

# ManSafe® for Roofing

Fall protection systems  
for rooftop maintenance

Constant Force® Post  
Freestanding Constant Force® Post  
WalkSafe®  
VersiRail®



# Introduction

Falls from height are the single biggest cause of death and one of the biggest causes of serious injury in the workplace today. For businesses whose workers need to operate quickly and effectively at height, fall protection is already a major issue—and this will become increasingly important as regulatory authorities introduce ever-stricter rules governing:

- Where height safety should be implemented
- The systems that are acceptable for use
- Who is responsible for ensuring worker safety, engineered systems, prevention of falls, introduction of equipment and techniques to stop a fall in progress.

## Are you responsible?

The answer could well be 'Yes'. According to the legislation, these are just some of the people responsible for ensuring adequate fall protection and potentially liable in the event of an accident.

Employers  
Contractors  
Owners  
Architect/  
Design Authority

## What you need to do

The official advice to those responsible can be summarized as follows:

- Avoid work at height, where possible
- When working at height is essential, ensure that workers are not exposed to unnecessary risks
- Where it is not possible to eliminate the risk of falling, **use a suitable fall protection system to minimize the consequences of a fall**

**Latchways plc—global leaders  
in fall protection**

# ManSafe for Roofing

## Where is fall protection required?



### Rooftop fall protection examples

#### 1 Roof Access:

Access via ladders and roof hatches

#### 2 Roof Edges:

Access required for gutter cleaning, leakage checks, inspection and maintenance to the rest of the roof

#### 3 Roof Plant:

Air conditioning units, satellite dishes and solar panels all need regular checks

#### 4 Walkways:

Walkways should be accompanied by a fall protection system

#### 5 Skylight:

Fall protection required for cleaning and maintenance

### All roofs require some form of access for:

- General maintenance
- Structural/performance checks for warranty maintenance
- Plant access



# What type of fall protection system should you install?

Latchways has developed an easy-to-use assessment method to help establish what type of system is required for permanent access. There are a number of key considerations that will help decide what type of system needs to be installed and therefore minimize risk:

- Experience of the worker(s) accessing the system
- Number of worker(s) accessing the system
- Duration of the worker(s) on the system
- Frequency of use

In most cases, unless specialist rope access is required, it is best practice to assume that the worker has only basic experience. The illustrations below are designed merely as a guide to the options that are available. In all cases a propriety walkway, such as WalkSafe® is recommended to accompany the fall protection system to provide a safe means of access to the place of work. WalkSafe also ensures the rooftop is protected from any possible damage caused during regular cleaning and maintenance of plant, gutters, down pipes etc.

Latchways' in-house design team can further advice on the most appropriate system for your particular requirement. For advice on system design and specification, email Latchways at [spec@latchways.com](mailto:spec@latchways.com).

