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Designing accessible pedestrian facilities: Common problems and solutions

Pedestrians may encounter two different kinds of barriers when they use pedestrian facilities: movement barriers and information barriers. These barriers can make using the facilities difficult for non-disabled pedestrians and nearly impossible for disabled pedestrians.

Movement barriers include the following:

- difficult terrain such as steep grades and cross slopes and soft or uneven surfaces
- obstacles such as benches, sign posts, and newspaper boxes
- lack of time to cross a street
- narrow facilities
- lack of ramps

Information barriers exist for visual, hearing, and cognitive disabilities and include the following:

- lack of good sight lines and visual cues
- ack of auditory traffic signals for the visually impaired
- lack of tactile information designating the boundary between the roadway and the pedestrian way

Typical problems with pedestrian facilities

In Iowa, the most common problems of inaccessible pedestrian facilities are movement barriers on sidewalks and curb

Editor's note

This article, second in a series, addresses common problems and typical issues that local transportation agencies in Iowa face when designing ADA pedestrian facilities. The first article addressed ADA legal requirements.

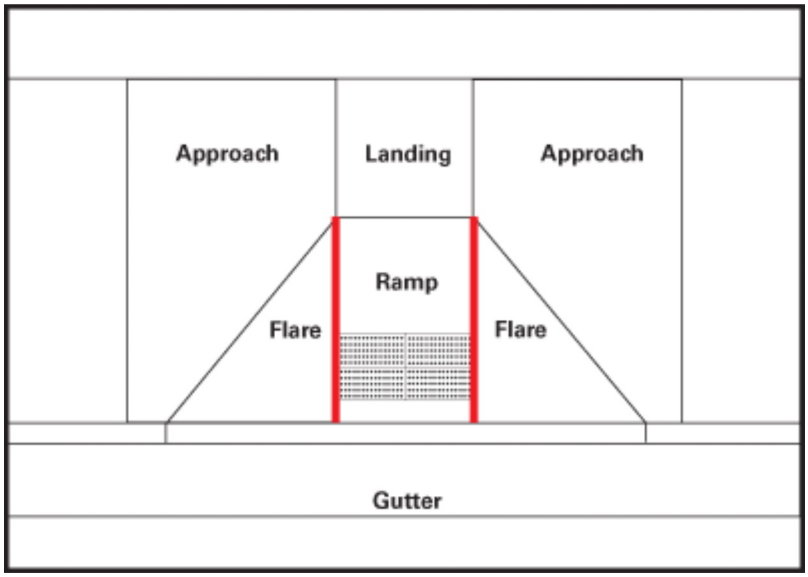

Figure 1. Components of a curb ramp

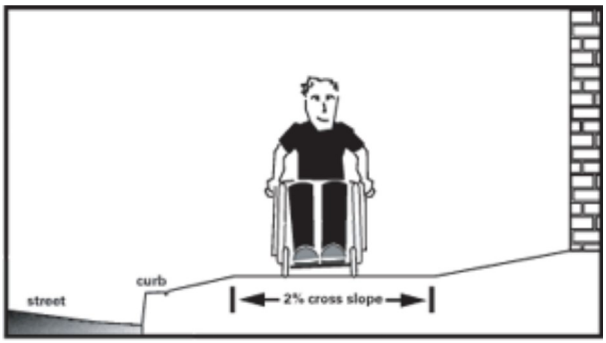

Figure 2. Provide a level (2 percent cross slope) area at least 4 to 5 feet wide in the center of the sidewalk.

ramps. Facilities that are too steep or have unacceptable cross slopes are two of the most common complaints.

Grades that are too steep require significantly more energy for someone in a wheelchair to negotiate. For example, the landing at the top of a ramp should have no more than a 2 percent cross slope. A cross slope of 3 percent requires 50 percent more energy from the wheelchair user.

In addition, the lengths of the sides of the ramp (shown in red in Figure 1) should be equal to prevent a diagonal cross slope, which is difficult for wheelchair users to negotiate with all four wheels on the ground.

Steep grades on curb ramps. The maximum grade for a curb ramp is 8.3 percent. However, due to the nature of construction and the need for construction tolerances, ramps that are designed for the maximum allowable 8.3 percent grade often are constructed at a higher grade.

