

When It Comes To Tribal Road Safety, Maintenance Matters

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Learning Objectives

- Explain how roadway maintainers play an essential role in roadway safety.
- Identify and take action on potential roadway safety concerns related to maintenance.
- “Read the Road” as a means of making your roads safer.

Overview

- Introduction/Background
- Vegetation
- Drainage
- Road Surface Condition
- Shoulders
- Traffic Control Devices
- Pedestrian Facilities
- Reading the Road

Rural/Local Road Safety Concerns

- Large system but very limited funds
- Crashes tend to be more severe
 - higher speeds
 - lower restraint use
 - longer emergency response times
- Roadway departure crashes predominate
- Driver distraction

Myth vs. Reality

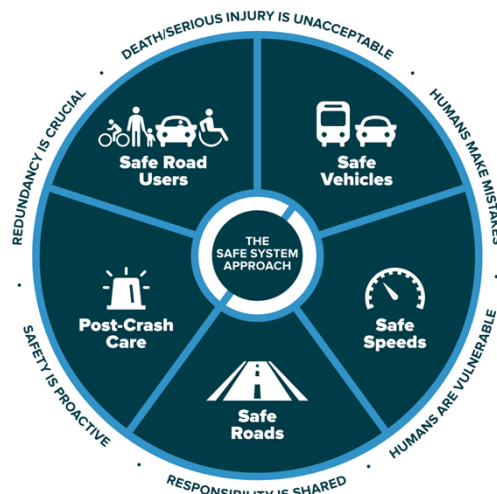
Myth:

Crashes are the driver's fault and there's nothing I can do about it.

Reality:

Crashes have multiple causes (driver, roadway and vehicle)

The Safe System Approach



The 5 Safe System Elements



The 6 Safe System Principles



Myth vs. Reality

Myth:

Roadway safety
is something
somebody else
does

Reality:

What we do or don't
do in maintenance
has a big impact
on safety

Myth vs. Reality

Myth:

We can't do safety
because it
costs too much

Reality:

Often, we can
enhance safety for
little or no cost

Example--
Does Doing the Job Right Matter?



Vegetation

- Can obscure traffic control devices and roadside features
- Can block sight lines in curves and at intersections
- Can interfere with drainage
- Can be roadside fixed and falling objects

Traffic Control Device Visibility



Obscured Fixed Object



Horizontal Curve



Before



After

Sight Triangles at Intersections



Water on Pavement Due to High Shoulder



Trees--Roadside Fixed Object



. . . Don't Forget the Stumps, Vertically



. . . and Horizontally



'Hazard' Tree



What to Look For?

- Lack of leaves
- Leaning over road
- Exposed and undermined roots
- Cavities in trunk or limbs
- Cracks
- Mushrooms/Conchs at base of tree

