



Rooftop Fall Protection Solutions





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Falls in the workplace continue to be one of the leading causes of death and injury each year, and ensuring rooftop

safety compliance can be daunting. That's why Nation's Roof has teamed up with Diversified Fall Protection to offer integrated fall protection systems and solutions alongside our roofing projects.

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ACTIVE SOLUTIONS

Active Fall Protection Systems require user engagement and training, and are subject to inspection and certification required by law.

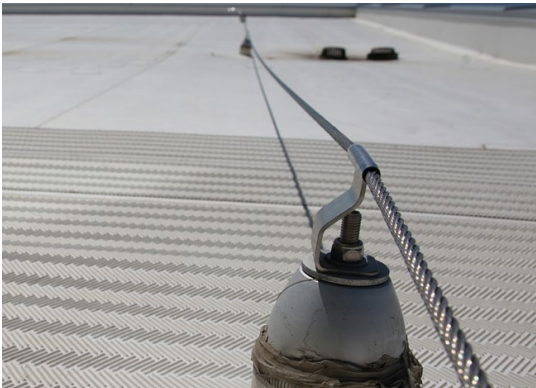
Active systems are generally broken down into those used for Fall Arrest and those intended for use in a Travel Restraint system.

- **Fall Arrest Solutions** are employed where workers are necessarily exposed to falls by virtue of the work performed.
- **Travel Restraint Systems** are designed to limit access to the fall hazard completely, although they are subject to the same load requirements as fall arrest systems.

Anchorage for both Arrest and Restraint Systems must be designed, installed, and used under the supervision of a Qualified Person and be capable of supporting a 5,000 lb load or designed to a safety factor of two-times the maximum foreseeable force.

TRAVEL RESTRAINT SYSTEMS

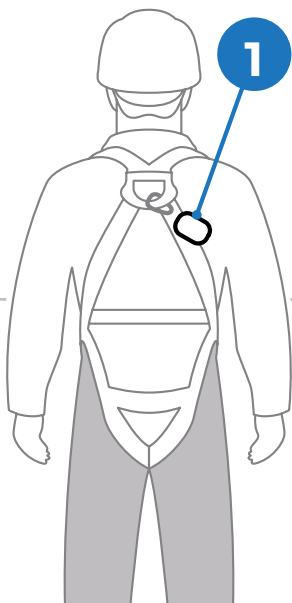
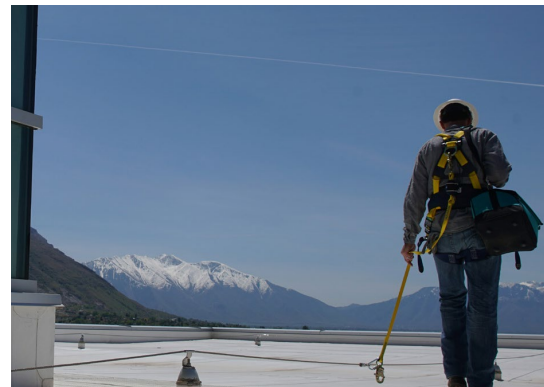
HORIZONTAL LIFELINE



Horizontal Lifeline Systems (HLL) are user-friendly systems that allow workers to be safely anchored while traversing the roof or other elevated platform. They can be designed for Restraint or Arrest applications and can be engineered for single or multiple workers.

ARRESTING FORCES

Per OSHA, active fall protection systems must limit the maximum arresting force on workers to 1800 pounds. To exceed this standard, and to reduce impact loading to structure, manufacturers of equipment and PPE make many shock absorbing components available.



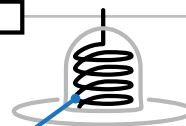
Energy Absorbers on PPE

Energy absorbers on PPE are made from rip-stretching or other deployable webbing and are incorporated into shock absorbing lanyards.

2

In-Line Energy Absorber

These components are attached to the cable itself and deploy under a specified load to absorb shock during a fall arrest.



3

Deformable Anchorage Connectors

These connectors attach to structure and deform under load to absorb energy while arresting a fall, protecting the structure.

LADDER SAFETY

According to OSHA, a fixed ladder is an acceptable walking-working surface only if workers can maintain three-point contact. Above 24 feet, OSHA 1910.29(i) mandates that fixed ladders be equipped with an active fall arrest system. If the work performed makes three-point contact impossible or unlikely, safety system designers should specify a stair system to protect workers. And if neither three-point contact nor a stair system is possible, an active fall arrest system should be used regardless of the height of the ladder.

VERTICAL LIFELINE SYSTEMS



A vertical lifeline allows movement up and down the entire height of the line, eliminating the need to disconnect and find new tie-off points while ascending or descending from a tower or ladder. By connecting to the vertical lifeline using a shuttle or traveler, users may move as long as tension is slack on the lifeline. In the event of a fall, the shuttle automatically engages the vertical lifeline and locks, arresting the fall.

VERTICAL RAIL SYSTEMS



A vertical, rigid track fall arrest system typically offers longer service life than a Vertical Lifeline constructed with steel cable.

