



## Technical Provisions—How To Make a Hiker/Pedestrian Trail Accessible

Section 7.3 of the FSTAG explains the requirements for accessible trails, including trail **grade** and **cross slope**, **resting intervals**, **surfacing**, **clear tread width**, **passing spaces**, **tread obstacles**, **protruding objects**, **openings**, **edge protection**, and **signs**. All of these requirements are minimums. In the spirit and intent of universal design, designers are encouraged to meet the highest provisions wherever it is feasible, given the specific natural constraints of the environment, the level of development, and other managerial considerations. Trail puncheons and trail bridges are included in the Forest Service definition of trail constructed features, so they must be constructed to meet the same requirements. In the following sections, the term *trail* includes trail puncheons and trail bridges.

The building blocks for accessible design are mostly based on wheelchair dimensions, clear space, maneuvering room, and reach ranges found in the ABAAS. This is because the dimensions, multiple moving surface contact points and wheels of a wheelchair are usually the most difficult to accommodate. If a person who uses a wheelchair can use a trail, most other people can, too.

Technical provisions for trails are explained below. An Overview of the FSTAG Implementation Process and an Overview Chart of the FSTAG Implementation Process follow the technical provisions.

### Grade and Cross Slope for Trails

Trail grades and cross slopes must meet the requirements explained below. Recognizing that steeper terrain makes it difficult to achieve flat grades everywhere, and that people are able to handle steeper slopes for short distances, several options are provided to afford accessibility while fitting the trail to varying terrain. An exception to the trail grade and cross slope requirements is allowed if a condition for departure exists.

Trails are to be designed with a running slope of up to:

- 1:20 (5 percent) for any distance
- 1:12 (8.33 percent) for up to 200 feet (61 meters)
- 1:10 (10 percent) for up to 30 feet (9 meters)
- 1:8 (12.5 percent) for up to 10 feet (3 meters)
- 1:7 (14 percent) into and out of drain dips for up to 5 feet (1.5 meters) where the cross slope does not exceed 1:10 (10 percent, figure 110).

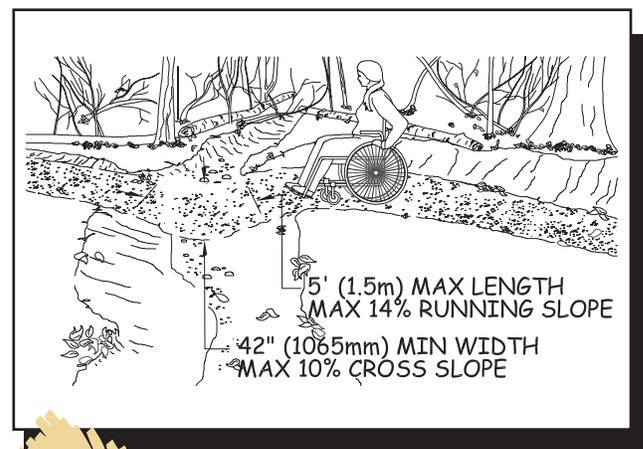
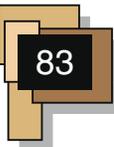


Figure 110—The requirements for accessible slopes at a drain dip.



### CONSTRUCTION TIP— *What is a slope ratio?*

Slopes are often described as a ratio of vertical distance to horizontal distance, or *rise to run* (figure 111). For instance, a slope of 1:20 means that for every foot of vertical rise, there are 20 feet of horizontal distance (or for every meter of vertical rise, there are 20 meters of horizontal distance).

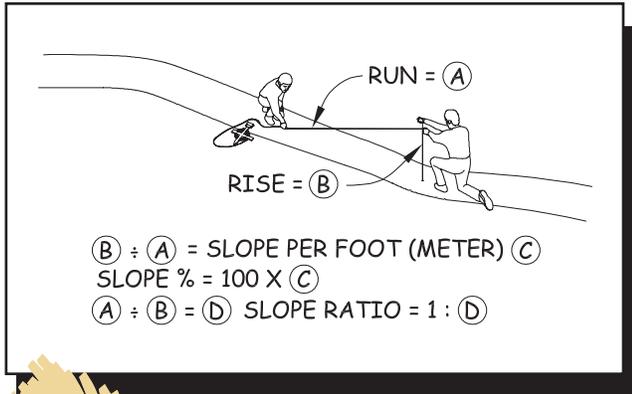


Figure 111—Determining the slope ratio.

