



Overview of the FSTAG Implementation Process

Now that you have learned about the extent of application, general exceptions, and the technical provisions, you may be wondering how the whole process ties together. A process overview chart that graphically summarizes the FSTAG steps and sequencing is included below. It guides the trail designer through a series of questions to determine if the FSTAG would apply to the trail being designed. Following this process also enables trail designers to verify that opportunities to provide the highest level of accessibility have been evaluated and that the character, trail class, and experience of the setting have not been changed. You may want to look at a copy of the chart while reading the following explanation of its use.

Step 1—Determine the applicability of the FSTAG

Once a decision has been made to design or alter a trail, three questions must be asked:

1—Is the designed use “hiker/pedestrian”?

If yes,

2—Does the work meet the definitions for new construction or alteration that are explained in *Understanding Trail Terminology*?

If yes,

3—Does the proposed trail connect to a trailhead or accessible trail? *Trailhead* is defined in *Understanding Trail Terminology*.

If the answer to any of those questions is *no*, the FSTAG does not apply and no further analysis is required. The finding and reasons that the FSTAG does not apply should be briefly documented and put in the project file. Even so, it is always desirable to incorporate accessibility where opportunities exist.

If the answer to all three questions is *yes*, the designer moves to step 2.



DESIGN TIP—

No substitute for on-the-ground layout

In order to work through steps 2, 3 and 4 of the overview process, trail designers should have a proposed trail alignment identified on the ground. The review and analysis required in these steps must be based on actual field conditions, rather than relying only on topographic maps.

Step 2—Identify the presence of limiting factors

This step addresses General Exception 1 and the four limiting factors that are explained in *Using the General Exceptions in the FSTAG*. The sequence for identifying the limiting factors may vary and does not need to be done in the order illustrated in the process overview chart.

Let’s work our way through the process overview chart by asking four questions, each related to one of the limiting factors. The first question will be explained in detail to serve as an example for the other three.

“Does the combined trail grade and cross slope exceed 20 percent for a continuous distance of 40 feet (12 meters) or more?”

If not, the FSTAG may still apply, so you should consider the next limiting factor. A *continuous distance* means a sustained grade without rest areas or more moderate grades or grade breaks. If the alignment can be relocated to get a more moderate grade, this limiting factor doesn’t apply.



**CONSTRUCTION TIP—
Measuring grade**

Grade can be measured in a number of ways. An informal survey can be done between obvious trail grade breaks with a hand level, survey rod, and measuring chain (figure 123). A digital level can also be used (figure 124). A detailed universal trail assessment process that uses a clinometer and digital inclinometer to measure grade and cross slope has been developed by Beneficial Designs. More information about this process and the instruments needed to perform the assessment are available at: <http://www.beneficialdesigns.com/trails/utap.html#overview%20background>.

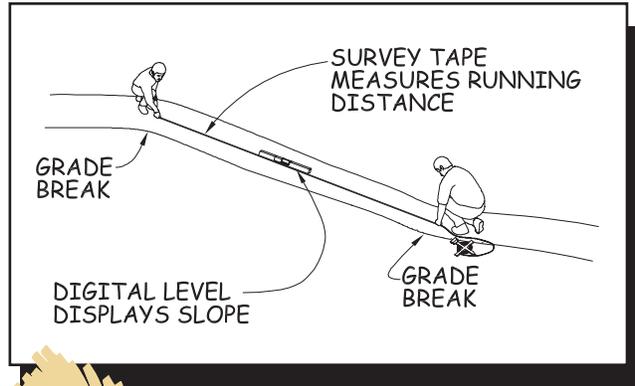


Figure 124—Surveying trail grade with a digital level.

still apply, so you should proceed to the next limiting factor.

If a condition for departure does exist, document the length of trail that exceeds those grades, the location of the area, and your data source (field survey, clinometer, etc.). The FSTAG requirements don't apply beyond the section with excessive grade.