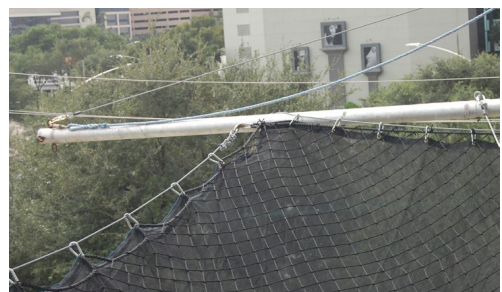
LADDER ANCHORS



Ladder anchors are attached to the top of a fixed ladder and are used with self-retracting lifelines. This is a solution that doesn't require a traveler or shuttle. Use of a ladder anchor and SRL also doesn't require a sternal d-ring on the workers harness, since the SRL is connected to the dorsal, fall arrest d-ring. More information about self-retracting lifelines for use with Ladder Anchors can be found on page 31

SAFETY NETTING

Safety netting consists of a netting material that is suspended below the work area, typically by cables or rods. The netting is designed to deform upon impact, absorbing the energy of the falling worker and reducing the risk of injury. Safety netting systems are often used in construction, where workers may be working at heights on scaffolding or other temporary structures, but are also compliant with OSHA General Industry standards.



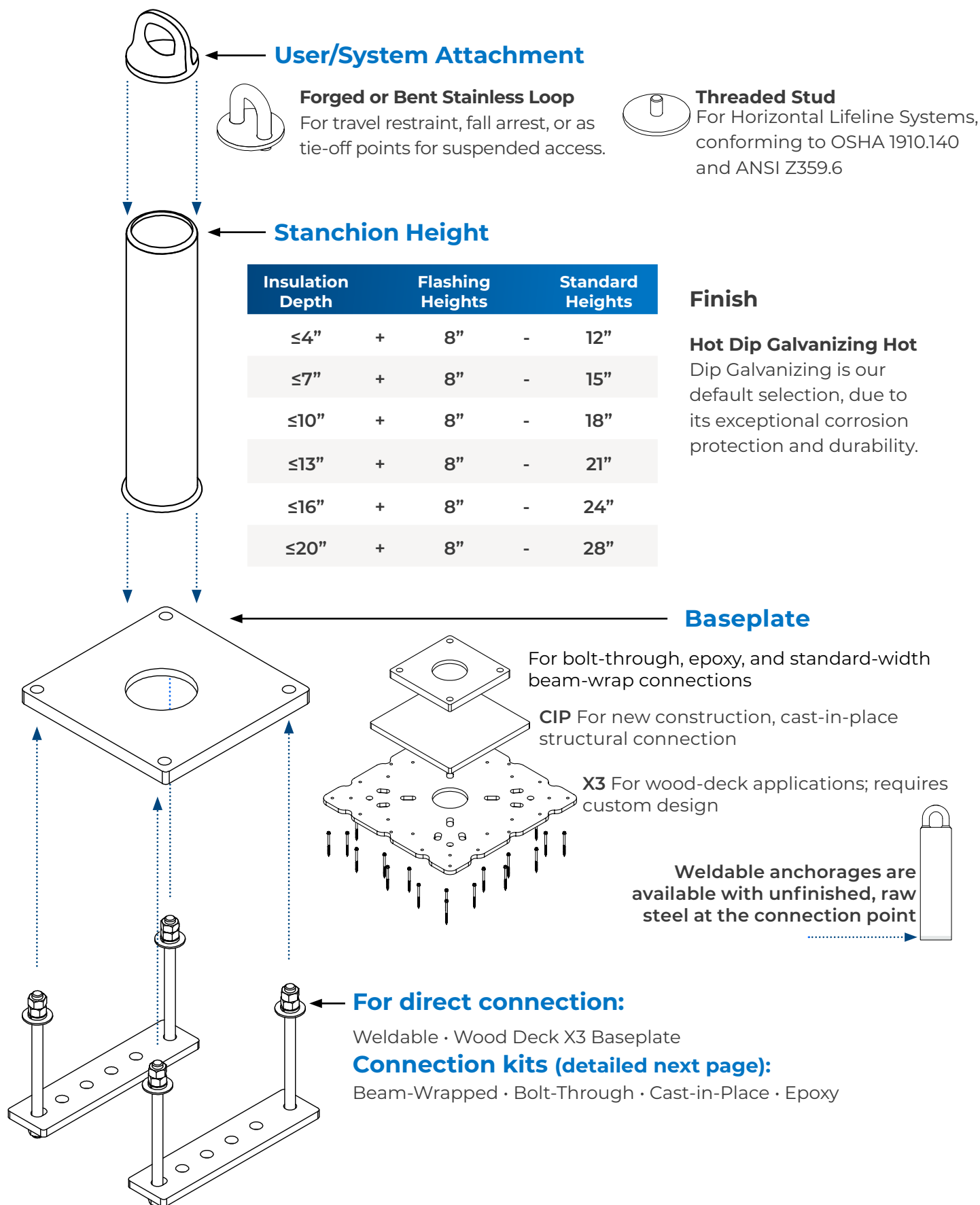


SUSPENDED ACCESS SOLUTIONS

In most applications under 300' (130 feet in California), façade maintenance, window cleaning, and other suspended access work is performed using rope-descent systems (RDS) or ground-rigged powered platform systems. The equipment required for compliant anchoring of these systems includes single-point tie-off anchorages, pinned outrigger beams, rigging sleeves, and davit systems. At greater elevations, facade maintenance is accomplished with top-rotating davits for dedicated, roof-launched platform systems or building maintenance units (BMUs).

Whatever building height or architectural features exist, our engineering team can design a suspended access system to provide safe anchorage for workers and the peace of mind that comes with compliance for employers and building owners.

