

Safe Highway Design for Older Road Users

Dick Schaffer, FHWA - March 17, 2010



The 65 and older age group will grow from:

- 37.3 million in 2006,
- to more than 40 million by 2010,
- to 55 million in 2020, and
- by 2030 nearly 71.5 million older persons, or 1/5th of the US population.

Transportation Modal Groups

- There will be more older drivers, and pedestrians as we age
- We desire to keep our independence, and also access transit
- Older drivers, bicyclists, and motorcyclists view their mobility as a right, even with cognitive and physical limitations

Physical and cognitive impacts of aging affect:

- Neck movement,
- Vision,
- Walking speeds,
- Flexibility,
- Road and speed awareness,
- Hearing, and,
- Night glare.

FHWA Response - 1998 Older Driver Highway Design Handbook

- First practical information source on Older Drivers.
- Linked age-related declines in functional capabilities to design, operational, and traffic engineering enhancements.
- Keyed to specific roadway features, and
- Addressed pedestrians in the intersection section.

2001 Highway Design Handbook *for Older Drivers and* *Pedestrians*

- Expanded data and recommendations on older pedestrians and drivers.
- Was based upon recommendations from local and State level practitioners, and
- Led to a FHWA Older Driver engineering training course taught by the Resource Centers

2011 Highway Design Handbook *for Older Road Users*

- Will incorporate new research, and the 2009 MUTCD
- Expand the range of applications covered by the Handbook
- Identify Innovative Techniques/Best Practices
- Introduce format changes—including a web-based version, and
- Will facilitate access and use by engineering professionals to improve our streets and highways for all road users in the years ahead.

Handbook retains its focus on five broad categories of roadway features:

- *Intersections* reflect older road users' most serious and enduring conflict area.
- *Interchanges* address merging/weaving and lane changing operations, and where applicable pedestrian crossing issues.
- *Roadway segments* emphasizes curves, passing zones, sidewalks, crosswalks, bike-lanes, and shoulders plus
- *Highway Construction/work zones* impact steering, increased potential for unexpected events, and pedestrian, bicycle and motorcycle travel along and across, and finally
- *Highway-rail grade crossings sites* where conflicts are deadly, with pedestrian, bicycle, and motorcycle travel rarely considered

Intersections

- Left and right turn movements compromised by physical and cognitive impairments
- Older pedestrians walk at a slower speed (2009 MUTCD slows to 3.5 fps)
- Night vision adversely affected which retro-reflective signs improve (2009 MUTCD Section 2A.07 Retroreflectivity and Illumination)
- Signal head size varies from 8 to 12 inches in diameter (Section 4D.07 Size of Vehicular Signal Indications)

Interchanges

- Designed for vehicles not pedestrians, although pedestrian crossings, uncontrolled are accommodated
- Off and on ramps often require quick lane movements and narrow space to maneuver

Roadway Segments

- Mid-block crossings between land uses often not controlled.
- Pedestrian crossings most often based upon distance and location, not safety.
- Medians often designed for the motorist, not the pedestrian.
- Numerous driveways cause walking hazards.

Highway Construction – Work Zones

- Rapid speed reduction and lane narrowing are difficult for older adults
- Use no more than two phases for a changeable message sign



Highway-rail grade crossing sites

- Warning signs should be well in advance of the crossing (50-150 feet) where trains cross at greater than 40 mph.
- Separate pedestrian crossings warranted when in commercial, school, and residential areas.
- Wide rail flange area and oblique rail crossings make it very difficult for bicyclists and motorcyclists.

Gains in safety and mobility

- Countermeasures for older road users will benefit all users.
- Leaves engineers and road designers with some flexibility when modal needs conflict, and
- Works to reach a balance between different modes.

Sample Countermeasures

- Reduce right turn radii, *when applicable, to reduce speed and accommodate pedestrians.*
- Accommodate pedestrians *when slip right turn radii can not be reduced.*
- Place traffic signals and road stencils *in direct proportion to the left turn lane, and*
- Provide pedestrian refuges *when intersection widths can not be reduced.*
- Promote countdown pedestrian signals *which are in the 2009 MUTCD*

Contact Information & Questions

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- **QUESTIONS ?**