To ensure that the trail is not designed as a series of steep segments, no more than 30 percent of the total length of the trail may exceed a grade of 1:12 (8.33 percent).

Cross slopes—the side-to-side slope of a trail tread (figure 112)—can be difficult to traverse, but provide drainage

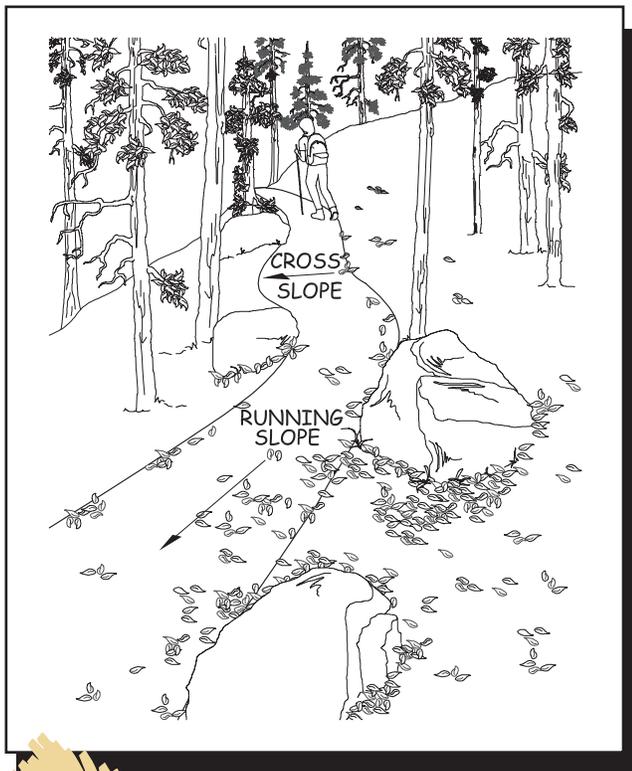


Figure 112—The running slope is measured along a trail's length; the cross slope is measured along its width.

to keep water from ponding and damaging the trail, especially on unpaved surfaces. Trails with too little cross slope tend to become streams. Water running down or ponding on them destroys the trail.

Cross slopes can't exceed 1:20 (5 percent). If a trail has at least 42 inches (1,065 millimeters) clear width at a drain dip, a cross slope of up to 1:10 (10 percent) is permitted at the bottom of the drain dip. The 42-inch (1,065-millimeter) width allows a person who uses a wheelchair to maneuver across the drain dip at an angle, minimizing the chances of tipping over (figure 110). The possibility that a wheelchair might tip over is also why the increased trail grade at a drain dip is only allowed where the cross slope is no steeper than 1:10.

## Resting Intervals on Trails

Resting intervals, relatively level areas that provide an opportunity for people to stop and catch their breath, are required any time the running slope exceeds 1:12 (8.33 percent). An exception allows a resting interval to be skipped if one can't be provided because of a condition for departure.

A resting interval is at least 60 inches (1,525 millimeters) long and at least as wide as the trail leading into it (figure 113). Depending on the design and location, the intersection of two trails may act as a resting interval (figure 114). In most cases, the slopes of a resting interval cannot exceed 1:20 (5 percent) in any direction. Where the trail grade falls between 1:20 (5 percent) and 1:12 (8.33 percent), resting intervals must be provided at least every 200 feet (61 meters). For slopes from 1:12 (8.33 percent) to 1:10 (10 percent), resting intervals must be provided at least every 30 feet (9 meters). Trail grades from 1:10 (10 percent) to 1:8 (12 percent) require resting intervals every 10 feet (3 meters).