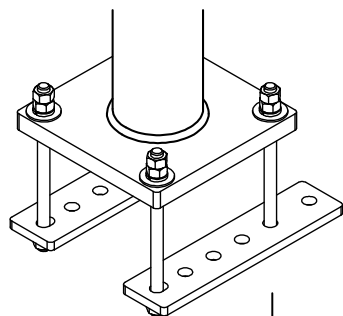
ANATOMY OF STANCHION ANCHORAGE



STANCHION ANCHORAGE CONNECTIONS

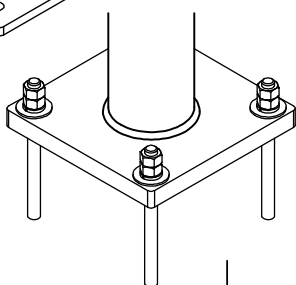
Anchors are affixed to roof structure by welding or with a baseplate and connection kit. The nuts, rod, and connection hardware are 5/8" grade 2 galvanized steel unless otherwise specified. Cast-in-Place anchors require stainless steel connection hardware. Rigid Anchors are rated to a 5000 lb (*5400 lbs in California). ultimate load and 1250 lb. working load in any direction. When attaching to concrete, slab must be rated to 3000 PSI minimum.

Deck Type	Retrofit	New Construction
Concrete < 4.5"	Bolt-Through	
Concrete 4.5" - 6"	Bolt-Through	Cast-in-Place
Concrete < 6"	Epoxy	
Structural Steel	Beam-Wrap	Weldable
Wood Deck	X3 Wood Deck Anchorage	



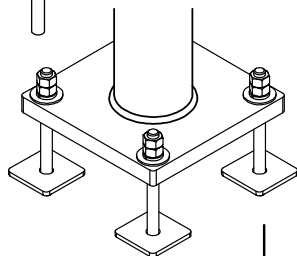
Beam-Wrap

The Beam Wrap Anchorage offers a solution when an adequately sized steel beam is available for attachment on retrofit projects.



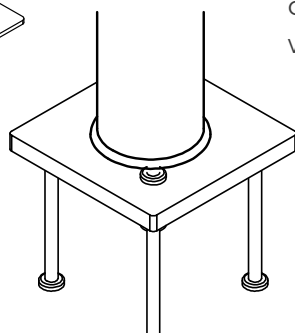
Epoxy

Used on existing roof deck or floor slabs where the thickness and strength of the concrete is adequate, the Epoxy Anchorage is attached with stainless steel rods and secured using an ICC-ES listed adhesive system.



Bolt-Through

The Bolt-Through Anchorage is used on existing roof or floor slabs that are made of structural concrete. The anchor is attached through the deck with bolts, back plates, lock washers, and nuts.

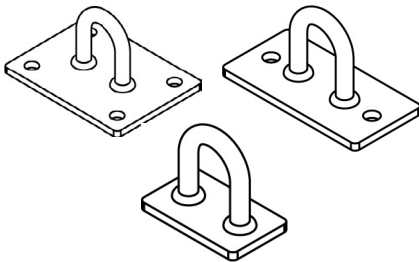


Cast-In-Place

The Cast-in-Place Anchorage is used on concrete roofs. The embed and anchorage are placed during forming— before the concrete is poured—for a permanent, structural anchorage point.

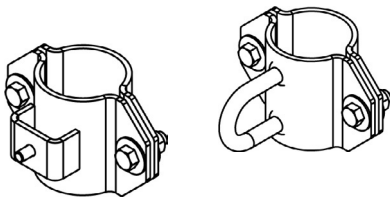
OTHER SUSPENDED ACCESS SOLUTIONS

WALL ANCHORAGES



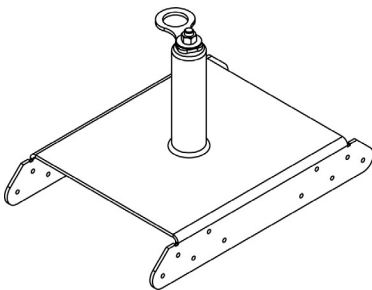
Wall anchorages are available in a variety of models and capable of attaching to the same substrates that roof anchors can be affixed to.

PIPE-WRAP ANCHORAGES



Pipe wrap anchorages offer a tie-off solution when an adequately sized steel pipe is available for attachment as is commonly found in mechanical or equipment screens.

UNDERMOUNT ANCHORAGES



Undermount anchorages are affixed to the underside of a wood deck between two trusses on a sloped roof, and have a swiveling stainless steel loop for 360-degree access.

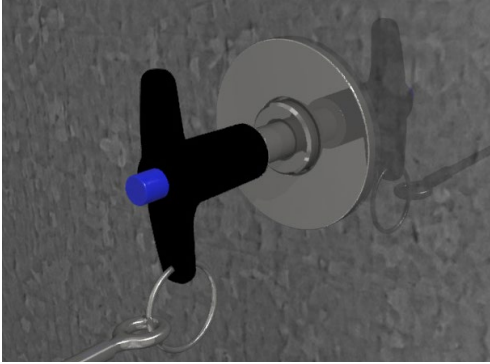
ARCHITECTURAL MONORAIL



These systems are specifically designed to accommodate building layout and the worker access requirements. They provide a solution to safely reach difficult access points such as atriums, roof overhangs, cornices, facade step-backs, interior walls, and unique or protruding architecture.