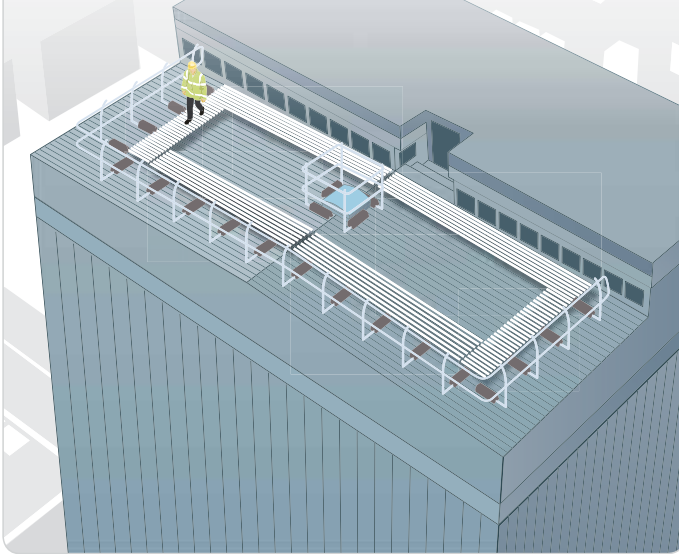


# ManSafe for Roofing

## **Solution: Guardrail**

Freestanding collective protection

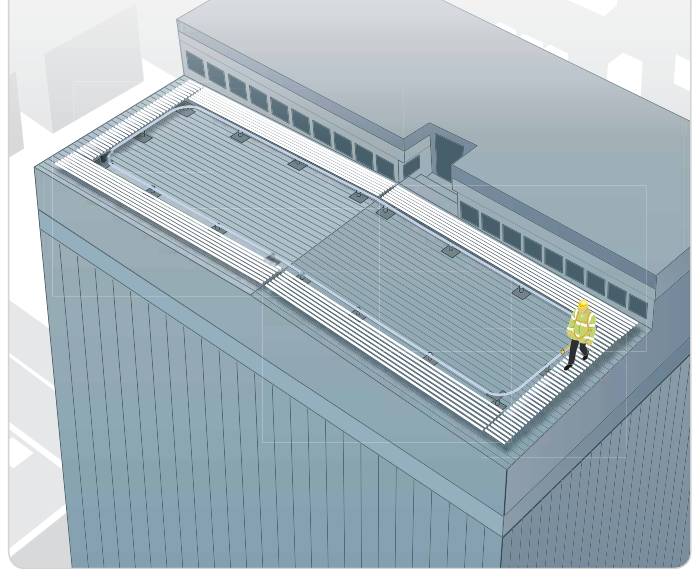
**Training requirement: None**



## **Solution: Fall Restraint\***

No lanyard adjustment required (perimeter system)

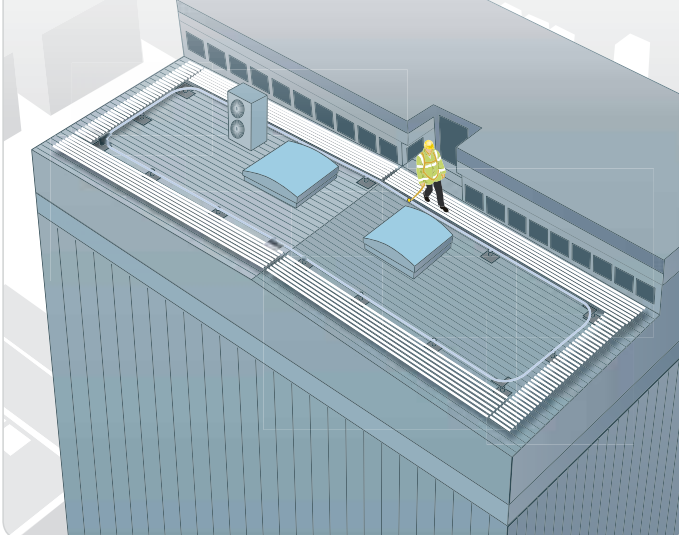
**Training requirement: Basic**



## **Solution: Fall Arrest\*\***

No lanyard adjustment required  
(perimeter system with fall hazards present)

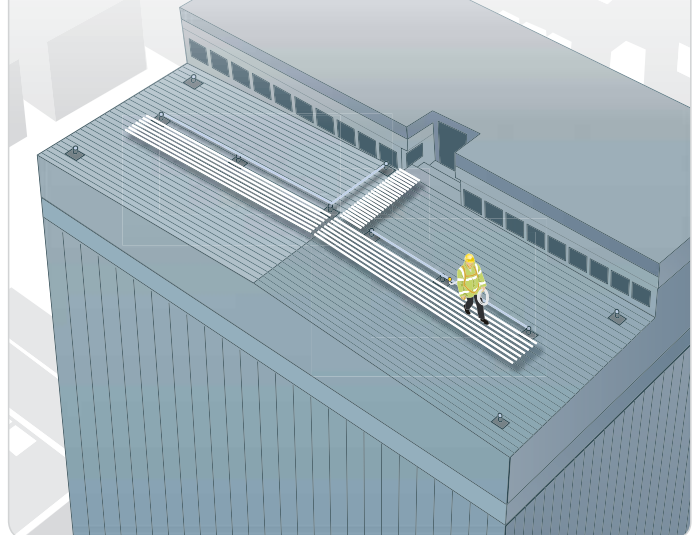
**Training requirement: Basic**



## **Solution: Fall Arrest\*\***

Lanyard adjustment required  
(ridge system with anti-pendulum posts)