To allow for construction tolerance, it's recommended that ramps be designed for a 7.1 percent (14:1) grade.

Steep grades on cross slopes. It's also important to keep in mind that running slopes such as ramps and driveways become cross slopes in the perpendicular direction. The main pedestrian corridor should maintain a 2 percent cross slope.

To achieve this, driveways may need to be reconstructed with a flat pedestrian crossing. Create a level area at least 4 to 5 feet wide in the center of the sidewalk and slope in stages to make up the elevation difference (see Figure 2).

The cross slope of a ramp should also not exceed 2 percent. When a ramp's cross slope exceeds 2 percent, wheelchair users have trouble keeping all four wheels on the ground (see Figure 3).

To avoid creating a steeper cross slope, make sure that the sides of the ramp are the same length.

Change in grade. The change in grade

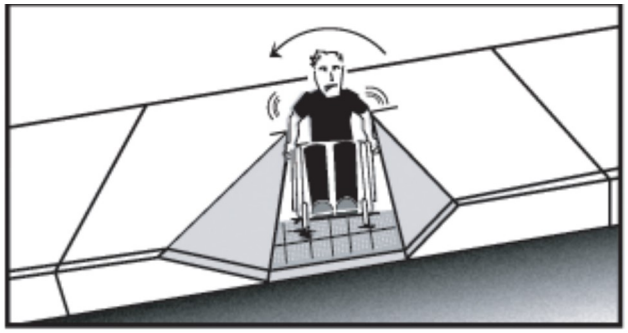

Figure 3. Ramp cross slopes exceeding 2 percent create problems for wheel chairs.

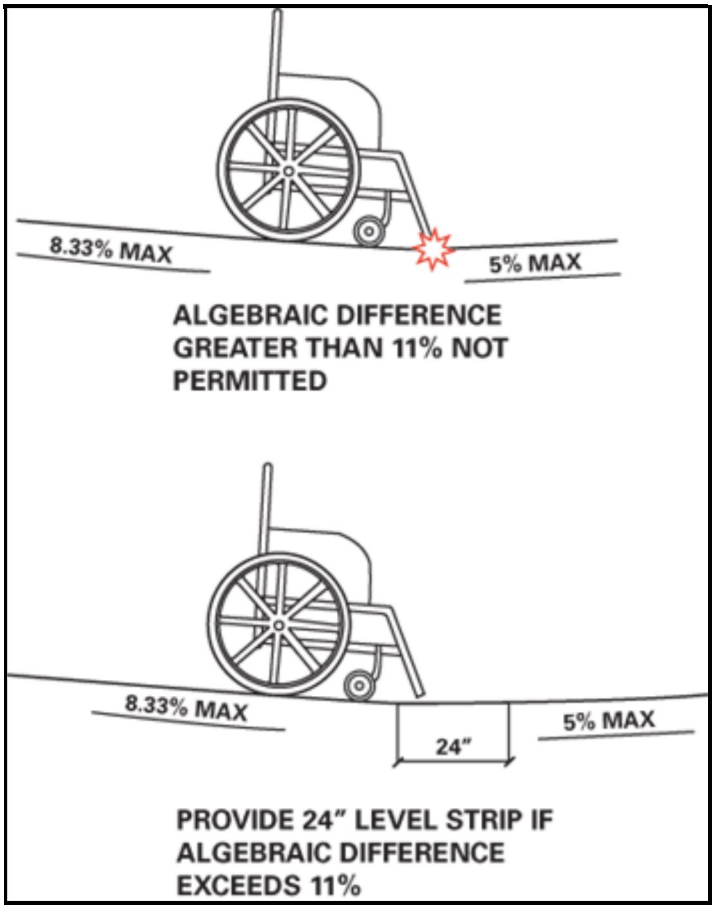

Figure 4. Correct a too-steep grade with a 24-inch flat area at the bottom of the ramp.