POWER PLATFORM SOLUTIONS

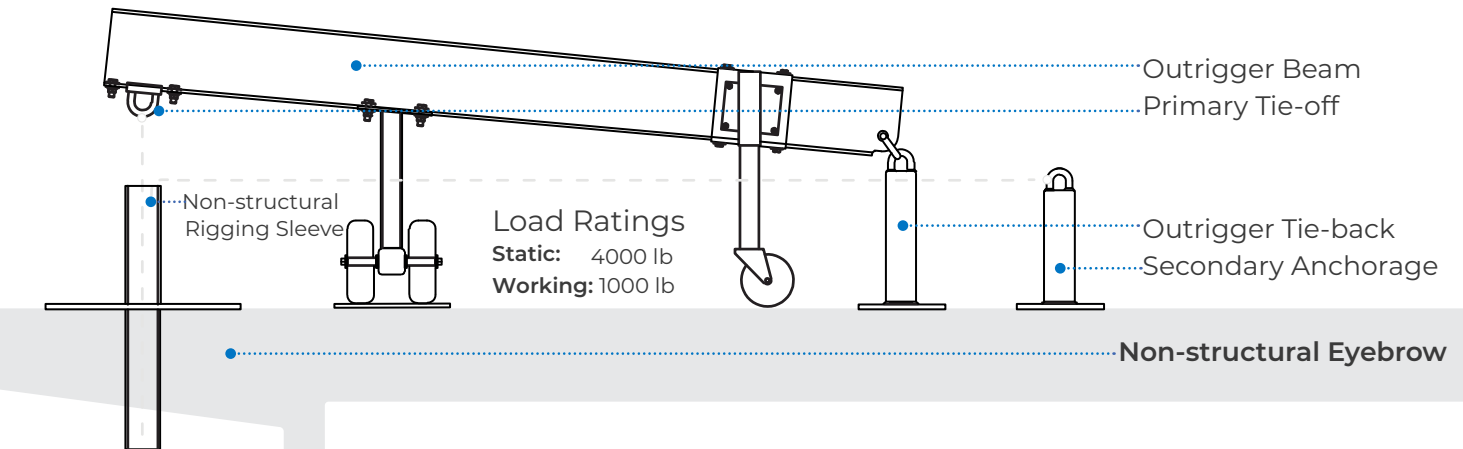
STABILIZATION ANCHORS



Intermittent Stabilization Anchors (ISAs) provide an attachment point to hold workers against the facade of a structure in the event of high winds. They also protect the facade of the building from damage that might be caused by unexpected platform movement. ISAs are acceptable for stabilization of roof-launched powered platform systems and are required at certain heights, under certain jurisdictions, or for compliance with consensus standards. ISAs should not be relied upon to provide continuous stabilization to ground rigged platform systems, although they can provide work station stabilization after the platform has been moved.



OUTRIGGER BEAMS AND RIGGING SLEEVES



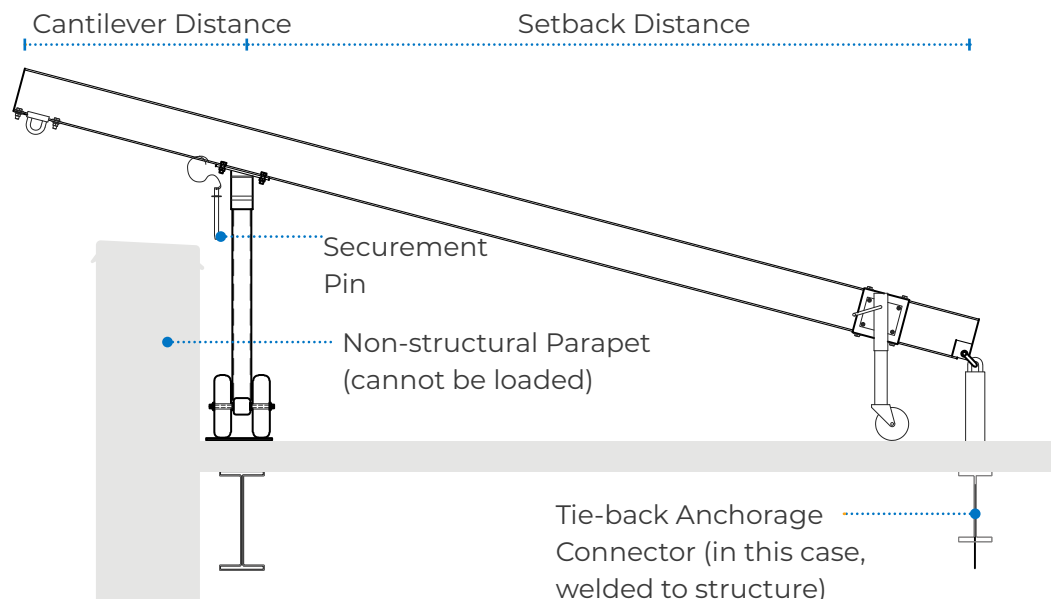
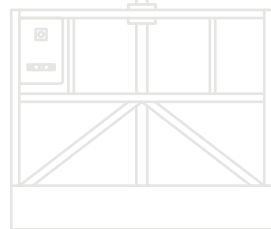
System Anatomy

When architectural features limit access to the facade of a building, we recommend a purpose-built system of Outrigger Beams and Rigging Sleeves.

Rigging Sleeves are a structural conduit designed to allow proper rigging configurations when building features obstruct safe access to work areas. These systems are specifically designed to accommodate building layout and worker access requirements.

