

SECTION 01 35 25 - FACILITIES FALL PROTECTION

1. GENERAL

- A. This section details the requirements for establishing permanent fall protection systems on the facilities at Brown University to enhance safe and compliant access to building equipment that requires regular access for inspection, repairs and maintenance. It also seeks to identify and minimize fall protection hazards that may develop in the course of new projects and renovation projects.
- B. Brown will use these procedures as a set of “living documents” over the long term to safely service this equipment in compliance with the latest editions of:
 - OSHA – 29 CFR 1926, Subpart M Fall Protection
 - OSHA – 26 CFR 1910, Subpart D Walking and Working Surfaces
 - ANSI Z359.1, Fall Protection Code
 - IWCA I-14.1, Window Cleaning Safety Standard
 - [Brown University Fall Protection Program](#)

2. DESIGN INTENT

- A. Permanent fall prevention / protection measures shall be included as an integral part of the design phase for all new construction projects and renovation/repair projects at Brown.
- B. All walking/working surfaces where employees are exposed to fall hazards over 4 feet (i.e. roof systems and floor openings) shall be permanently guarded or have qualified anchorages for personal fall arrest systems.
- C. Where a project is new construction or a “gut” renovation to an existing building, including repairs / upgrades to existing roofs, or the additions of new rooftop equipment, fall protection shall be designed and installed under the project.
- D. For renovations to existing buildings that already have fall protection installations, the existing documentation shall be updated or provided new to incorporate the project scope of work as necessary.

3. GENERAL DESIGN REQUIREMENTS

- A. A qualified person or firm with documented experience in fall protection is required to evaluate, design, plan and select appropriate fall protection / prevention solutions. Building anchorages, tie offs, lifeline systems and any other building structural solution shall be designed and certified by a registered Professional Engineer with expertise in fall protection systems.
- B. A wide variety of fall protection solutions and systems are available. It is important to select a solution based on the specific building type, roofing system and work applications that are expected.
- C. An adequate number of rated anchorage points shall be provided so that workers can reach areas required for maintenance and consider future construction and maintenance activities. Future activities may include, but are not limited to, window washing, roofing

replacement/repair, masonry or other siding repair, building inspections, HVAC maintenance, etc).

- D. During the early project design phase, the design team shall consult with EHS, FM-Operations staff and the University Architect for review. A complete understanding of the expected work procedures will help enable the design team to select the most appropriate fall protection system(s) for the project. Details for review include, but are not limited to:
- List of equipment requiring access in areas where there are fall hazards;
 - Frequency of equipment inspection and access;
 - Access and egress paths to / from the work or equipment areas;
 - Rigging and travel paths for moving or carrying tools, parts and consumables required for equipment service and repairs;
 - Window washing and building façade access requirements for inspection, cleaning and repair;
 - Roof drain and scupper access requirements for inspection and cleaning;
 - Selection of materials that can withstand harsh environments;
 - Aesthetics.

4. FALL PROTECTION CONTROLS HIERARCHY

- A. Control measures are not intended to be used independently; in many cases a combination of controls and systems may be implemented to reduce the exposure to fall hazards.
- B. Passive Fall Protection Systems: These systems do not require operational involvement from employees while performing work. Examples of these preferred methods are as follows:
- Construction of parapet walls that meet the requirements for guardrail systems;
 - Fixed guardrail systems.
- C. Engineering Controls: Designs to eliminate hazards by controlling exposure to fall hazards are also preferred. Examples:
- Installation of gutter screens and scupper guards.
 - Locating rooftop equipment towards the center of a building instead of near the edges.
 - Provide roof access from within the building, rather than needing a ladder to access the roof.
 - Provide coverage for holes and gaps in walking and working surfaces.
- D. Active Fall Protection Systems: Active Fall Protection Systems require that employees understand when they are exposed to fall hazards and that they have a working knowledge of the fall protection system available for their protection.

Active systems begin with a qualified anchorage point and have components connected to the worker (body harness, lanyard, self-retracting lifeline, and rails, etc.). Proper training in the use of active systems is essential for an effective fall protection system.