No Leaves, Exposed Roots, Leaning



What to Look For



Conchs at Base of Tree



Hole/Crack in Trunk

Drainage

- Water on road
- High shoulders
- Clogged devices/structures
- Washouts

Rule #1--Get Water Away From Road



Runoff Across Road



Water Crossing Road



Driveways—Often a Source of Water



High Shoulder with Water on Road



Clogged Inlet



Washout



Dale Heglund

Problematic Road Surface Conditions

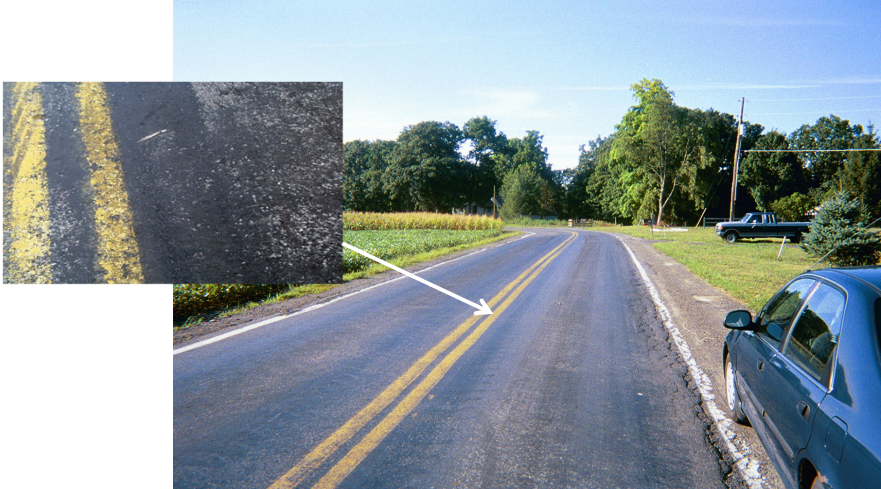
- Ponded/excess water on pavement
- Rutted pavement
- Bleeding pavement
- Mud or other contaminant on surface
- Loose stones or other material on surface
- Snow-/ice-covered roadway
- Rough surface (washboarding)
- Dust

Rutted Pavement



FHWA

Bleeding Pavement



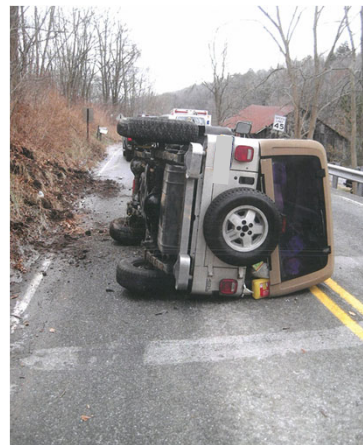
Mud on Pavement



Loose Stones on Surface



Isolated Icing Condition



Rough Unpaved Surface



Dust



Impacts

Health
Road Safety
Environmental

Controls

Institutional
Road watering
Dust suppressants
Road surface stabilization

Shoulders

- Shoulder condition
- Pavement edge drop-off

Shoulder Condition



Edge of Pavement Drop-Off

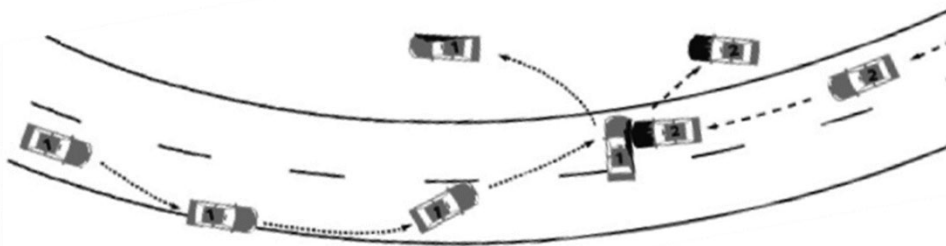
Edge drop-off
near mailbox



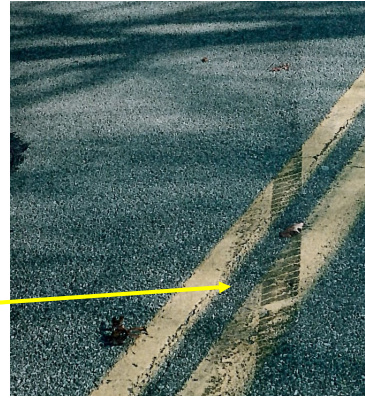
Pavement Edge Drop-Offs



Pavement edge drop-offs:
- following **resurfacing**, or
- **settling**, **erosion**, tire **wear**