Next, determine whether the extreme grade and cross slope are more than 500 feet (152 meters) from either end of the trail. If so, FSTAG requirements apply between the end of the trail and this limiting factor. If not, determine whether there is a prominent feature between the end of the trail and this limiting factor. If there is a prominent feature, FSTAG requirements apply from the end of the trail to the prominent feature. If there is no prominent feature, the FSTAG does not apply to this trail at all and no further review or analysis is required. This determination and the applicable condition for departure should be documented for the project file.

Work your way through the other three limiting factors the same way.

“Is the surface unfirm or unstable for 45 feet (14 meters) or more?”

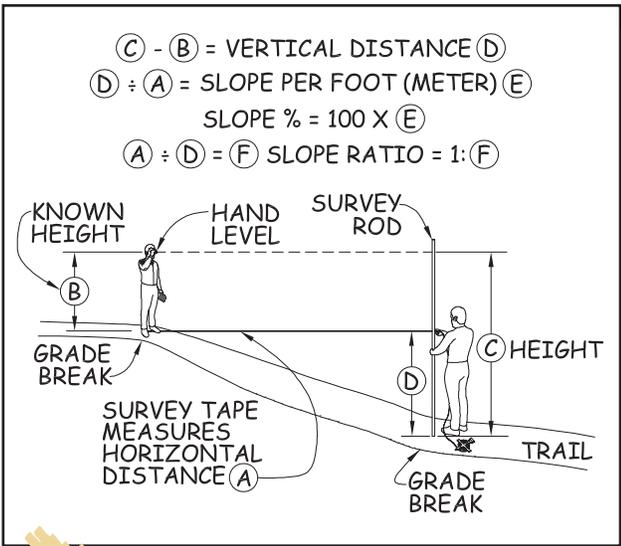


Figure 123—Surveying trail grade with a hand level.

If the grade and cross slope are exceeded, you would need to determine whether a condition for departure exists that permits a deviation from the required grade. If there is no condition for departure, the FSTAG may



DESIGN TIP—
What is firm and stable?

In the late 1990s, the Access Board funded an Accessible Exterior Surfaces research project conducted by Beneficial Designs of Minden, NV. Results of the study are available on the Access Board's Web site at: <http://www.access-board.gov/research/Exterior%20Surfaces/exteriorsarticle.htm>. Figure 31 shows the rotational penetrometer tool that can be used to evaluate surfaces. For further information, consult Beneficial Designs' Web site at: <http://www.beneficialdesigns.com/>. One of the results of the project was development of a scientific method for determining firm and stable exterior surfaces.

Figure 125 shows the rotational penetrometer tool that can be used to evaluate surfaces. For further information, consult Beneficial Designs' Web site at: <http://www.beneficialdesigns.com/>.

What sort of surface is firm and stable? In general, if the answer to both of the following questions is *yes*, the surface is probably firm and stable.

- Could a person ride a narrow-tired bicycle across the surface easily without making ruts? (The bicycle tires are similar to large rear wheels of a wheelchair.)
- Could a folding stroller with small, narrow plastic wheels containing a 3-year-old be pushed easily across the surface without making ruts? (The stroller's wheels are similar to the front wheels of a wheelchair.)

While this method for determining firmness and stability isn't scientifically accurate, it has proven to be effective.



Figure 125—Using the rotational penetrometer to determine whether a surface is firm and stable.

“Is the trail width 18 inches (455 millimeters) or less for a distance of at least 20 feet (6 meters)?”



DESIGN TIP—
Determining when trail width is a limiting factor

Measuring the existing trail width is easy—just use a measuring tape to get the side-to-side distance of the narrowest stretch of trail. Figuring out if you're stuck with that width may be a little more difficult. The trail may be less than 18 inches (455 millimeters) wide, but if you can widen it in its current location or move the trail alignment to an area where it can be wider, the limiting factor doesn't apply.

“Is there a trail obstacle at least 30 inches (760 millimeters) high?”

If you find a limiting factor where a condition for departure applies, there’s no reason to evaluate the trail beyond that point for successive limiting factors. Just look at the section of trail between the limiting factor or prominent feature and the trail terminus. If there are no limiting factors that would prevent compliance with the FSTAG, proceed to step 3.

Step 3—Apply the Technical Provisions.