**Training requirement: Advanced**



\*Restraint system—system is located so a worker on a fixed-length lanyard cannot reach any fall hazard.  
\*\*Arrest system—system location is restricted and fall hazards can be reached by a worker on a fixed or variable length lanyard.

## Quality products

Latchways' primary focus is to supply engineered fall protection products for all areas of industry, construction and maintenance. Installations include stadia, retail outlets, transmission towers, industrial complexes and notable sites such as Eden Project, Pier 6 at Gatwick Airport, Hong Kong Airport and Grand Central Station in New York. Latchways has worked closely with the major roofing manufacturers to produce a full range of fall protection systems for all designs and types of roofs.

### Constant Force Fall Protection Innovation

Latchways has taken the science of Constant Force and applied it to the fall protection industry providing an easy-to-install, reliable and cost-effective solution to rooftop safety.

### Traditional post

The principles of fall arrest are based on effective load control. A system must be able to withstand the force of a person's fall and absorb the energy generated. Traditionally this was achieved by attaching the system to the structure of the building with the anchor point absorbing the load. This inherently caused difficulties for designers and installers as the system location was determined by the structural elements of the building. System installation was time consuming as fixings had to be made from above and below. Such an installation method can create issues regarding warranties, leakage and cold bridging.



### Considerations

- Heat loss
- Thermal loss
- Waterproofing issues
- Risk of invalidating the roof manufacturers' warranty
- Installation restricted by building design





# ManSafe for Roofing

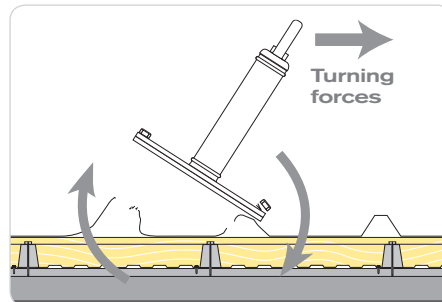
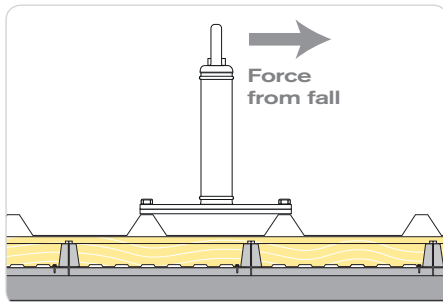
## The advantage of Constant Force technology

### Top Fixed Rigid Anchor post

The advent of 'Top fix' installation, meant a system could be installed to the complete roofing system rather than the traditional method of attaching an anchor through the roof to the building structure.

These images depict the implications of a rigid steel anchor deploying on a pre-engineered metal profile roof. In the event of a fall on the system, the roof is destroyed and the anchor has broken away, due

to very limited energy absorption. If there is limited energy absorption in the system (even if line absorbers in the cable exist) then the lever effect pushes one side of the anchor into the roof (compression) and the other side upwards (tension). This pulls the anchor away from the roof and causes severe damage. These forces need to be adequately controlled to prevent failure of the roof; Latchways have achieved this through their innovative Constant Force post.

