

OSHA STANDARDS

1910.23(c) Protection of open-sided floors, platforms, and runways

(1) Every open-sided floor or platform 4 feet or more above adjacent floor or ground level shall be guarded by a standard railing (or the equivalent as specified in paragraph (e)(3) of this section) on all open sides except where there is entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a toe board wherever, beneath the open sides,

(i) Persons can pass,

(ii) There is moving machinery, or

(iii) There is equipment with which falling materials could create a hazard.

(2) Every runway shall be guarded by a standard railing (or the equivalent as specified in paragraph (e)(3) of this section) on all open sides 4 feet or more above floor or ground level. Wherever tools, machine parts, or materials are likely to be used on the runway, a toe board shall also be provided on each exposed side. Runways used exclusively for special purposes (such as oiling, shafting, or filling tank cars) may have the railing on one side omitted where operating conditions necessitate such omission, providing the falling hazard is minimized by using a runway of not less than 18 inches wide. Where persons entering upon runways become thereby exposed to machinery, electrical equipment, or other danger not a falling hazard, additional guarding than is here specified may be essential for protection.

(3) Regardless of height, open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, pickling or galvanizing tanks, degreasing units, and similar hazards shall be guarded with a standard railing and toe board.

OSHA Act of 1970

Section 5

(a) Each employer

1. shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees

NPS POLICIES

Management Policies – Wilderness

6.3.3 Consistency

The National Park Service will seek to achieve consistency in wilderness management objectives, techniques, and practices on both an agency and an interagency basis. Accordingly, the National Park Service will seek to maintain effective intra-agency and interagency communications, and will encourage,

sponsor, and participate in intra-agency and interagency training and workshops designed to promote the sharing of ideas, concerns, and techniques related to wilderness management. However, the need for interagency consistency will in no way diminish any established NPS wilderness...

6.3.5 Minimum Requirement standards and values.

...In accordance with this policy, superintendents will apply the minimum requirement concept in the context of wilderness stewardship planning, as well as to all other administrative practices, proposed special uses, scientific activities, and equipment use in wilderness...

6.3.10.2 Trails in Wilderness

Trails will be permitted within wilderness when they are determined to be necessary for resource protection and/or for providing for visitor use for the purposes of wilderness. The identification and inventory of the wilderness trail system will be included as an integral part of the wilderness management plan or other appropriate planning document. Trails will be maintained at levels and conditions identified within the approved wilderness management plan or other planning document. Trail maintenance structures (such as water bars, gabions) may be provided, under minimum requirement protocols, where they are essential for resource preservation or where significant safety hazards exist during normal use periods. Historic and/or prehistoric trails will be administered in keeping with approved cultural resource and wilderness management plan requirements...

Management Policies – Visitor Safety

8.2.5.1 Visitor Safety

The saving of human life will take precedence over all other management actions as the Park Service strives to protect human life and provide for injury-free visits. The Service will do this within the constraints of the [1916 Organic Act](#). The primary—and very substantial—constraint imposed by the Organic Act is that discretionary management activities may be undertaken only to the extent that they will not impair park resources and values.

While recognizing that there are limitations on its capability to totally eliminate all hazards, the Service and its concessioners, contractors, and cooperators will seek to provide a safe and healthful environment for visitors and employees. The Service will work cooperatively with other federal, tribal, state, and local agencies; organizations; and individuals to carry out this responsibility. The Service will strive to identify and prevent injuries from recognizable threats to the safety and health of persons and to the protection of property by applying nationally accepted codes,

standards, engineering principles, and the guidance contained in [Director's Orders #50B, #50C, #58, and #83](#) and their associated reference manuals. When practicable and consistent with congressionally designated purposes and mandates, the Service will reduce or remove known hazards and apply other appropriate measures, including closures, guarding, signing, or other forms of education. In doing so, the Service's preferred actions will be those that have the least impact on park resources and values.

The Service recognizes that the park resources it protects are not only visitor attractions, but that they may also be potentially hazardous. In addition, the recreational activities of some visitors may be of especially high-risk, high-adventure types, which pose a significant personal risk to participants and which the Service cannot totally control. Park visitors must assume a substantial degree of risk and responsibility for their own safety when visiting areas that are managed and maintained as natural, cultural, or recreational environments.

These management policies do not impose park-specific visitor safety prescriptions. The means by which public safety concerns are to be addressed is left to the discretion of superintendents and other decision-makers at the park level who must work within the limits of funding and staffing. Examples include decisions about whether to install warning signs or artificial lighting, distribute weather warnings or advisories, initiate search-and-rescue operations or render emergency aid, eliminate potentially dangerous animals, close roads and trails or install guardrails and fences, and grant or deny backcountry or climbing permits. Some forms of visitor safeguards typically found in other public venues—such as fences, railings, and paved walking surfaces—may not be appropriate or practicable in a national park setting.