- E. Personal Fall Arrest Systems: Personal Fall Arrest Systems (PFAS) are considered active systems and shall be incorporated into the building design when elimination of the fall hazard or a passive system is not feasible. Examples of PFAS include:
- Fixed point anchors certified as an attachment point for workers who work locally.
 - Horizontal Lifeline (HLL) systems to serve as an anchorage attachment for continuous fall protection.

- Fall protection design shall consider rescue procedures which would be required in the event an employee is subjected to a fall using a fall arrest system.

PFAS anchorages must be easily accessible from the roof access in order to avoid fall hazards during connection to the fall protection system. Systems shall provide uninterrupted access to the entire length of the structure without having to disconnect from the system to pass through intermediate support points when using double clip lanyards.

All essential components shall be designed and tested as part of the system in order to provide a complete and fully operational fall arrest system.

5. SPECIFIC DESIGN REQUIREMENTS

- A. Fixed ladders and platforms for servicing and accessing building equipment shall be provided with appropriate fall protection in all situations where workers are working or accessing elevated surfaces 4 feet above a lower level, whenever there is a possibility of falling onto dangerous equipment or into a hazardous environment, or where there are impalement hazards present.
- B. Ladder access shall be protected from the leading edge of the roof (within 15 feet) and utilize railings (passive fall protection system), anchor points and/or lifelines (active fall protection system) to safeguard workers on the rooftop or elevated work space.
- C. Hatch access to roofs shall be protected by using guards, railings or other approved measures.
- D. New skylights shall be designed and protected to prevent people from falling through them. Existing skylights shall be protected by appropriate skylight screens or fixed railings on all exposed sides.
- E. Roof anchors shall be provided on all buildings that require windows to be washed by suspended scaffolds, boatswain's chair, rope descent system or other suspended system.
- F. Identify "safe work" zones on elevated platforms and roofs (ie; more than 15 feet away from an unprotected roof edge). Provide appropriate signage, where required, to warn of unprotected hazards or areas on elevated platforms and roofs.
- G. Anchor points or lifeline systems shall be engineered to support at least 2 workers using the system at one time.

6. SIGNAGE

- A. A laminated, reduced-size (11 x 17" nominal size) roof or floor plan showing all fall protection system locations, anchor load ratings, number of authorized users that may attach to the system at one time, shall be posted at every roof or floor access leading to areas with fall protection.
- B. The fall protection plan shall include scaled locations and the equipment tag or naming information for all equipment / devices / "green roof" components, etc. in need of service and access, the designated walking paths, tie-off locations, lifeline locations, PFAS locations, shaded fall hazard zones along with the setback information denoting safe areas for access and travel on the roof or area covered.

- C. Anchor points or systems shall identify the number of workers who may use the system at one time.

7. DELIVERABLES

- A. The qualified person/contract designer and the installation contractor shall ensure that documentation of anchorage certification and periodic recertification requirements are provided to Brown prior to the system being put into use.
- B. Submit shop drawings for all major fall protection system components, such as tie-offs and permanent anchors, and related fall protection materials.
- C. Submit manufacturer's cut sheets for routine fall protection materials such as ladder guards, railings and anchor points.
- D. Submit detailed user instructions for any active fall arrest systems that are provided under the project. User instructions shall include at least the following:
 - Manufacturer's name, address, and telephone number.
 - Manufacturer's user instructions for the part and model numbers utilized.
 - Descriptions of proper methods and limitations of use.
 - Description of detailed inspection/recertification procedures for fall arrest system.
 - Criteria for failing inspections and determining unusable equipment.
- E. Submit shop drawings illustrating the fall protection system signage to be affixed at all roof accesses.
- F. Submit manufacturer's warranty information and documentation showing that the system was installed in accordance with manufacturer's instructions.
- G. Provide electronic files for each plan, in both AutoCAD and PDF electronic files, of roof signage plans for future use and updates.
- H. A preventative maintenance program shall be developed and submitted for the actual fall protection systems installed under the project. Program shall include all anchor design information for each permanent anchor type and lifeline anchors, the periodic inspection requirements and the testing requirements.

End of Section

Sample Roof Fall Protection Plan