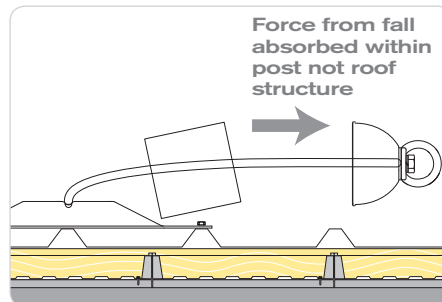
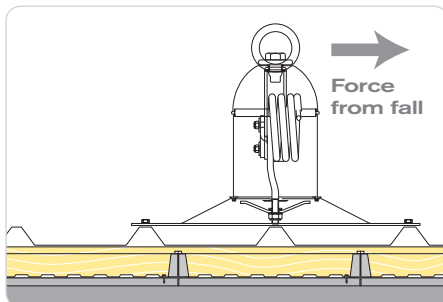


#### Considerations

- Risk of roof failure
- Uses in-line cable absorbers—limiting capacity
- Post has limited energy absorption—limiting capacity

### Constant Force post

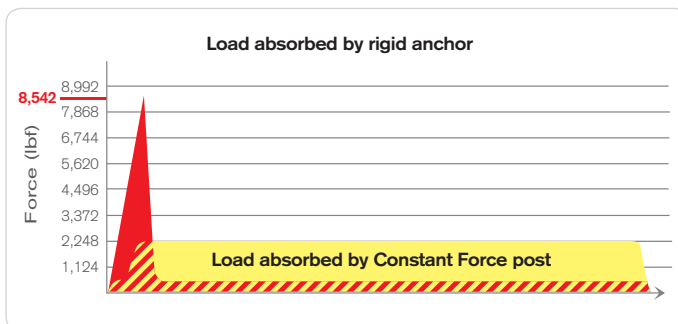
Latchways' Constant Force post does not need to be fixed to the building structure therefore simplifying installation (see pages 10 & 11). The Constant Force technology allows the load generated in the event of a fall to be absorbed through the entire system, as illustrated in the graph below.



#### Advantages

- Limits load to the roof—in the event of a fall
- Eliminates thermal bridging
- Tested on representative roofs (with full build-up)

### Constant Force post performance compared against Rigid Anchor





## Legislation and equipment standards

According to OSHA (see below), falls from height account for the majority of accidents in the workplace and regrettably, a high proportion of these are fatal. In 2012 a report published by the Bureau of Labour Statistics (BLS) reported that—in the previous year—541 lives alone had been taken by a fall from height (<http://www.bls.gov/news.release/pdf/cfoi.pdf>).

Falls from height not only have devastating consequences for the victims, but also for the employers. The risks of litigation, fines and long-term financial consequences for businesses are huge, so the need for a fall protection plan is crucial.

### USA

The Occupational Safety and Health Act of 1970 (OSH Act) was passed to prevent workers from being killed or seriously harmed at work. This law created the Occupational Safety and Health Administration (OSHA), which sets and enforces protective workplace safety and health standards. OSHA provides information, training, and assistance to employers and workers. It is also the governing body which sets out the legislation for safe working at height.

The key standards that Latchways' systems conform to in the US are:

- ANSI/ASSE Z359.1-2007 Safety Requirements for Fall Arrest Systems, Subsystems and Components

Latchways products and systems are Independently Tested in an ISO 17025 accredited test lab in accordance with:

- ANSI/ASSE Z359.7-2011 Qualification and Verification Testing of Fall Protection Products

For the American market, Latchways' registered installers design ManSafe systems in accordance to meet the requirements of ANSI Z359.6 (Specifications and Design Requirements for Active Fall Protection Systems).

ANSI Z359 is an ever evolving Standard. Latchways sits on the committee and takes an active role in being involved with the progress of this standard—if you have any queries with regards to the standard please contact Latchways directly [info@latchways.com](mailto:info@latchways.com).

Latchways horizontal lifeline systems conform to OSHA 1926.502 and 1910.66.