Rigging Sleeves can provide a solution to safely reach difficult access points such as atriums, roof overhangs, cornices, facade stepbacks, interior walls, and unique or protruding architecture. A variety of models are available, all designed to support powered platforms, single worker cages, or powered bosun chairs.

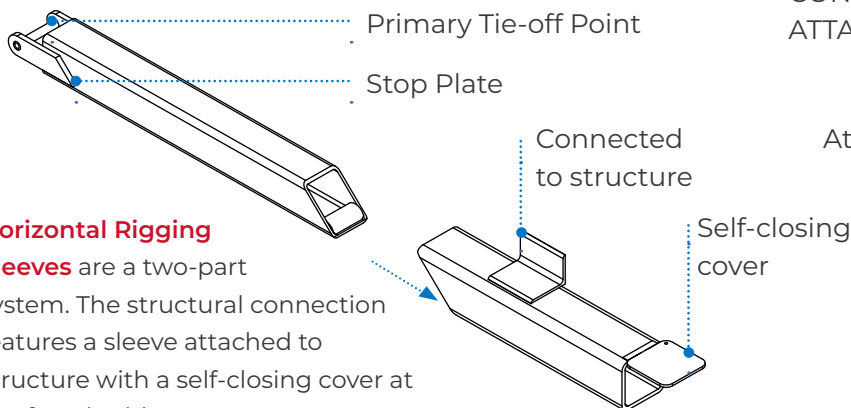
When there is no available structure for anchorage tie-off, or when a vertical parapet cannot be loaded (below), pinned Outrigger Beams can be used, sometimes with pass-through sleeves that are not intended for tie-off (as pictured above).



STRUCTURAL RIGGING SLEEVES

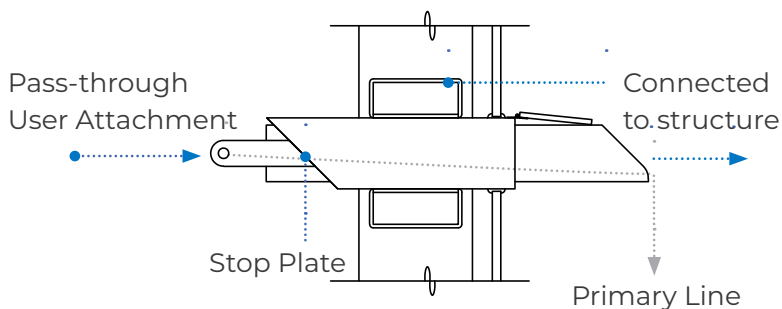


Horizontal



Horizontal Rigging Sleeves are a two-part system. The structural connection features a sleeve attached to structure with a self-closing cover at the facade side.

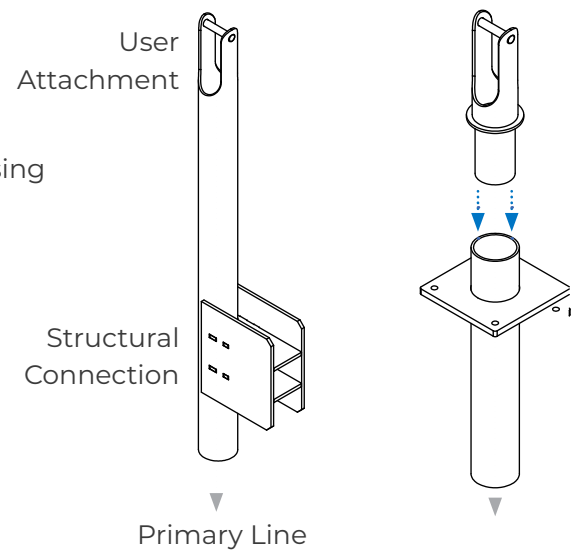
The primary tie-off point is incorporated into a pass-through sleeve and stop plate.



Vertical

CONNECTION: **Unified Tie-off**
ATTACHMENT: **Weldable**

Recessed Tie-off
Bolt-on



Vertical Rigging Sleeves feature an incorporated primary tie-off point and are available with weldable bolt-on structural connections.

The anchorage tie-off is available in one, unified sleeve or as a two-piece, recessed tie-off that allows for the structural connection to be hidden beneath a paver.