Yaw Marks = Out-of-Control



Example—Fatal Crash Due to Edge Dropoff



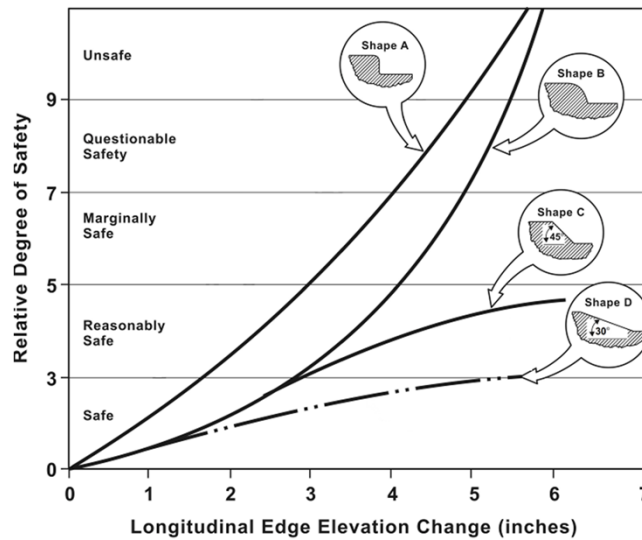
Fatal Crash Due to Edge Dropoff (2)



Risk Factors for Edge Drop-Off Crashes

- Speed
- Driver Experience
- Vehicle/Tires
- Drop-Off Height
- **Shape of Pavement Edge**

Relative Safety of Different Drop-Offs



Traffic Control Devices What to Look For

- Visibility (vegetation and other things)
- Damaged signs or posts
- Proper placement
- Fading, weathering, damage
- Bad retroreflectivity

TCD Visibility--Vegetation



TCD Visibility—Work Zone Devices (1)



normally



during construction

Tragic Consequences (2)



Traffic Control Device Condition



Sign Knock-Downs or Damage



Bent or Twisted Supports



Consequences of Bent/Twisted Sign



Sign Placement

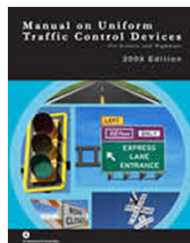


Should Not Block Driver Sight Lines



Sign Supports

- MUTCD requires crashworthy sign supports on all public roads (Section 2A-19)



Options for Crashworthy Installations



Bending or Yielding
Soil Driven



Slip
Base



Breakaway

Crashworthy Support?



Weathering/Fading



Condition of Sign Face



For Work Zone Signs: Handle With Care

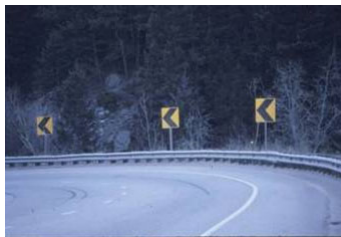


Machine Repair & Design

Nighttime Driving

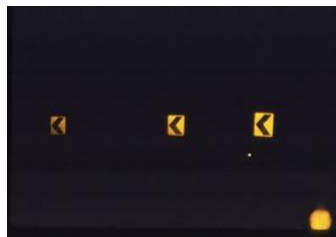
Daytime

Many cues available
Driver task relatively easy



Nighttime

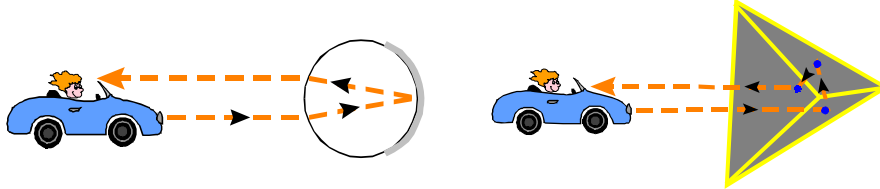
Few cues remain
Task more difficult



Retroreflectivity provides nighttime guidance

Retroreflective Elements

- Glass spheres and microsized prisms are the current technologies used to make sign materials retroreflective



- The light is returned to the source

Maintaining Traffic Sign Retroreflectivity



Retroreflectivity Degrades Over Time



Pavement Marking Condition



Retro Can Help Delineate Islands



Pedestrian Facilities

- Sidewalks
- Crosswalks
- Protruding Objects
- Temporary Traffic Control

What Pedestrians Expect

- Pedestrians expect a walkway surface to remain level, have the same traction properties and be free of impediments.



Another Expectancy Violation



Unexpected Change in Traction



Crosswalks



Markings

Surface Condition



Protruding Objects (1)

- Objects with leading edges more than 27 inches and not more than 80 inches above the finish surface shall protrude 4 inches max. horizontally into pedestrian circulation paths.