## Canada

The Canadian Occupation Health and Safety (OHS) Legislation for fall protection requirements varies between each province, but they will all have some requirement for workers to be protected against a fall from height (generally above 3 m/10 ft). The legislation in some provinces details exactly which type of fall protection is required and in others this decision is left to the employers. Despite there being a variation in legislation across each province, it is generally considered that the Hierarchy of Fall Protection be followed as a guide for specifying the most appropriate means of fall protection:

1. Eliminate the Risk—use Guardrail to protect workers from a fall hazard.
2. Restrain the worker from accessing the hazard—with a fall/travel restraint system which meets the relevant CSA Standards.
3. Use a Fall Arrest system to stop a workers descent in the event of a fall—with a personal fall arrest system or safety nets—meeting the requirements of the relevant CSA Standards as dictated by the OHS legislation.

A 'Fall Protection Plan' is only required under the legislation of a few provinces, and in some it is only required when working at a certain height (e.g. 7 m/25 ft); it is considered best practice to have a Plan in place so an organisation is seen to be showing due diligence to the OHS legislation.

## Mexico

The official Mexican fall protection regulations are detailed in NOM-009-STPS-2011 (Safety Conditions for working at Heights).

The relevant standards are as follows:

- NMX-S-058/1-SCFI-2005, Security, Personal Protection Systems to stop falling from heights—Part 1: Full Body Harnesses—Requirements and test methods.
- NMX-S-058/5-SCFI-2005, Security, Personal Protection Systems to stop falling height—Part 5: Connectors with locking devices and automatic lock—Requirements and test methods.

Fall protection requirements for each province (for organisations with presence in multiple provinces, it is the Canadian Labour Code which should be followed):

- Alberta—OHS Part 9
- British Columbia—OHS Part 11
- Manitoba—Workplace Safety and Health Regulation—Part 14
- New Brunswick—OHS Part 49
- Newfoundland & Labrador—OHS Part X
- Northwest Territories & Nunavut—OHS Part 7 (103)
- Nova Scotia—Fall Protection and Scaffolding Regulations
- Ontario—Ministry of Labour OH&S Part XII
- Prince Edward Island—Section 2.(1)
- Quebec—Section 2.9.1
- Saskatchewan—OHS Part VII & IX
- Yukon—OHS Part 1(37)

The key standards that Latchways' systems conform to in Canada are:

CSA Z259.2.2—Self-Retracting Devices

CSA Z259.2.3—Descent Devices

CSA Z259.2.5—Fall arresters and vertical lifelines

CSA Z259.16—Design of Active Fall-Protection Systems

## European

Latchways products also conform to European test standards including:

EN 795 PPE against falls from a height—Anchor devices—Requirements and testing.

EN 795 is a key standard which relates to the anchor devices. Developments in technology mean that the nature of the anchor device has changed. As such, Latchways conduct full roofing system tests, on a roof measuring 19' 8" x 19' 8" (6 m x 6 m), to replicate the in-situ installation. This is a minimum requirement where top-fixed solutions are concerned.



# Constant Force post: Fixing details

Latchways' Constant Force systems offer a complete fall protection solution for both fall restraint and fall arrest. The simplicity of the fixings allows a quick and easy installation providing safe solutions where workers are exposed to a fall hazard. System design can be verified with Latchways' software.

Latchways works with all major roof manufacturers. To understand how posts fix to manufacturers' individual roofing systems please contact [spec@latchways.com](mailto:spec@latchways.com).

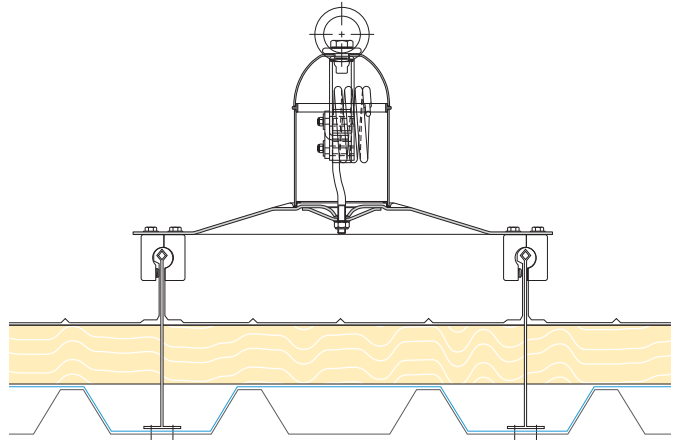
Email: [spec@latchways.com](mailto:spec@latchways.com) for more information.

