

Research Recommendations

This guidebook represents what we know about current accessible design practices. Very little research has been conducted on the physiological impacts of one design over another. Most information is anecdotal or based on personal experience. In addition, few systems exist that can quantitatively measure the conditions of sidewalks and trails. As improving pedestrian access becomes a more integral part of good design, a quantitative understanding of what people can and cannot negotiate will become critical.

Some standards, such as reach ranges, were based on the evaluations of disabled veterans. Men with developed upper body strength have a longer reach range than

a smaller child or an adult with limited upper body movement. The population is growing older, and a person that becomes disabled at an older age is more likely to have less ability than a younger person who develops a disability. It will be important to evaluate future needs and identify missing gaps in the research. As opportunities increase, it's important to widen the range of access to all users. The following items were identified as planning and design topics that warrant further investigation:

1. Develop educational programs about pedestrian access for students and professionals in fields that share roles in the

- planning, design, and construction of public rights-of-way.
2. Develop design strategies for improving pedestrian access at roundabouts. Currently, most roundabouts in the United States are difficult for people with vision impairments to use because they cannot determine when it is safe to cross the street. European and Asian designs, such as the Swedish model, which use pedestrian-controlled traffic signals and set the crosswalks back four car lengths from the intersection, should be investigated.
 3. Conduct research that identifies strategies for installing and maintaining detectable warnings in climates with harsh weather conditions. Detectable warnings indicating the transition between the sidewalk and the street provide critical information to people with vision impairments.
 4. Analyze intersections to establish guidelines for when accessible information is needed and what type of signal is most appropriate. Develop National standards for specifications of features to be included in pedestrian signals for full access.
 5. Standardize sign formats for people with vision impairments.
 6. Evaluate the impact that right turn on red has on pedestrians, including those with vision impairments, and establish guidelines for when this practice should and should not be permitted.
 7. Evaluate the prototype Sidewalk Assessment Process (SWAP) presented in Chapter 11 as both an assessment tool and an access information dissemination tool.
 8. Evaluate the effects of various traffic calming applications on the disabled, the elderly, and children.

9. Develop signs and mapping formats that provide access information to sidewalk users.
10. Develop consistent and reliable methods to assist transportation agencies with the development of Americans with Disabilities Act transition plans. The ADA mandates municipalities to complete a self-assessment as part of their transition plan to identify discriminatory practices. However, no specific guidelines currently exist for evaluating sidewalk conditions.
11. Develop information systems to better inform citizens of places that are readily accessible. All elements, such as accessible offices, stores, routes, parking spaces, etc., should be highlighted. Such an information system should be readily accessible, easy to understand, and regularly updated as the transition plan for existing facilities unfolds and new construction is built.
12. Develop designs for drainage systems that are compatible with gutter and curb ramp installations.
13. Investigate the potential for broadcast signs that give routine information to pedestrians on sidewalk elements through handheld receivers.
14. Develop effective strategies to enhance the detectability of motor vehicles in slip lanes, such as acoustic surfaces, and include research on effects of acoustic surfaces on bicyclists.
15. Evaluate current wayfinding strategies for sidewalks and trails, such as intersection guidestrips, and develop standardized design guidelines.
16. Develop methodologies to analyze existing shared-use paths to determine if the needs of pedestrians are being addressed.

17. Research and develop design solutions for access at all railroad crossings. The flangeway filler used to service low speed light rail trains at railroad crossings provides a good access solution.
18. Develop standardized construction barricade systems that assure consistency and promote safety for all users.
19. Re-evaluate the existing American Association of State Highway and Transportation Officials (AASHTO) guidelines for the turning radius at an intersection in order to better balance the needs of pedestrians with the needs of long trucks.
20. Develop new surfacing technologies that will provide alternatives to asphalt and concrete for firm and stable surfaces. Alternative surfacing is desired on outdoor recreation trails and other instances where asphalt or concrete fundamentally alters the experience.
21. Define a standard for the levelness of outdoor surfaces. Many stone or rock paths and uneven tile surfaces provide a historic or decorative look while causing a rough ride for wheelchair users and a tripping hazard for others.
22. Establish and enforce minimum requirements for surface firmness and stability. Use objective measures, such as the ANSI/RESNA standards, as the basis for these requirements and the disclosure of information of outdoor recreation trails.
23. Provide data evaluating pedestrian exposure both before and after various roadway and crossing applications are installed.
24. Examine the effects of large curb radius vs. small curb radius on motorists' behavior towards pedestrian right-of-way.

25. Evaluate the impact of guidestrips on bicyclists.
26. Evaluate the ability for the visually impaired to accurately recognize signal changes in various instances.
27. Evaluate the impact of thermoplastic materials and inlay tapes on slip resistance. While these materials are more desirable because they last longer than paint, they reduce the slip resistance for pedestrians and bicyclists. Materials that can be added to thermoplastics and inlay tapes to improve slip resistance should also be considered.
28. Develop a universally designed barrier/gate that restricts access by non-pedestrian user groups but does not restrict access by people with mobility impairments.
29. Encourage the development of universal designs in the pedestrian environment.
30. Evaluate the effects of motor vehicle speed on pedestrian gap detection at various intersection applications.