NCHRP 17-113 COUNTERMEASURES

Lane Departure Warning Systems (LDWS)

ROADWAy DEPARTURE

LDWS are in-vehicle technologies that detect unintended lane drifting using sensors or cameras and alert drivers through visual, audible, or haptic warnings.

Implementation Strategy

How and Where to Apply

- Integrated into new or existing vehicles, rather than fixed infrastructure, most effective on highways, rural roads, and high-speed arterials.
- Deployment is encouraged in fleets and passenger vehicles on rural two-lane and multi-lane highways with clear lane markings, supported by policies, consumer education, and integration with other driver assistance. technologies like AEB and ACC.
- Ensuring well-maintained, visible lane markings on roadways is essential to maximize LDWS performance, as sensor detection depends on clear lane delineation.

Use in a Safe System Approach

LDWS support the SSA by warning drivers of unintended lane departures, helping prevent serious run-off-road and head-on crashes. They complement other vehicle safety systems to improve crash prevention.

Key Stakeholders

Transportation safety agencies and regulators, fleet operators, policy makers and legislators, roadway infrastructure agencies.

Proactive Implementation

Proactive implementation of LDWS involves encouraging widespread integration of these technologies. This includes promoting fleet adoption through incentives, enhancing driver awareness with education campaigns, and ensuring roadways have well-maintained lane markings to support sensor accuracy.

Countermeasure Overview

Objective: Keep vehicles from encroaching into opposite lane

Strategy: Provide center two-way left-turn lanes for four- and two-lane roads

Selected Related Countermeasures

- CM1 Electronic Stability Control (ESC)
- CM2 Centerline Rumble Strips
- CM3 Edgeline Rumble Strips

Cost: Moderate

Service Life: 5 years

Targeted Solution

CONTRIBUTING FACTORS	▪ Inadequate lane markings ▪ Driver Inattention ▪ Fatigue ▪ Speeding
TARGET CRASH TYPE	▪ Run-off-road ▪ Fixed object
ROAD FACILITY TYPE (ARTERIAL, COLLECTOR, LOCAL)	▪ N/A
AREA TYPE	▪ All

Safety Linkage

NCHRP 500 Series

Run-off Road

AASHTO'S TOWARD ZERO DEATHS

Safer Vehicles

SAFE SYSTEM APPROACH

Safe Vehicles

SAFE SYSTEM ROADWAY DESIGN

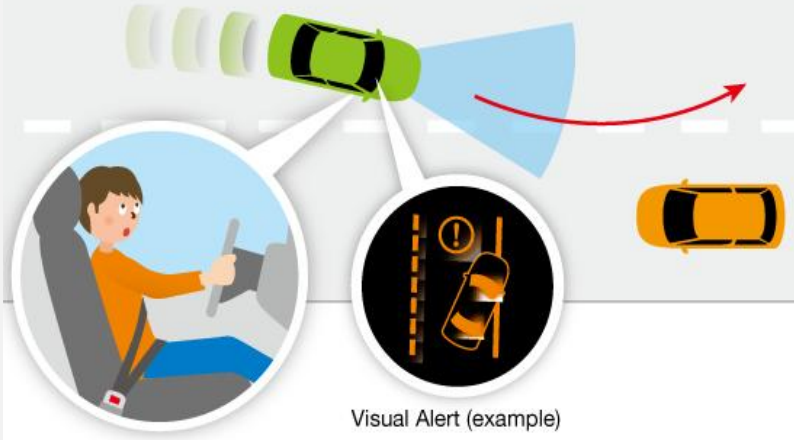
TIER 1
TIER 2
TIER 3
TIER 4

Tier 4

Source: LDWS

Safety Benefits

Warns drivers when leaving lanes unintentionally, preventing run-off-road and sideswipe crashes.



Resources

- Benefit-cost Ratio
- FHWA-HRT-20-068, https://highways.dot.gov/media/2696
- FHWA-HRT-18-035, https://highways.dot.gov/media/34031
- [1]https://doi.org/10.1080/15389588.2016.1230672