## Key advantages

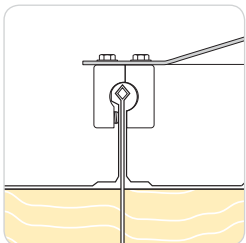
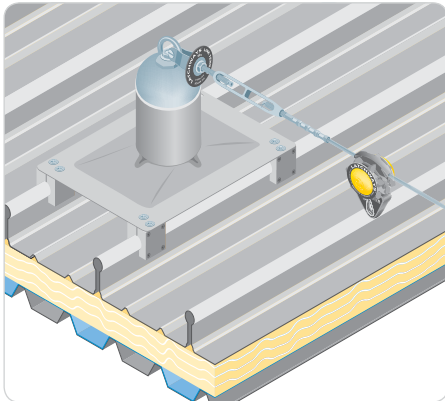
- System technology limits load to 1 tonne in the event of a fall
- Top-fixing ensures quick and easy installation
- Reduces cold bridging
- Does not invalidate roofing warranty
- System location not restricted to buildings' structural elements
- Option of powder coating posts to match roof
- Suitable for use on a roof pitch up to 15°
- Omni-directional post—enabling the post to deploy and control load in any direction
- Designed for foreseeable misuse
- Suitable for two users

A variety of base plates are available to fit all roof configurations:

Roof type
Pre-engineered Standing-seam
Composite and built-up pre-engineered metal profile panels
Secret-fix
Flat built-up roofing—Steel deck
Flat built-up roofing—Concrete deck
Flat built-up roofing—Timber deck

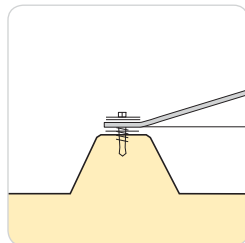
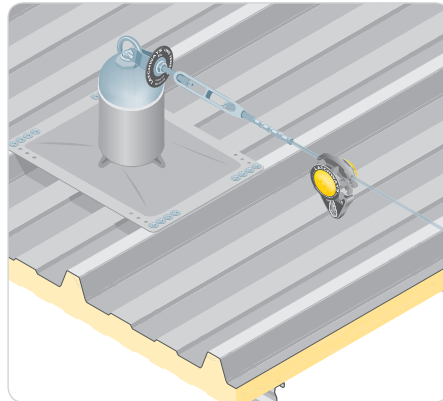


## Constant Force post on pre-engineered standing-seam roofing



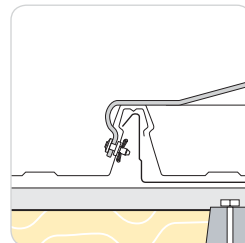
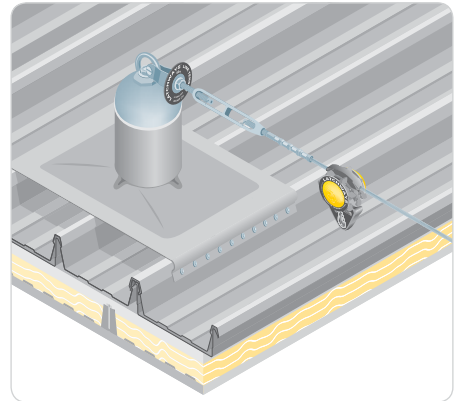
Fixing method:  
4 split clamps

