113 COUNTERMEASURES

Convert 2 Lane Roadway to 4 Lane Divided Roadway

ROADWAY DEPARTURE

Expanding and dividing roadways aims to increase capacity and reduce cross-traffic conflicts, potentially improving safety and flow.

Implementation Strategy

How and Where to Apply

- This treatment is best suited for roadways with high traffic volumes, limited passing opportunities, and history of head-on or ROR crashes.
- A divided roadway physically separates travel directions, eliminates the need for risky overtaking, and provides space for left-turn lanes or recovery in the event of driver error.
- Consider implementing during major reconstruction or corridor upgrades where traffic growth and crash history indicate the need for capacity and safety improvements.

Key Stakeholders

State DOTs, Traffic Safety Engineers, Urban Planners

Proactive Implementation

Agencies should identify corridors where traffic volumes, crash histories, and overtaking-related collisions suggest a need for divided roadways. Implementation can be prioritized through safety audits and regional transportation planning. Conversions can be phased or integrated into resurfacing, realignment, or development-driven roadway expansion projects.

Use in a Safe System Approach

This countermeasure directly aligns with SSA principles by designing roads to reduce conflict points and the consequences of driver error. Divided roadways eliminate direct opposing traffic exposure, and provide room for error recovery, ultimately reducing both crash frequency and severity.

Countermeasure Overview

Objective: Reduce the severity of the crash

Strategy: Improve design and application of barrier and attenuation systems

Targeted Solution

CONTRIBUTING FACTORS	▪ Risky Overtaking Maneuvers
TARGET CRASH TYPE	▪ Run-off Road ▪ Head-on
ROAD FACILITY TYPE	▪ Not specified
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 (TIER 1, TIER 2, TIER 3, TIER 4)
Safer Infrastructure	Tier 1

Selected Related Countermeasures

- CM1 Installation of centerline or median barriers
- CM2 Addition of dedicated turn lanes
- CM3 Add paved shoulders

Cost: $ (High)

Service Life: 20 years

Benefit-Cost Ratio: 1.75:1

4 lane divided roadway, Source: desmoinesregister.com.

Safety Benefits

76% Widened and divided roadways reduce risk of all crash types in urban areas[1]

45% Rural area crashes are decreased for all crash tyes[2]

[1] CMF ID: 7572
[2] CMF ID: 7571

Resources

- Safety Effects of the Conversion of Rural Two-Lane Roadways to Four-Lane Roadways
- Comparisons of Crashes on Rural Two-Lane and Four-Lane Highways in Texas