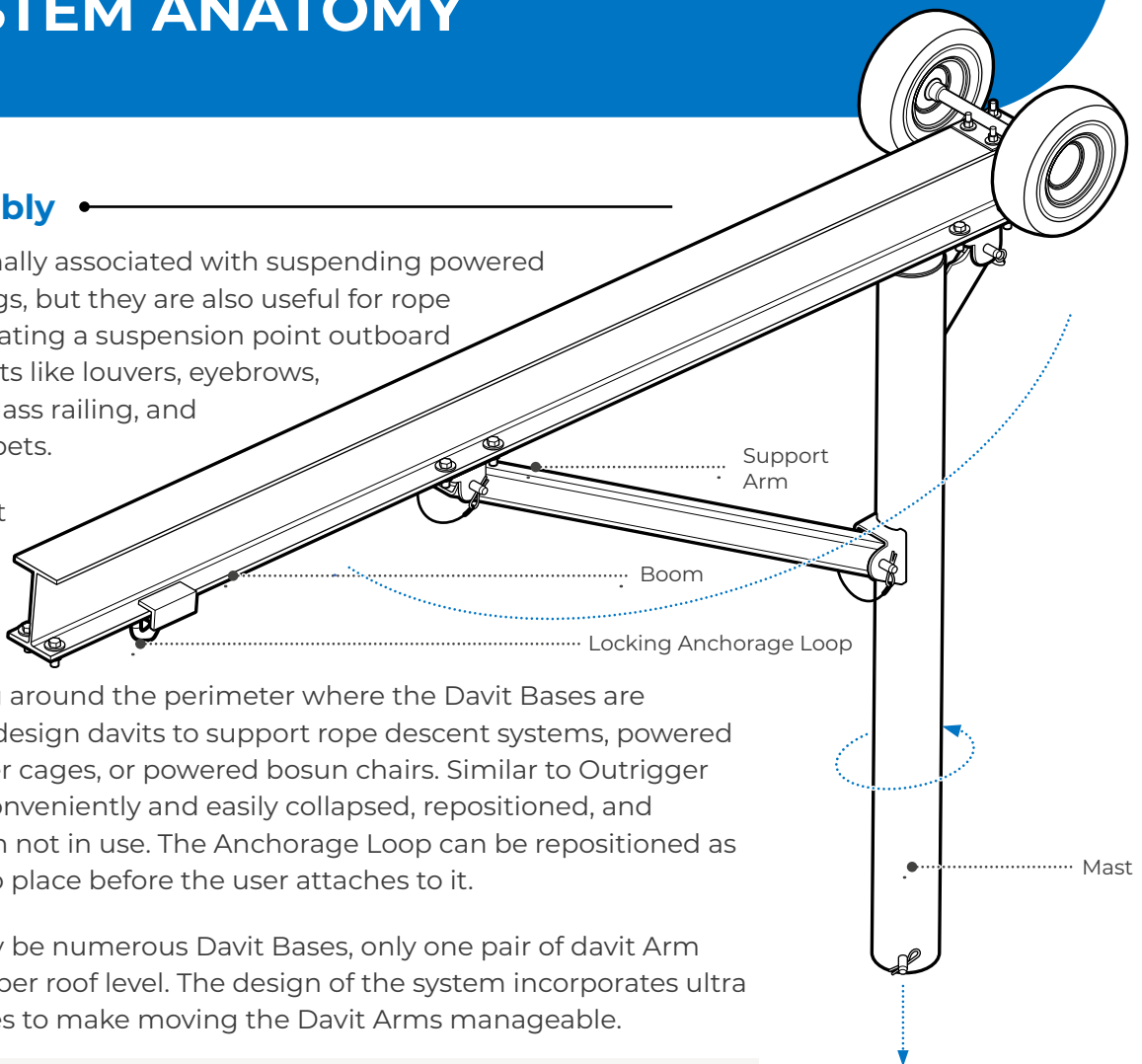
DAVIT SYSTEM ANATOMY

Davit Arm Assembly

Davit arms are traditionally associated with suspending powered platforms from buildings, but they are also useful for rope descent systems by creating a suspension point outboard of architectural elements like louvers, eyebrows, sun shades, awnings, glass railing, and non-load-bearing parapets.

These systems are most frequently designed into new construction projects because they require substantial bracing and reinforcing around the perimeter where the Davit Bases are installed. We routinely design davits to support rope descent systems, powered platforms, single-worker cages, or powered bosun chairs. Similar to Outrigger Beams, these can be conveniently and easily collapsed, repositioned, and stored out of view when not in use. The Anchorage Loop can be repositioned as needed and locked into place before the user attaches to it.

Even though there may be numerous Davit Bases, only one pair of davit Arm Assemblies is required per roof level. The design of the system incorporates ultra durable, foam-filled tires to make moving the Davit Arms manageable.



Standard Dimensions (6" increments)

Boom: 4 feet - 8.5 feet
Mast: 5 feet - 12 feet

Composition and Finish

Boom: Aluminum
Mast: Aluminum

Load Ratings

Ultimate: ≥ 4000 lbs
Working: ≥ 1000 lbs

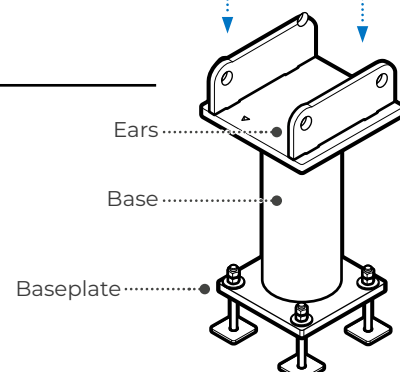
Davit Socket

The Davit Socket (galvanized steel) is engineered to tip over so the mast can be inserted and raised before securing the socket. The securement pins (stainless steel) prevent unwanted movement after the Davit Arm has been raised into place. There can be as few as one pair of Davit Sockets per roof, since the socket can be detached and relocated as needed.

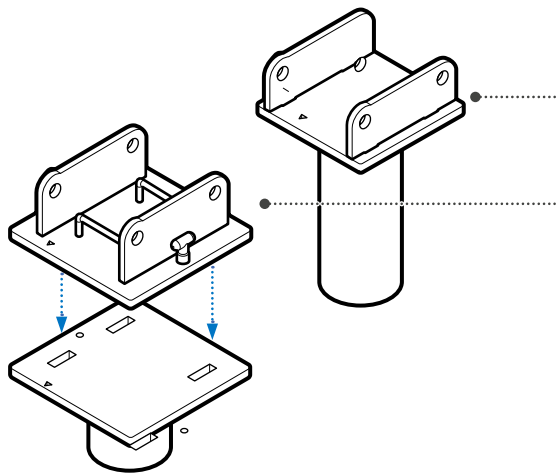


Davit Base

The Davit Base Assembly (galvanized steel) is comprised of attachment Ears, a Davit Base, a Baseplate, and a Structural Connection kit (unless the Davit Bases will be welded to steel structure). The Davit Socket is attached at the ears, first installing one securement pin to allow the Socket to tip inboard. Once the Mast is inserted into the Socket, the system can be raised and rotated, and finally the second securement pin can be inserted and locked.



