NCHRP 17-113 COUNTERMEASURES

PEDESTRIANS AND BICYCLISTS

Dutch Style Bicycle Signals

It uses pavement-embedded sensors to detect cyclists and display a countdown timer, providing a clear, bicycle-specific green phase reducing conflicts.

Implementation Strategy

How and Where to Apply

- Use at intersections with high bicycle volumes, turning vehicle conflicts, or complex geometry, especially where standard signals fail to address cyclist safety needs.
- Prioritize areas with protected bike lanes, schools, transit hubs, or commercial zones to reduce cyclist delay, increase compliance, and improve predictability.
- Through bilateral cooperation with Dutch officials, the **FHWA** has explored the Dutch approach to bicycle mobility, including infrastructure strategies that support safe and comfortable cycling.

Use in a Safe System Approach

Supports SSA by physically separating road users and clearly defining signal phases, which reduce the likelihood of severe conflicts between cyclists and motor vehicles. These signals help create a safer traffic system that prioritizes injury prevention over crash avoidance alone.

Key Stakeholders

State and local transportation agencies, urban planners and traffic engineers, cyclists and bicycle advocacy groups, local government and elected officials.

Proactive Implementation

Proactive implementation involves integrating cyclist-specific phases and detection systems during intersection upgrades or new projects before crashes occur. This includes automated detection (e.g., inductive loops or cameras), optimized signal timing, and clear signal visibility, guided by cyclist movement data and aligned with broader initiatives like Vision Zero and Complete Streets programs.

Countermeasure Overview

Objective: Reduce bicycle crashes at intersections

Strategy: Improve signal timing and detection

Selected Related Countermeasures

- CM1 Protected Intersection
- CM2 Convert Traditional or Flush Buffered Bike Lane to SBL with Flexi-posts
- CM3 Intersection Conflict Warning Systems

Cost: Moderate to High

Service Life: 10 years

Targeted Solution

CONTRIBUTING FACTORS	▪ Failure to yield ▪ Lack of prioritization for bicycles
TARGET CRASH TYPE	▪ Failure to yield
ROAD FACILITY TYPE	▪ N/A
AREA TYPE	▪ Urban

Safety Linkage

NCHRP 500 Series

Pedestrians and Bicyclists

AASHTO'S TOWARD ZERO DEATHS

Safer Vulnerable Users

SAFE SYSTEM APPROACH

Safe Road Users

SAFE SYSTEM ROADWAY DESIGN

TIER 1
TIER 2
TIER 3
TIER 4

Tier 3

Source: Dutch Style Bicycle Signals (pexels)

Safety Benefits

Provides separate signal phases for cyclists, reducing conflicts with vehicles.

Resources

- The Dutch Approach to Bicycle Mobility, FHWA, 2017
- Safe System Approach, FHWA