DESIGN GUIDELINE 4.8 FALL PROTECTION ON ROOFS

Scope

This section specifically includes design requirements and standards for fall protection measures on roofs and at skylights. It does not address policies and procedures for employee fall protection.

Related Sections

- MIOSHA Construction Safety and Health Standard, Part 45. Fall Protection •
- MIOSHA General Industry Safety and Health Standard, Part 2. Walking Working Surfaces
- ANSI/ASSE Z359.6-2016 Specifications and Design Requirements for Active Fall Protection Systems
- ANSI/ASSE Z359.18 – 2017 Safety Requirements for Anchorage Connectors for Active Fall Protection Systems
- ANSI/IWCA I.14 Window Cleaning Safety Standard

Related Sections

U-M Design Guideline Sections:

6.0 DG 075000 Roofing Systems

Definitions:

Passive Fall Prevention: A stationary device such as a guard rail, barrier, screen or parapet wall or other structure that eliminates exposure to the fall hazard.

Travel Restraint System: A lanyard system that restrains a user from reaching the roof edge/ fall hazard.

Personal Fall Arrest System: An energy absorbing lanyard system that decelerates and arrests a fall that has already begun.
Anchorage: A secure point of attachment for equipment such as lifelines, lanyards, and rope descent systems.

Non-Engineered Anchorage: A structural component capable of accepting an anchorage connector and supporting at least 5,000 pounds (22.2 kN) per employee attached as determined by a competent person.

Engineered Anchorage: An anchorage connector designed and installed to a structural component for use with a complete personal fall arrest system which maintains a safety factor of at least two.

Low Sloped: means a roof that has a slope less than or equal to a ratio of 4 in 12 (vertical to horizontal).

Steep Sloped: means a roof that has a slope greater than a ratio of 4 in 12 (vertical to horizontal). Typically requires anchorage for a personal arrest system.

Unprotected roof edge: mean any side of a roof where there is no wall, guardrail system, or stair rail system to protect an employee from falling to a lower level.

RDS Rope descent system: means a suspension system that allows an employee to descend over a roof edge to perform window washing or other tasks.

Fall Protection Design Requirements

Passive Fall Prevention Systems:

University design should default to passive fall prevention systems. Design rooftop areas containing a fall hazard of greater than four feet to a lower level with specific regard to fall prevention. Comply with the following passive fall protection measures wherever possible:

- Locate entry points, walkways, roof hatches and equipment (including roof drains) a minimum of 15 feet from unguarded roof edges. This includes any walkways to or around the equipment. A clearly defined pathway must be provided.
- Include permanent structures such as parapet walls or guard rails that meet MIOSHA regulations for design. Note that the guard rails can form a perimeter around the equipment and service space rather than being mounted at the edge of the roof. Guardrails should not infringe on the working clearance necessary to service the equipment.
- Provide passive fall protection at roof hatches in compliance with DG 6.1 075000 Roofing Systems. Hatch guardrails shall be equipped with self-closing gate and have ladder rungs built into gate
- Provide passive fall protection at all skylights
    - Guardrails and /or screens must comply with MIOSHA regulations and Michigan Building Code.
    - Provide permanent signage on guards at perimeter of skylight noting designed weight limits.
    - Provide permanent signage on guards at perimeter of skylight noting “Warning – skylight. Do not step, stand or sit on skylight. Access only for cleaning and maintenance by approved personal.”

Engineered Anchorages – Travel Restraint and Fall Arrest Systems

Anchor points shall not be included in the roof design without the written approval of EHS. Anchorages should only be considered when passive fall prevention systems are not feasible, such as on steep sloped roofs.

When approved, permanent engineered anchorage system must be capable of supporting twice the maximum arresting forces of a personal fall arrest and/or restraint system complying with the following:

- Anchorage must be located a minimum of 10 feet from the roof edge and must be easily accessible and within reach of the employee.
- Anchorages must be independent of any anchorage being used to support a rope descent or suspended platform system.
- Single-point anchorages should be ANSI Type A if feasible. ANSI Type A anchorages for fall arrest are mandatory for steep pitch roofs (greater than 4:12)
- At shop drawing submittal/approval, a Qualified Person (PE) shall provide a Certification documenting the system's design, fabrication, installation, and use. The qualified person shall include with the documentation a written statement that the system meets criteria established by ANSI Z359.6 and other referenced standards, as applicable. This certification shall be submitted to owner's representative prior to project close out.

Engineered Anchorages - Rope Descent Systems (RDS)

Rope Descent Systems shall only be provided at locations where regular access or maintenance is required and access from ground equipment is not practical. When required, RDS systems must comply with the following:

- The building owner should be informed of the requirement for a qualified person to test and certify each RDS anchorage at least every 10 years. Certification costs for the RDS system will be paid by the facility owner utilizing a Service Level Agreement with Maintenance Services. EHS must be contacted to coordinate and approve the inspection and certification of anchorages.
- At shop drawing submittal/approval a Qualified Person (PE) shall provide a Certification documenting the system has been designed, installed, and tested to support at least 5,000 pounds (268 kg), in any direction, for each employee attached.
- The qualified person shall include with the documentation a written statement that the system meets and has been tested per criteria established by ANSI/IWCA I.14 Window Cleaning Safety Standard and MIOSHA General Industry Safety and Health Standard, Part 2, as applicable.