This step involves looking at FSTAG sections 7.3.1 through 7.3.8, which are the provisions for trail grade, cross slope, resting interval, surface, clear tread width, passing space, tread obstacles, protruding objects, and openings. The provisions for edge protection and signs aren’t included because they don’t affect the accessibility of the trail to the extent the other provisions do.

This summary and the process overview chart do not contain everything you need to know about trail requirements. Designers must refer to the FSTAG for detailed instructions, definitions, conditions for departure, technical provisions 7.0 through 7.3.10, and exceptions.

A series of questions with yes or no answers is asked for each of the provisions listed above, similar to step 2. Let’s take trail grade as an example.

First, look at the existing conditions on the ground and determine whether the trail alignment complies with the required grades (1:20 for any distance, 1:12 for up to 200 feet [61 meters], 1:10 for up to 30 feet [9 meters], and so forth). If not, is there a condition for departure that

would prevent adjusting the trail alignment or making other changes to achieve compliance? If a condition for departure exists, measure and record the length of the deviation and proceed to the next provision. If the trail alignment complies with the required grades or there is no condition for departure, compliance with the provision for trail grade is required.

Each technical provision is addressed in a similar manner. A determination is made for every provision: either compliance is required, or deviations are permitted. Be sure to measure and record the length of each deviation from a particular provision. Once you have worked through the provisions, proceed to the last step.



If at any point during step 3 you find that the recorded length of deviations from the provisions adds up to 15 percent or more of the total trail length, proceed directly to step 4.

Step 4—Calculate Cumulative Deviation Percentage.

This is the final step in determining how much of the trail must comply with the FSTAG as addressed by general exception 2.

Tally up the measurements of permitted deviations from step 3. If they occur on less than 15 percent of the total trail length, the FSTAG technical provisions apply to the entire trail.

However, if the length of permitted deviations is 15 percent or more of the total trail length, the FSTAG applies to only part of the trail, or may not apply at all.

If the first deviation occurs more than 500 feet (152 meters) from one end of the trail, apply the FSTAG from that end of the trail to the first deviation.

If the first deviation occurs less than 500 feet (152 meters) from one end of the trail and a prominent feature is between the end of the trail and the deviation, the FSTAG applies from that end of the trail to the prominent feature.

If the first deviation occurs less than 500 feet (152 meters) from one end of the trail and no prominent feature is between the end of the trail and the deviation, the FSTAG doesn't apply to the trail.



**DESIGN TIP—
Applying the process**

Figure 126 helps illustrate how to apply the process by calculating cumulative deviations and considering a prominent feature. The drawing shows that:

- Deviations occur on more than 15 percent of the trail because 15 percent of 950 feet = 142.5 feet (15 percent of 290 meters = 43.5 meters), but the deviations total 216 feet (66 meters).
- The first point of deviation occurs 400 feet (122 meters) from the trailhead.
- The vista is only 250 feet (76 meters) from the trailhead.

The trail must comply with the guidelines from the trailhead to the vista. Beyond the vista, the trail does not have to comply with the guidelines.

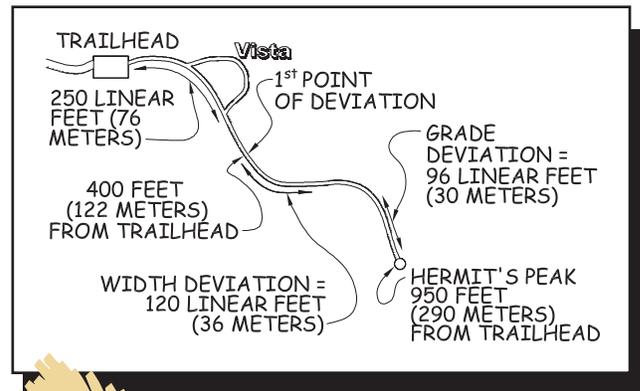
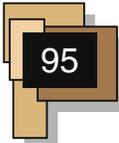


Figure 126—This trail schematic illustrates how to determine where the trail must comply with the FSTAG.

That's all there is to it!

Trail Layout Notes