A Canadian Resource to Aid Aging Road Users

Margaret Gibbs, P.Eng
Gregory Ablett, EIT
Overview

• Demographics and Crashes Involving Older Road Users

• Limitations of Older Road Users

• Problems for Older Road Users

• Resources for Older Road Users
  • FHWA Guides
  • Alberta Traffic Safety Guide to Accommodate Aging Road Users
Demographics - North America

1970
- POPULATION: 203.2 million
- MEDIAN AGE: 27.9

1990
- POPULATION: 248.7 million
- MEDIAN AGE: 32.9

2010
- POPULATION: 282.6 million
- MEDIAN AGE: 39
Demographics - Canada

Population Predictions 65 years and Older

% of total population

Note: Medium growth scenario.
Source: Statistics Canada, Catalogue no. 91-520-XIE.
Limitations of Aging Road Users

Limitations

- visual
- cognitive (mental)
- motor (physical)

Due to

- aging
- age-related illnesses
- medications
Vision Limitations

• Reduced visual acuity (sharpness) due to:
  • Cataracts
  • Glaucoma
  • Age-related macular degeneration
Vision Limitations - Cataracts

Source: National Eye Institute (US NIH)
Vision Limitations - Glaucoma

Source: National Eye Institute (US NIH)
Vision Limitations - Macular Degeneration

Source: National Eye Institute (US NIH)
Vision Limitations

- Reduced peripheral vision
- Reduced contrast sensitivity
Vision Limitations

- Reduced night vision
- Reduced glare resistance
Cognitive (Mental) Limitations

- Selective attention
- Memory deficits
Cognitive (Mental) Limitations

- Reaction time (choice/decision)
- Dementia
Motor (Physical) Limitations

• Decrease in overall strength
• Reduced range of motion
• Difficulty with balance
• Deduced agility
• Arthritis
Aging Road Users in Canada

Percentage of Canadian Household Population 65 and Older with Valid Drivers License

- **vision problem**: 34% (60% with vision problem, 26% with cognitive problem, 16% with mobility problem)
- **cognitive problem**: 26% (57% with vision problem, 26% with cognitive problem, 16% with mobility problem)
- **mobility problem**: 16% (47% with vision problem, 26% with cognitive problem, 16% with mobility problem)

Source: 1996/7 National Population Health Survey
Problems for Aging Drivers

- Intersections
  - vision limitations
  - selective attention
  - reaction time
Problems for Aging Drivers

• Navigation
  • vision limitations
  • selective attention
  • reaction time
Problems for Aging Drivers

- High-speed lane changes
  - vision (peripheral)
  - reaction time
  - arthritis
Problems for Aging Drivers

- Night-time driving
  - night vision
  - glare resistance
  - visual acuity
Resources for Aging Road Users

Existing Guides in the United States and Canada:

- Highway Design Handbook for Older Drivers and Pedestrians (FHWA, 2001)
- Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians (FHWA, 2001)

Opus Publications:

FHWA Guidelines

- List of recommendations, with rationale and differences from existing standards

  - Recommendations for:
    - intersections
    - interchanges
    - roadway curves and passing zones
    - work zones
    - at-grade railway crossings
In 2005, the Alberta Motor Association sponsored the development of Canada’s first guide aimed at road and traffic control design for the aging driver population.

Details of the Guide:

• a comprehensive list of engineering practices that benefit the aging driver

• supplements (but does not replace) existing standards

• improves safety for all road users, not just aging drivers
• Point to or build upon the most conservative standards in Alberta/Canada, or provide more specific guidance

• Canadianized units and examples

• Relationship to existing standards are clearly indicated
Alberta Motor Association recognized the opportunity to prepare an updated guide to:

- Incorporate feedback received on the original Guide from practitioners;

- Address the accessibility needs of non-motorized road users;

- Incorporate advancements in technology, traffic control devices and industry standards
Introducing the 2009 Guide

• More than just a new cover…
Structure of the 2009 Guide

- **Network Components** such as intersections, sidewalks & multi-use paths, road links

- **Design Elements** such as traffic signals, pedestrian refuge islands, roundabouts

- **Enhancements** such as curve radius, sign size / reflectivity, signal head positioning

- **Reference to Current Guidance** for comparison
Enhancement Format of the 2009 Guide

Network Component

Design Element

Enhancement Title

Graphic of Enhancement

Aging Road User Safety Enhancement

Rationale Behind Enhancement

Will Appear on Enhancements Deemed Cost-Effective to Implement

Land-Use Setting and Road User Appropriate for Enhancement

Potential Conflicts

Related Guidance

Reference to Best Current Guidance

Relationship to Best Current Guidance

At-Grade Intersections

A.2 Turning Lanes

A.2.1 Separate Left-Turn Lane

Potential Conflicts:
Ideal for high-speed conditions with a history of collisions, moderate volume, and where a left-turn lane can be provided within existing pavement width. If a left-turn lane cannot be provided within existing pavement width, conflicts with the needs of older pedestrians will arise, as the crossing distance will be longer.

Rationale:
The separate lane provides unobstructed sight distance, easing the left-turning movement for aging drivers.

Best Current Guidance
Alberta Highway Geometric Design Guide [D.7.6]

Relationship
Enhancement exceeds current guidance

Related Guidance:
TAC Geometric Design Guide for Canadian Roads [Section 2.3.9]
High Entry Angle Right-Turn Channels

- Reduces the backward viewing angle to check for appropriate entry gaps
- Improves visibility of pedestrians
- Reduces turning speed, more consistent with a yield condition

Potential Conflicts: Design selection guidelines for various right-turn designs can be found in TABLE 1 of Section 4 in the City of Edmonton Report. Related Guidance: ITE Urban Street Geometric Design Handbook [Section 4.5.6] Ontario Good Roads Association Milestones Vol. 8 #3 – September 2008 [Section pg. 49 - 51]

Relationship: Enhancement reflects most conservative existing guidance
Help to All Road Users

• Improve visibility and conspicuousness of
  • signs and signals
  • other road users

• Simplify operations, especially at intersections

• Improve delineation
  • at intersections
  • on curves
Questions?

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