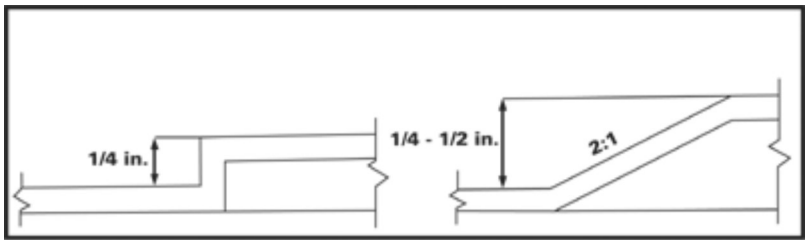

Figure 5. Maximum vertical change in level is one-quarter inch.

between the street and the curb ramp should be no more than 11 percent.

If the change in grade is greater than 11 percent, the wheelchair's foot pegs can hit the bottom of the slope like the bumper of a big car. But the jarring for someone in a wheelchair can be painful and possibly knock the person out of the chair (see Figure 4).

One way to correct a too steep grade is to provide a 24-inch flat area at the bottom of the ramp.

Change in level. The maximum allowable change in vertical elevation for pedestrian facilities is one-quarter inch (see Figure 5). This height makes it easy for everyone to move over the surface without tripping or having to use extra energy to maneuver wheelchairs over it.

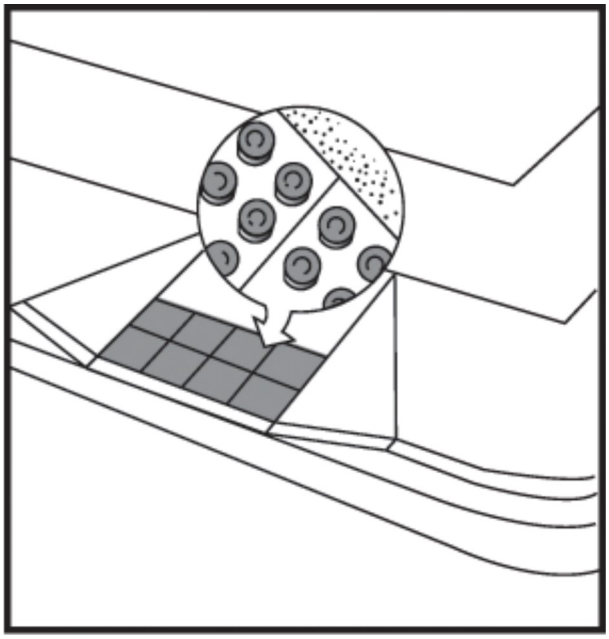

Figure 6. Detectable warnings (truncated domes) on curb ramps

If the change in level is one-quarter to one-half inch, a bevel or ramp, no steeper than 2:1, may be used (see Figure 5). If the difference is greater than one-half inch, it should be treated as a ramp.

Other accessibility problems

For visually impaired pedestrians who can't see the signs and signals that fully sighted pedestrians use, tactile information such as curbs, the sides of buildings, and textures that differentiate the sidewalk from the street, helps them navigate.

Detectable warnings. Truncated domes are provided specifically for blind pedestrians to help them distinguish between the sidewalk and the street. They are the only standard for a detectable warning and are required. The domes must be oriented properly to allow wheelchair wheels to easily glide between them.

Sidewalk construction. Typical sidewalk construction surrounded by a few cones is signal enough for the average sighted, walking pedestrian to get around. But the barrier doesn't provide blind pedestrians with enough information to navigate around it.

A safe, alternative route must be provided for all pedestrians.

Providing more information for pedestrians

In addition to tactile information, visually impaired pedestrians rely on auditory signals such as the sound of traffic to guide themselves. Intersections that are too noisy or where the traffic flow is too intermittent can be difficult to cross.

A locator tone that is activated when the crosswalk button is pushed helps the visually impaired know when it's safe to cross the street. Tactile information on the button and pole to indicate the direction of the crosswalk and the name of the street is also helpful.

How many times have you pushed a crosswalk button and wondered if it was working? There's now a crosswalk button that will let you know by a visual and auditory signal that it's been activated.

While none of these traffic signal improvements is yet required, such improvements can provide information that's beneficial to all pedestrians.

For more information

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Also see the sidewalk design section in chapter eight of the Iowa Statewide Urban Design Standards Manual (SUDAS).