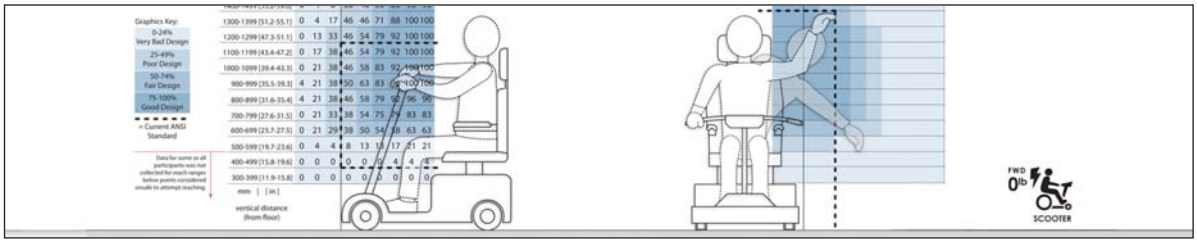

DESIGN RESOURCES

DR-09 Scooters in the Built Environment

Center for Inclusive Design and Environmental Access

Scooters in the Built Environment

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Issue and Its Importance to Universal Design

Powered mobility scooters are an increasingly popular mode of transport for people with limited mobility. Scooters are less expensive than powered wheelchairs and many provide better traction, stability and ground clearance, which is important for outdoor use. Unfortunately, scooters tend to be larger and less maneuverable. This study addresses the challenge of developing new built environment accessibility guidelines which meet the needs of the growing number of scooter users who may need access indoors in public spaces.

Existing Research/Evidence

Scooter research focusing specifically on the accessibility of the built environment is currently very limited, and current access standards (US, Ontario, Australia, UK) are based on the requirements of a manual wheelchair. The majority of existing research focuses on the increased popularity of this mode of transport and on the benefits of scooter use for older adults and people with limited mobility.

An exception to this is a project by Steyn and associates in the Fraser Valley region of British Columbia which examined a variety of educational and regulatory factors regarding scooter users' interactions with pedestrians and traffic in the region. They make recommendations for balancing the needs of pedestrians, motor vehicle drivers and scooter users, and report on successful tests of a scooter driver education program for enhancing safety (Steyn & Chan, 2008).

Additionally, the compilation of anthropometric data for manual wheelchairs, powered wheelchairs and scooters is part of an ongoing study by Steinfeld and associates. They are measuring the geometry of the people and the devices, in addition to the reach ranges which are accessible to the users (Steinfeld et al., 2005).

Quality of Existing Evidence

There is very little evidence regarding the accessibility needs of scooter users and, very little other evidence regarding what space must be allowed in the built environment to permit access for scooter users.

Existing Design Guidelines

Current guidelines for the design of built environments for the US and Canada are given in the Ministry of Municipal Affairs and Housing Building and Development Branch: 2006 Building Code Compendium; Standards Council of Canada: Accessible Design for the Built Environment; and the U.S. Architectural and Transportation Barriers Compliance Board: Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (Ministry of Municipal Affairs and Housing

Building and Development Branch, 2006; Standards Council of Canada, 2004; U.S. Architectural and Transportation Barriers Compliance Board, 2004).

Summary of Related New Research Accomplished by RERC-UD

A study of scooter maneuverability was performed by the Toronto Rehabilitation Institute in response to a request from the Ontario Ministry of Health and Long-term Care in order to inform the development of new design guidelines for built environments.

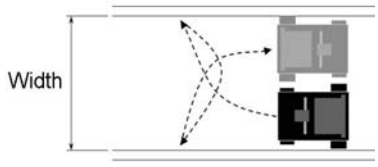
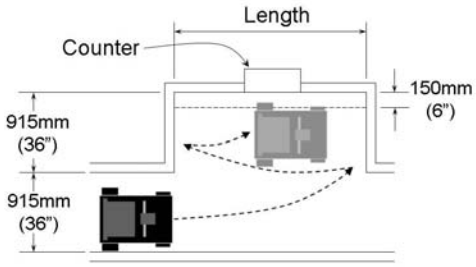
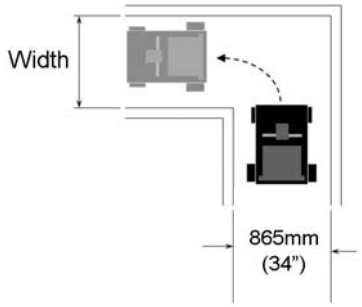
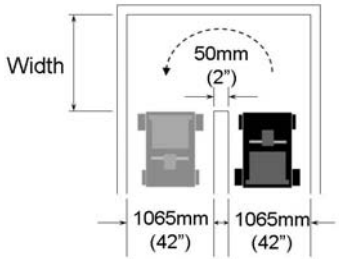
Methods: An expert scooter driver was asked to drive five manufacturer-recommended scooter models which combined indoor maneuverability with good outdoor performance. An expert scooter driver maneuvered these scooters through a variety of spatial configurations commonly encountered in the built environment. Key dimensions were adjusted to find the minimum space requirements for maneuvering in each scooter.

