National Best Practices

Designing and Operating Roads for Older Drivers

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Dave Morena
FHWA Michigan Division
Percent of State Population 65 or older:

1. Florida 18%
2. Pennsylvania 16%
3. West Virginia 15%
4. Iowa 15%
5. North Dakota 15%

MT - 13%
SD - 14%
WY - 12%

2000 census
Older drivers (65+) involved in fatal crashes

1. Florida 563
2. California 459
3. Texas 413
4. Pennsylvania 294
5. Georgia 267
6. New York 231
7. Illinois 222
8. North Carolina 219
9. Ohio 215
10. Tennessee 194

2005 FARS
Percentage Increase in Elderly Population:
2000 to 2025

UNITED STATES 76.8%

Source: HIGHWAY DESIGN HANDBOOK FOR OLDER DRIVERS AND PEDESTRIANS
Aged Diminished Capabilities

- VISION
- PHYSICAL MOVEMENT
- COGNITIVE
Aged Diminished Capabilities

Visual Acuity

Cap/ lower case

8” letters

Ability to read signs

all caps

4” letters
Diagrammatic Sign

DOT evaluating: N. Dakota, Michigan

Current MUTCD
Clearer Lettering

Font makes a difference
Michigan: Side-by-Side Comparison

Series E Modified

Clearview
Michigan: Night Comparison

2004: TX - all guide signs
      PA - freeway signs (Maint Dept)

2005: MI, VA, AZ, MD, KY, IA

2006-07: AK, OK, WY, AL, AR, IL, NY, OH, WI ++
Cardinal Direction -
Enlarge first letter

MUTCD requirement since 1997
Bigger Signs

Mississippi DOT
2004 program
Larger lettering - FWY

MUTCD Std
16” / 12”

20” / 15”
Legend

Maryland DOT - Larger Copy at the decision point
Street Name Signs: large lettering upper / lower case

Rochester Hills MI

12 Inch Blades 9 Inch lettering
Brighter Sign Sheeting

Michigan: Side-by-Side Comparison
All signs newly erected
Fluorescent Yellow Signs

All signs - TX, MI, IA
Some signs - MD, OK, PA, VA
Also: AK, CO, MT, NY, SD ...
Fluorescent Orange Sheeting

State DOTs using:

VA (1992), TX, NC, NY, MI, AK, CO, MT, DC, MO, SD, KY…
White Prismatic Sheeting on Guide Signs

Current national practice

PA, NH, TX, KY, MI, AK, CO, MT, MO
ID, WY, VA, AR, SD, WV …
Reflective Sheeting on sign supports

- 2-way to 4-way Stop conversions
- remove sheeting after two years
Lower Mounting Height —
WRONG-WAY & DO NOT ENTER

CA - 2 ft

Idaho - 4 ft rural

CA wrong-way crashes:
Down from 60 /mo. to 2 /mo.
at 90% of locations

States using this strategy:
CA, ID, VA
Flasher beacons on signs – replacing overhead flashers

Minnesota DOT:
Approx 30 intersections, since 2000
Aged Diminished Capabilities
Contrast Sensitivity

Detection in low light:

- curbs, edge of road
- lane lines
- pedestrians
Delineate islands

States that paint nose of islands:
- Center and channelizing islands – AK, IA
- Center islands - WI
Wider lines: 8-inch

Nevada DOT - all freeways
SD - 2-lane roads with narrow shoulder
6-inch lines

22 State DOT’s and 6 Toll Roads routinely use 6” longitudinal lines
Contrast Pavement Markings on concrete pavement

3M tape

WisDOT: 300+ miles

Penn DOT: 100+ miles

VA – on all concrete pavement

TX - all concrete pavement within Houston ring road
Make a Line that Works on a Wet Night
Over-sized Glass Beads

Markings that contain large beads will perform well at night under normal film of water, and up to slight drizzle.
Large Bead STATES

MDOT: Recessed markings
Raised Pavement Markers

**Ohio DOT policy**
- use RPM on all roads
- replace on 2-4 yr cycle

**Florida DOT**
RPMs at 40’ spacing
3M Wet-Night Tape - as RPM

Missouri DOT - full 10’ skip lines on Interstate.
Mich DOT - full use on all Interstate skip lines in Detroit area
Painting the rumbles:
freeway

Michigan pilot: 100+ freeway miles
Painting the rumbles:
2-lane

Mississippi DOT: statewide pilot

1,100 lane miles
Aged Diminished Capabilities

Physical: Upper body strength, range of motion

Scanning traffic, turning movement becomes more difficult
Make the Turning Motion Easier
Re-align Skewed Intersections

Nebraska DOT – 2004 policy to realign major intersections
Separate the right turn traffic

Iowa DOT: more and longer turn lanes
Separate the right turn traffic

Wide shoulder allows drivers to exit mainline, then slow and make easy turn

Michigan DOT
Muskegon TSC
Aged Diminished Capabilities

Cognitive

• Selective Attention
• Divided Attention
• Perception - Reaction Time
• Working Memory
Aged Diminished Capabilities
Divided Attention

process info from multiple sources simultaneously
Aged Diminished Capabilities
Selective Attention

continuously focus on the most critical information
Compared to drivers age 40-49:

- drivers age 65-69 are **2.3 times** more at risk for multiple-vehicle crashes at intersections

- drivers age 85+ are **10.62 times** more at risk

1998 study. Preusser et al
Provide Advance Information
Advance Street Name Signs

Troy, MI

urban

rural

Iowa
Advance Street Name
- supplemental plaques

Ingham County, MI - all roads, 1980+
Advance Lane Assignment

Ground-mounted signs & markings

Overhead signs

Lansing, MI

Iowa
Advance Signal Signs – Activated Flashers

Common design criteria:
• high-speed
• isolated or unexpected intersection
• limited sight distance

MnDOT test:
• Red Light violations 29%
• Truck violations 63%

Maryland DOT:
• Rt angle crashes 62%
• Rear end crashes 36%

15+ states
Help the Left-turners
Crashes age 65+          28 %

4-lane to 3-lane conversion

Iowa DOT has converted 20+ corridors

Crashes                        24 %
Crashes age 65+               28 %

All LTs cross one lane only
Offset Left Turn Lanes

Florida DOT – very wide offsets

North Dakota DOT – since 1999 wherever possible
Offset right turn lane

Michigan

Benefits to crossroad LT traffic:
• sight distance to trailing vehicles
• commitment from turning vehicle

Experienced states:
WI, MO, KY, MT
Remove / Relocate the Left Turn
ROUNDABOUTS  Eliminate left turn, head-on crashes
Roundabouts - Clearwater, FL

21.5% of residents are aged 65 +
1.7 x the national average

Through
Community
Involvement:

Clearwater has built 5 modern low-speed roundabouts.

Seven are in design...

and 5 more are in the pipeline.
Roundabouts - Clearwater Beach, FL

32% of residents are aged 65 +
2.6 x the national average

Acacia roundabout:
- By petition of residents and store owners
- Petition included $3000
Roundabouts in America:

ADOPTED:

State DOT’s that now consider roundabout option in every new or re-design:

MD, NY, KS, WI, MN, VA
Dave Morena
FHWA Michigan Division
517- 702-1836
David.Morena@fhwa.dot.gov