DAVIT BASE ANATOMY



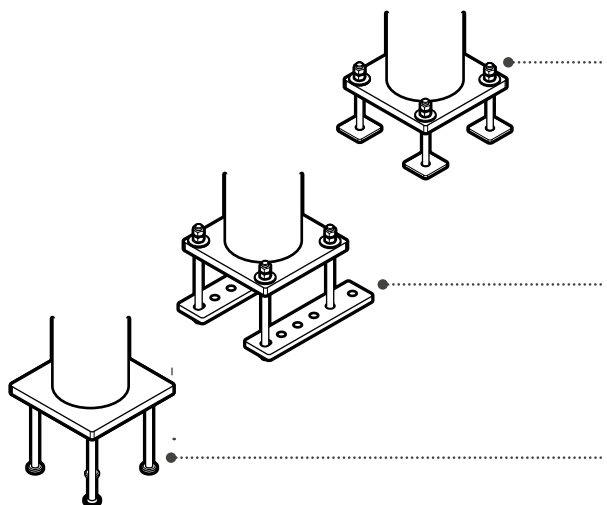
Davit Base

Standard Davit Base

Our standard Davit Base is used in typical roofing assemblies.

Recessed Davit Base

In applications where a raised paver system is installed on roofs, terraces, or balconies, design professionals prefer a Recessed Davit Base that can be concealed beneath the paver system. When not used, the transportable Davit Base mating plate can be removed and stored with the rest of the davit components.



Structural Connection

Bolt-Through

The Bolt-Through connection is used on existing roof or roof floor slabs that are made of structural concrete. The anchor is attached through the deck with bolts, back plates, lock washers, and nuts.

Beam-Wrap

The Beam Wrap connection offers a solution when an adequately sized steel beam is available for attachment on retrofit projects.

Cast-in-Place

The Cast-in Place connection is used on concrete roofs. The embed and anchorage are placed during forming—before the concrete is poured—for a permanent, structural anchorage point.



PASSIVE SAFETY SOLUTIONS

These products protect workers and create compliance without any engagement or effort from the user. On the Hierarchy of Controls, Passive Fall Protection is second only to Hazard Elimination. Building owners and facility managers prefer passive systems since they're excluded from OSHA's annual inspection requirements.

PASSIVE SAFETY SOLUTIONS

ROOF HATCH SAFETY RAIL



The roof hatch represents the greatest exposure to fall hazards in a rooftop environment since everyone who goes onto the roof must use it. Our roof hatch safety rail was created to keep the roof hatch safe and secure, allowing users to pass through the roof hatch while maintaining adequate contact with the ladder, and offering OSHA compliance by mitigating the fall risk through the hatch opening for users working on the roof. Includes a self-closing gate that serves as a ladder extension, creating additional compliance with OSHA 1910.23.

SKYLIGHT COVERS



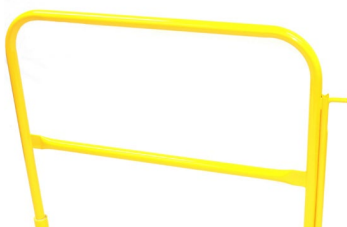
A skylight cover (or skylight screen) is an effective and affordable means of protection by preventing a worker from stepping on or through the skylight. These OSHA compliant skylight covers are made in the USA, install in minutes and don't compromise the weatherproofing features of the skylight.

UNIVERSAL SAFETY GATE



A guardrail swing gate is an adjustable length, self-closing gate which is manufactured in the USA, OSHA compliant and designed for maximum flexibility and durability.

MEZZANINE GATES



Mezzanine gates prevent people and equipment from falling over the edge of mezzanines when closed, but can swing to allow for equipment to be loaded through the opening when needed.

PORTABLE GUARDRAIL



Designed to be easily installed section-by-section, the Portable Guardrail system quickly adapts to suit your needs during construction, around roof access points, or when temporary projects exist. The patented, cantilevered base uses proprietary geometry to achieve maximum safety with minimal weight. It disperses weight across a large footprint to ensure that a roof's membrane and insulation are never compromised.

PIPE & COMPONENT GUARDRAIL



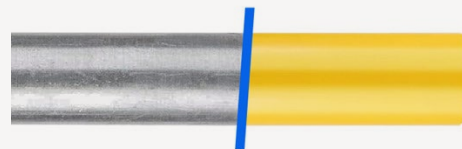
Component Guardrail features Strongtight fittings that allow every attachment point to be custom fit. This reduces micro-movements, creating a solid system and prolonging the life of the roof surface. Component Guardrail upright the mid & top rails are parallel to the parapet and variations in the roof caused by crickets don't result in undulating rails that disrupt aesthetics.