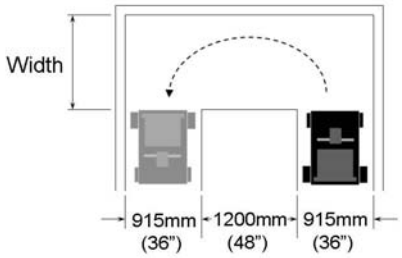
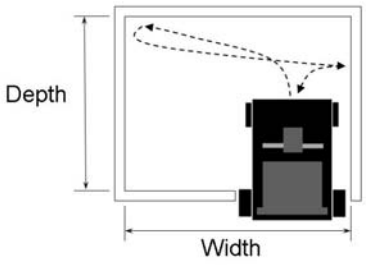
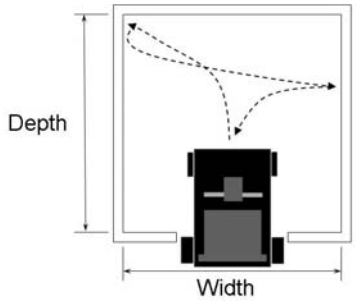
A survey of store managers of Ontario's largest scooter retailer (Shoppers Home Health Care) confirmed that the Fortress 1700 and mid-size scooter equivalents are the most commonly sold product in service areas outside the Greater Toronto Area. The managers confirmed that reasonably safe outdoor performance is achieved with a mid-sized scooter and it also allows access to public indoor spaces.

We therefore recommend that the current maneuvering abilities of this scooter be the basis for setting indoor accessibility standards. We believe that setting the standard based on this type of scooter would not produce undue hardship for manufacturers and would allow adequate, safe mobility for users in outdoor environments. However, it must be recognized that no existing scooter is recommended for use in winter weather. In practice, in rural environments in the winter, very large scooters are used but never transported to the city.

The maneuvering capabilities of the four-wheeled Fortress 1700 form the basis for our design recommendations, presented below. The minimum dimensions achieved by our expert driver were increased by an average of 70 mm to ensure that users can complete maneuvers in a reasonable time and to accommodate the accoutrements such as baskets, bags, canes, oxygen tanks, etc. that many people attach to their scooters.

New Design Guidelines

Condition		Existing Ontario Standard (minimum dimensions in mm)	Recommended Standard (minimum dimensions in mm)
Corridor width for a 180° turn using a 3-point turn		1500	2000
Clear space needed to get both front and back wheels within 150mm of a recessed counter or work surface when approaching from the side		1200	2200
Corridor width needed to turn 90° when exiting from a 865mm (34") wide doorway or hallway		810	1300
Clear width needed to maneuver around a 50mm (2") wide obstacle using a 3-point turn		1100	1700 (increase to 2000 if the maneuver must be repeated, as in the case of switchbacks on a ramp)

Clear width needed to maneuver around a 1200mm (4') wide obstacle using a multi-point turn		920	1300
The minimum width and depth of a rectangular space that a scooter can drive into, make a three-point turn and drive out facing forwards if the doorway is near the corner of room		Space includes a circle with a 1500 mm diameter	1950 x 2590 (depth x width)
The minimum width and depth of a rectangular room that a scooter can drive into, make a three-point turn and drive out facing forwards if the doorway is centred in one wall			2440 x 2440

Examples of Application

These new guidelines will be used to ensure that new public buildings are accessible to scooter users.

Research Needs

These new guidelines should be tested by actual scooter users with varying levels of physical and cognitive impairment to determine what further allowances may be required. Also, more objective scooter performance data is required including dynamic stability testing on slopes and ramps on a variety of surface conditions. This type of testing has been difficult until now; however, once Toronto Rehab's new Challenging Environment Assessment Laboratory has been commissioned in early 2011, more rigorous testing will be possible.

References

Ministry of Municipal Affairs and Housing Building and Development Branch, "2006 Building Code Compendium," Toronto, Ontario: Queen's Printer for Ontario, 2008.

Standards Council of Canada, "Accessible design for the built environment," Mississauga, Ontario, Canada: Canadian Standards Association, 2004.

E. Steinfeld, J. Maisel, and D. Feathers, "Standards and Anthropometry for Wheeled Mobility Devices," U. S. A. Boards, Ed. Washington, DC, 2005.

P. V. Steyn and A. S. Chan, "Final Report: Mobility Scooter Research Project," University College of the Fraser Valley, AbbotsfordMarch 2008.

U.S. Architectural and Transportation Barriers Compliance Board, "Americans with Disabilities Act " in *Accessibility Guidelines for Buildings and Facilities* Washington, D.C., 2004.

DESIGN RESOURCES

DR-09 Scooters in the Built Environment

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