Director's Order #41 – Wilderness Management

Sunset and superseded by chapter 6 of the NPS Management Policies (above)

Director's Order #50B, SECTION 3.2 REQUIREMENTS

The NPS will:

C. Meet or exceed all current applicable statutory, regulatory, and policy requirements relating to occupational safety and health. Where conflicts arise between statutory, regulatory, and policy requirements, and codes and standards, the more stringent requirement(s) will be used. If codes, standards, procedures, and guidelines do not exist, or those that exist are not adequate, appropriate policies or programs will be developed.

Director's Order 50C

Unable to copy to insert. See sections 2.1 Policy; 3.10 Superintendents; 4 Operational Policies and Procedures

TRAILS STANDARDS

Trail Construction and Maintenance Notebook – USDOT FHA

Bridges

Trail bridges range from a simple foot bridge with a handrail ([figure 62](#)) to multiple span, suspended, and truss structures. In the Forest Service, handrails are required on all bridges unless an analysis (design warrant) shows that the risk of falling off the bridge is minimal or the trail itself presents a higher risk. All bridges require a curb.

Design Approval

On national forests, all bridges require design approval from engineering before being constructed. Some regions have standardized, approved designs for simple bridges.



Figure 62--A simple footbridge with a handrail.

On hiking trails, log footbridges ([figure 63](#)) can be used to cross streams or to provide access during periods of high runoff. Log footbridges consist of a log, sills, and bulkheads. The log needs drainage and airspace to keep it from rotting. The foot log should be level and well anchored. Notch the sill--not the log--when leveling the foot log. The foot log should be no less than 457 millimeters (18 inches) in diameter. The top surface should be hewed to provide a walking surface that is at least 250 millimeters (10 inches) wide. Don't let the log or rails sit on the bare ground. Remove all bark from logs and poles.

If the foot log is associated with a shallow stream ford, be sure to position the log upstream or well downstream of the ford. Logs immediately below the crossing can trap travelers who lose their footing in the ford.



Figure 63--A log footbridge. The sill can be notched to accommodate the logs, but not vice versa. Photo has been digitally altered.

Choosing the materials for a bridge is not a simple process. Even the use of native material for a simple foot log has consequences. For example, most untreated logs of a durable wood (like coastal Douglas-fir) have a useful life of less than 20 years. Yet it may take 100 years for a log to grow big enough to support visitor traffic and winter snow loads. The typical bridge has three to four stringers. Multiply this replacement-to-growth ratio by several replacement cycles and you can see how it's possible to create a slow-motion clearcut around a bridge site.

Handrails

In the Forest Service, handrails are required unless an analysis (design warrant) shows they are not needed. If you have handrails, construct them according to plan. Improperly constructed handrails are a big liability, because they probably will not be strong enough.

Standard Trail Bridge Drawings and Design Aids - USFS

<http://www.fs.fed.us/eng/bridges/drawings.htm> (see attached design; one of several standardized and approved designs)

USFS - MTDC

Rail Systems

The first consideration in selecting a rail system must be safety. Safety requirements are primarily determined by the needs of the expected trail users. Fitting rail types into appropriate Recreation Opportunity Spectrum classifications is done through material selection and/or coatings. Construction specifications also influence which rail system is suitable for a specific location and use. The basic rail systems include:

1. Urban and High-Risk Areas (IBC-based)

The 2006 International Building Code (IBC) refers to the rail systems that are attached to buildings, such as visitor centers, as guards. **These rail systems are recommended on trail bridges in urban settings and high-use areas as well, for the protection of children.** This code (IBC 1013, Guards and IBC 1607, Live Loads) requires a guard (rail system) at least 42 inches high. A 4-inch sphere must not pass through the lower 34 inches of the rail system and an 8-inch sphere must not pass through the upper part of the rail system, from 34 to 42 inches.

2. Rural and Moderate-Risk Areas (AASHTO-based)

Rail systems on trail bridges frequently used by children must meet the American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Highway Bridges. This code (LRFD section 13, Railings) requires a railing (rail system) at least 42 inches high for pedestrian traffic and at least 54 inches high for bicycle or equestrian traffic. A 6-inch sphere must not pass through the lower 27 inches of the rail system and an 8-inch sphere must not pass through the upper part of the rail system, higher than 27 inches.

3. Remote and Low-Risk Areas (OSHA-based)

The Occupational Safety and Health Administration (OSHA) refers to rail systems as standard railings. This code (OSHA 1910.23) provides safety without complication and is widely accepted for protecting industrial workers. **Rail systems on remote trail bridges must be at least 42 inches high for pedestrian traffic and at least 54 inches high for bicycle or equestrian traffic. These rail systems must also have one or more intermediate rails so that the vertical distance does not exceed 15 inches**

between 2 x 4 wood rails and does not exceed 19 inches between steel rails.

Not all trail bridges require rail systems. An analysis should be completed to identify and evaluate the bridge's potential users and the hazards of not having a rail system. The analysis should also include the possibility of using a railing on only one side of the bridge. If the trail on which the bridge is located has more hazardous drops than the trail bridge, then a rail system is probably not required. Other considerations, such as convenience, may justify a rail system. As a general rule, any trail that is not in remote areas with a drop of 4 feet or more, or a remote trail with a drop of 8 feet or more, should have a rail system. All trail bridges that do not have a rail system must have a curb.