COMPONENT GUARDRAIL ACCESSORIES



Counterweighted Guardrail Bases

- Units nest together for easy transportation or shipping
- Bearing pressure is 1.3 psi per base and <1 PSI for the whole system
- Exceeds OSHA safety standards
- Non-penetrating design
- Contour design prevents water ponding or trapped debris
- Available in Thermagalv or hot-dipped galvanized steel
- Base weight: 84 lbs ±1lb
- Additional ballasts can be provided for compliance with Cal/OSHA requirements



Guardrail Finishes

Rooftop guardrail is available in hot dipped galvanized steel, or over 150 powder coating finishes.



Guardrail Base Roof Pads

Guardrail Base Pads can be used in between the guardrail base and the roof surface to protect and extend the life of the roof membrane. Pads are constructed of UV-resistant high-strength rubber for maximum durability.

STABILIZATION ANCHORS



These systems can be mounted to walls, parapets, or the roof surface. They are designed to be a permanent passive fall protection solution. Fixed guardrail is an excellent solution to protect workers from fall hazards at locations such as rooftops, catwalks, mezzanines, loading docks, and access platforms where portable guardrail is not suitable.





ACCESS & EGRESS SOLUTIONS

Employers must provide clearly defined, purpose-built access and egress whenever workers are required to travel through a worksite. In many cases, these systems are equipped with fall protection or other safety systems. But the access equipment itself is also a safety solution; it incorporates passive safety design standards and creates compliance with OSHA 1910.22, which states that walking-working surfaces must be maintained free of hazards such as sharp or protruding objects, loose boards, corrosion, leaks, spills, snow, and ice.

ACCESS & EGRESS SOLUTIONS

EZ SERIES FIXED LADDERS



Designed with set and bolt technology for precise placement and adjustment of standoff brackets, this revolutionary access ladder design eliminates field modification of stand off brackets. Every fixed ladder complies with OSHA's revised 1910.23 regulations for ladders and carries a limited lifetime warranty.

FIXED LADDERS ACCESSORIES



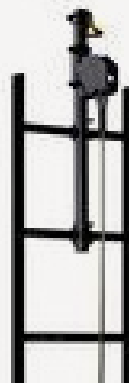
Swing Gate

An adjustable, integrated swing gate and weather-resistant powder coated or hot-dipped galvanized finish, combined with a wide range of mounting options make our fixed ladder swing gate system an ideal fall protection solution for any rooftop.



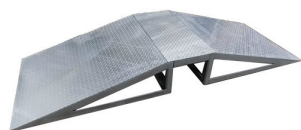
Ladder Guard

Reduce the risk and liability associated with unauthorized ladder use with the lightest, longest-lasting, easiest-installing ladder guard on the market. Made in the USA with 5052 aluminum, the ladder guard is designed to eliminate pinch points associated with hinged, enclosure style ladder guards. Ladder guards are durable, weatherproof and compatible for use with all ladder lifeline systems.



Ladder Safety System (see pg 6)

RAMPS



Ramps offer solutions for wheeled access to areas previously blocked by rooftop pipes, structural gaps, or minor elevation changes. This allows for heavy items to be rolled in or out for placement or service.

STAIR SYSTEMS



Roof stairs are custom designed to meet both project and design specifications. Stair treads are made from heavy-duty grating. The system rests upon 100% recycled rubber or polycarbonate bases that safely distribute PSI to the roof membrane and provides a safe pathway over conveyors, ductwork, roof elevation changes, pipes and other obstacles.

PLATFORMS AND GANGWAY



Gangways are purpose-built for each industry and application where workers need to access the top of rolling stock. The safety stair is designed for applications where the working range exceeds angles greater than 15° above or below the platform height.

MOBILE LADDER STAND



A portable ladder system is a set of modular steps that can be useful for many applications. These stair systems typically consist of individual stair treads and risers that can be connected together to form a complete staircase.

ROOF HATCH



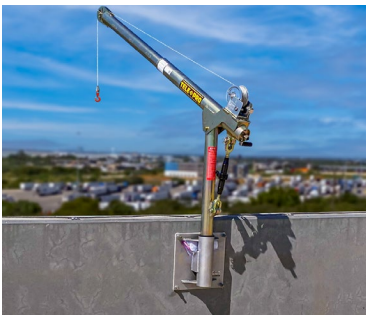
Roof hatches provide convenient, cost-efficient rooftop access, allowing for ladder or stair access to the roof from the building interior. Our hatches are designed for use with DFP Roof Hatch Safety Rails and Automatic Roof Hatch Openers, although they meet a standard specification and can be purchased and installed stand-alone.

AUTOMATIC ROOF HATCH OPENER



The SafePro Automatic Roof Hatch Opener will automatically lock/unlock, open/close and latch the roof hatch door from the ground floor. When properly installed, the roof can be accessed from the safety of the ground by entering a code into the keypad or by remote control. The system can also be wired into a security system making access available with a security key card or access code. The ARHO is both a safety and a security device.

MATERIAL HANDLING SYSTEM



Material handling hoists are rooftop-mounted crane systems that allow for the easy raising and lowering of rooftop equipment and materials. They provide enough horizontal reach to clear the edge of the rooftop as well as enough vertical height to lift loads over any curbs, parapets, or architectural features present.

WARNING LINES



A warning line system is used to delineate between inboard roof areas and restricted access areas. The warning line indicates a worker is approaching a fall hazard and must not proceed without utilizing conventional fall protection. Warning lines are designed to meet OSHA 1926 as well as OSHA 1910.28 standards, for a permanent, UV-rated installation.



www.nationsroof.com

Nations Account Services Team

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Your Fall Protection Contact:

In partnership with Diversified Fall Protection
www.fallprotect.com