Approaches To Road Safety

8th Annual National Tribal Transportation Conference
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Scottsdale, Arizona
Anatomy of a road

1 Construction Limits
2 Backslope
3 Hinge Point
4 Hinge Point
Clear Zone

A clear zone is the total roadside border, starting at the edge of the roadway, which is available for safe use by errant vehicles.
What Affects Road Safety?

Here are a few elements to review and what to look for.

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Visibility Signs

Can you see it? Can you read it?
Is the sign defaced or otherwise damaged? Is the color and retroreflectivity still good?
Location

- Is the sign in the right location to allow enough time to make a decision? Is it the correct sign? Is the sign necessary?

Signs

- Not less than 6ft
- Not less than 5ft
Pavement Markings

- **Visibility/Retroreflectivity:** Are the markings clearly visible during the day? At night?
- **Condition:** Are the markings complete? Are any parts missing? Are they the correct color, dimensions,
- **Location:** Are the markings in the correct location?
Temporary Traffic Control

- **Visibility**: Can the traveling public see the signs and react in a timely manner?
- **Condition**: Are the signs in good condition (according to the ATSSA Guide)? Damage?
- **Location**: Are the devices spaced properly?
Transverse Drainage

Includes culverts and bridges.

- **Condition**: Are there any obstructions in the drainage structure? Is there evidence of any damage, undermining or scouring?

- **Capacity**: Is the size adequate for the water flow?
Parallel Drainage includes ditches and embankments

- **Ditch Condition:** Are they deep enough? Graded properly? Any obstructions?
- **Embankment Condition:** Are there gullies or erosion? Are there slumps or slides?
Guardrail

- **Condition:** Are they at the proper height? Are the connections secure? Any snagging points? Are posts on embankments affected by erosion?

- **Crash-Worthiness:** Are the terminal sections damaged? Have the tangent terminals been serviced (check tension) Are the terminals crash-tested devices?
Road Surface

- **Paved Condition:** Are there potholes? Cracking? Soft spots? Etc.

- **Unpaved Condition:** Are there potholes? Washboard? Soft spots? Erosion?
ROAD SAFETY AUDIT

Improve Safety
Definition of Safety Audit

“A formal examination of an existing or future road or traffic project, or any projects which interacts with road users, in which an independent examiner reports on the project’s accident potential and safety performance,”

Source: AUSTROADS 1994
Four Elements To The Audit

- Planning
- Design (50-90%)
- Construction
- Maintenance (existing roads)

Modeled from the Road Safety Audits Final Report FHWA’s Scanning Program

Publication No. FHWA-PL-98-009
Sample Questions

Planning Audit
What is the existing land use of the proposed route?

Design Audit
Access to property and developments.
Can all accesses be used safely? (entry and exit/merging)

Construction Audit
Shoulder and edge delineation.
Are delineators and pavement markings placed correctly?

Maintenance Audit
Are there any drainage problems that could erode portions of the road or cause washouts?
Design or Construction?
Who’s doing the audits?

- Dept. of Transportation - Road Inspector, Design Engineer, Transportation Planner, Construction Engineer, Maintenance Engineer
- Law Enforcement
- Public – individuals who are familiar with the area, associations, various age groups.
- Other interested parties
Maintenance/Construction Audits

- Diagram sites
- Exit and entry points
- Drainage
- Off road, skid marks, debris
Site Inspection

An Introduction to Road System Traffic Safety Reviews
By
Stephen Ford
Program Design

- Safety reviews are an on-going program utilizing annual reviews to cover different groups of roads within a system.
- Divide your area up into geographical areas. Target the area of highest number of accidents and start there first.

NEED CRASH REPORT!
Program Design

- The areas are reviewed in sequence—one area each year and each area every third or fourth year.
- It is not necessary to review every road every year. Annual accident numbers on a low volume road are highly variable. Reviewing the same road on a 3-4 year cycle allows for some regression to the mean.
- The first review should include only a few roads in the selected area on which a relatively high number of accidents have been reported. This will give time to work out any faulty processes.
Equipment Needed

- Distance measuring device (if no GPS is used)
- Ball bank indicator & accurate speedometer (measures advisory speed on curves and turns)
- Reflectometer
- Rotating beacon
- Audio recorder
- Laptop
Support Systems

- An Accurate Milepost System or use GPS
- Sign Inventory Database (University of New Hampshire Technology; Sign Inventory Management System (SIMS) $25.00 (800) 423-0060)
- Accident Database
In The Field

- Drive the road looking for non-standard installations or other conditions requiring signing and marking changes.
- Record the milepost or GPS, and sign code (MUTCD) for each recommendation.
The MUTCD is approved by the FHWA as the National Standard in accordance with Title 23
In The Field

Ball-bank inspection
- Drive design speed and below design speed

Sight-distance Check
- Two 3.5’ colored pipes
  Marks at eye height 3.5’ for vehicle and 2’ for objects.
- Driven at design speed
Once suspected feature are ID, use standard signing and marking from the MUTCD to design a scheme to mitigate their impact.
Guidance for implementation of the AASHTO Strategic Highway Safety Plan
Standardization

- Similar schemes should then be applied to other sites with similar features whether or not they have an accident history.
- Similar features should have similar treatments. Similar treatments mean similar conditions.
- This can help prevent accidents through standardization.
Goal

- The goal is to provide drivers with the information they need to safely navigate sections of the road system with either a known, or a potential, accident hazard.
Possible Safety Treatments

- Schedule periodic maintenance checks and remedial action.
- Replace signs that have been damaged or lost their retroreflectivity.
- Ensure the accuracy of all signs.
- Use larger warning signs at sites where getting the drivers’ attention is essential.
- Use properly-spaced delineators to outline confusing alignment, and indicate the edge of the roadway when the side slop is unsafe but not warranting of a greater treatment.
- Consider using windsocks with warning signs at sites where accident reports indicate that cross winds were a contributing factor to the crashes.
- New lane markings.

Source: Highway Safety Challenges on Low-Volume Rural Roads; Jerome W. Hall, Elizabeth W. Rutman, James D. Brogan
Experiments

Eye In The Sky
Video Surveillance Trailer

- Autonomous power (solar panels/battery system)
- Cameras
- Microwave input to activate video recording
- Time-lapse recording media
- Trailer-mounted

Western Transportation Institute
Montana State University
Measuring Speed
Reasons for Using Video Surveillance

- Good for geographically isolated areas
- Unpredictable weather patterns
- Lack of shoulder space
- Productive
Questions regarding trailer video

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Improve Availability of Gaps in Traffic and Assist Drivers in Judging Gap Size

Automated Real-Time System to Identify Available Gaps – Missouri DOT
STRIETER-LITE reflectors

Deer head toward road for crossing.
What’s wrong with this picture?
Questions?