

Basis of Design

This section applies to the incorporation of a safe means of access, including fall protection where necessary, into the design of University facilities.

Background

- This design guide addresses the safety of University occupants and maintenance personnel. The safety of construction workers during building construction is a separate issue that demands the attention of the general contractor and the subcontractors.
- A safe means of access is mandated by the Washington Administrative Code which requires that the University provide to each employee a place of employment free from recognized hazards that are causing or likely to cause serious injury or death.
- Provide safe access to all equipment associated with operations and maintenance. This includes HVAC equipment, windows, roofs, lighting, and fire safety equipment. Access must not put personnel at risk. In general, access should not require maintenance personnel provide equipment such as ladders or lifts. Access for exterior window washing is an exception to this rule as the preferred method is from the ground using University owned lifts.
- Identify hazards associated with operations and maintenance, and design measures to mitigate these hazards that are acceptable to University project review.

Programming

- Provide a narrative of maintenance access requirements, noting any areas of the building where known fall or other safety hazards exist, and provide a plan for mitigating these hazards to provide safe access. For example, a roof might present a fall hazard and the mitigation step is a parapet of at least 42 inches in height. It is the intent of this requirement that a conscientious identification and mitigation of known access hazards will result in a safer environment.
- Comments from University maintenance and alterations staff concerning specific needs for safe access shall be solicited.
- Safety codes discuss two typical methods for compliance with worker fall protection: “Fall Restraint” and “Fall Arrest”.
 - 1) Fall restraint prevents personnel from entering a fall hazard. This is provided by a parapet or guardrail or a system for attaching personnel to a restraining system.
 - 2) Fall arrest assumes that a person might not be safely restrained from a fall and must be arrested (caught) during an actual fall event. Fall arrest systems must ALWAYS be designed for “over the side” work, where personnel are supported on a swing stage, bosons chair, etc.

Design Criteria

- Provide fixed stairs or a ships ladder where access to different roof elevations is required for such purposes as gauging, inspection, regular maintenance, etc., and when carrying tools or equipment by hand is normally required.

- In multi-story buildings provide at least one stair access to the main (flat) roof level, and terminate in an enclosed space such as a penthouse. The slope of this stair shall be uniform all the way to the roof. The top landing shall have enough space for a worker to set down tools and supplies while opening the door or hatch to the roof. Place entrance to the roof in a safe location where personal fall protection equipment is not required.
- Fixed ladders are limited to locations where workers are not required to carry objects while climbing; tools carried inside a tool belt leaving both hands free to climb is acceptable. Ladders shall comply with WAC Chapter 296-155, Part J, Stairways and Ladders. Aluminum ladders are unacceptable unless approved during University project review.
- Wherever there is danger of falling through a skylight opening, and the skylight itself is not capable of sustaining the weight of a two hundred pound person with a safety factor of four, the skylight opening must be guarded by a standard skylight screen or a fixed standard railing on all exposed sides. See Roofing Section of Facilities Services Design Guide for further information.
- Provide sufficient working space around all equipment to allow safe operation and maintenance of the equipment.
- Provide adequate headroom for servicing equipment. The minimum headroom of working spaces about service equipment, switchboards, panel boards or motor control centers, shall be 6 feet 3 inches.
- The minimum width of exitways or routine access path shall not be less than 28 inches.
- Provide a minimum of one entrance, at least 24" wide x 6' 6" high for access to the working space around electric equipment. For equipment 600 volts or less, where live parts are normally exposed, the working space in front of such equipment shall not be less than 3 feet deep or less than 30 inches wide in front of the electric equipment.
- A standard guardrail system shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of 42 inches from upper surface of top rail to floor. The intermediate rail shall be approximately halfway between the top rail and the floor.
- A parapet shall be at least 42 inches from the top to the roof surface if it is being designed for use as fall restraint.
- All anchors, including those designed as part of a fall restraint system, must be designed to fall arrest requirements to avoid confusion and the potential for a fall restraint anchor to be used for fall arrest.
- The design, fabrication and installation of every fall arrest system, including all anchors and lifelines, are the responsibility of the design consultant and must comply with codes and standards. Fall arrest anchors and their attachment to the building shall be of materials that will not rot, corrode or deteriorate in any way. Locations of the anchors must be approved by University project review prior to completion of building design.

Design Evaluation

- Programming Phase: Program statement addressing safe access and fall protection issues.
- Design Development Phase: Narrative for mitigating safe access issues. Outline specifications support mitigation plan
- Construction Document Phase: Detailed narrative for mitigating safe access issues. Final specifications support mitigation plan.

References

- WAC 296-155, Part C-1: Fall Arrest and Fall Restraint
- WAC 296-155, Part K: Floor Openings, Wall Openings, and Stairways.
- WAC 296-24: Working Surfaces, Guarding Floors and Wall Openings, Ladders.

Related Sections

The following sections address specific elements of this section:

- Facilities Services Design Guide - Architectural - Roofing
- Facilities Services Design Guide - Architectural – Curtain walls & Windows
- Facilities Services Design Guide - Architectural - Masonry Walls
- Facilities Services Design Guide - Mechanical – Heating, Ventilation and Air Conditioning
- Facilities Services Design Guide - Civil – Utility Tunnels and Trenches
- Facilities Services Design Guide - Electrical – Lighting
- Facilities Services Design Guide - Electrical – Primary Distribution: Utility Tunnels & Manholes

Products, Materials and Equipment

- Fall arrest anchors should be based on the designs shown in Roofing: Drawings – Typical Fall Arrest Anchor. Provide structural analysis of alternate systems.
- “Off-the-shelf” fall protection systems are NOT to be used. This includes davit systems.

END OF DESIGN GUIDE