Fire Department Connection

Protruding Objects (2)

- Protruding objects can be hazardous for all peds, especially peds who are blind or have low vision.



What Should We Do Here?



Temporary Traffic Control

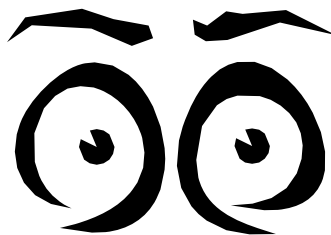


Needs to Be Detectable and Accessible

What Do You Think?



Learn To “Read the Road”



Look for indications that road users are having difficulty negotiating a section of road

To “Read the Road” Look For

- Many Tire Marks on Pavement Surface
- Multiple Scars on Road, Trees, etc.
- Repeated Damage to Signs and Guardrail
- Vehicle Debris on Roadside
- Other Similar Evidence

Locked Wheel Tire Marks



Tire Marks on Roadside



Scrapes/Scratches on Pavement



Scratches on Roadside Features



Crash Debris



Example

Reading the road identifies gouge marks on top of curb



What's Going on Here?

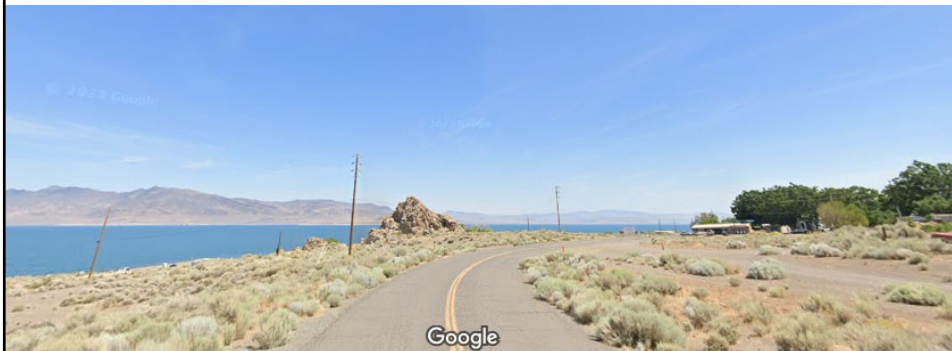
Driver View Approaching Hillcrest



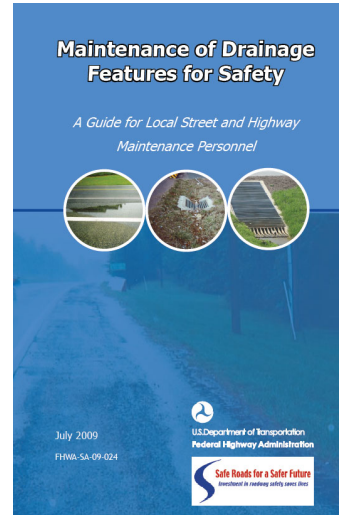
Informal Cues Override Formal Cues, Especially at Night



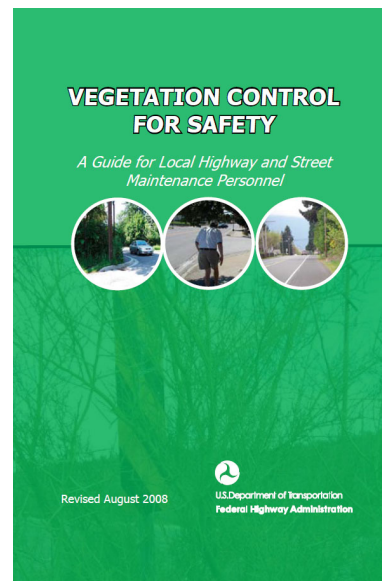
Maintainers' work is key when it comes to reducing crashes on tribal roads



Resources



Available from
FHWA Safety
Website or
TTAP/ LTAP
Center



Thank You!

Questions?

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