## Constant Force post on composite/built-up pre-engineered metal profile panel roofing



Fixing method:  
16 stitching  
screws/bulb  
tite rivets

## Constant Force post on secret-fix roofing

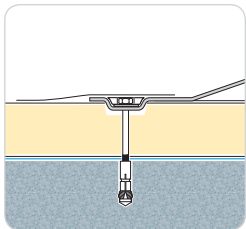
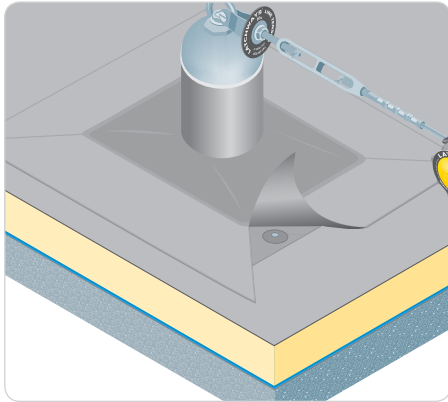


Fixing method:  
20 bulb tite water  
seal rivets

# ManSafe for Roofing

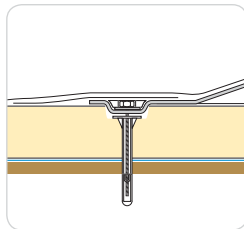
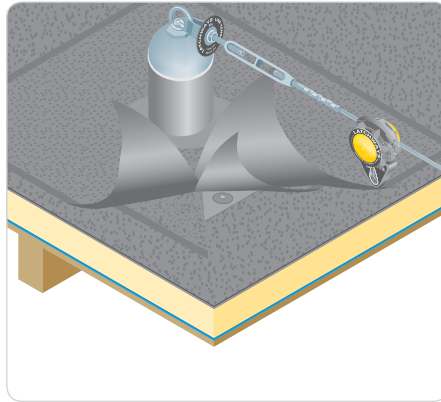
## Constant Force post: Fixing details

**Constant Force post on flat built-up roofing — concrete deck**



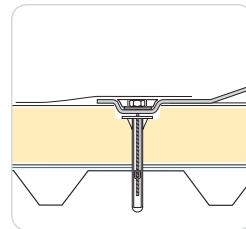
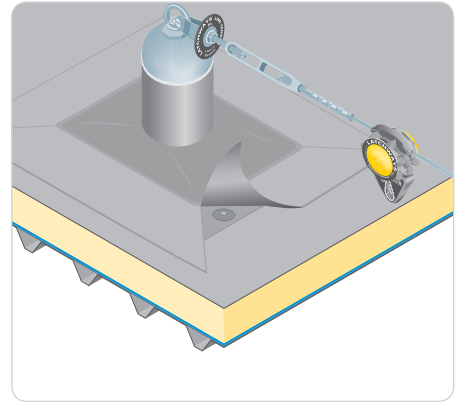
**Fixing method:**  
4 M8 mechanical  
fixing anchorages

**Constant Force post on flat built-up roofing — timber deck**



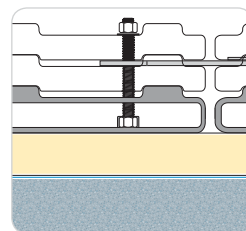
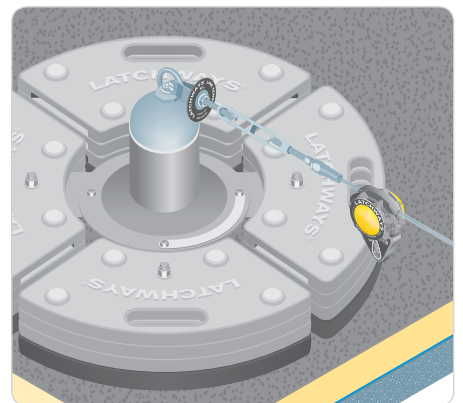
**Fixing method:**  
4 toggle bolts

**Constant Force post on flat built-up roofing — steel deck**



**Fixing method:**  
4 toggle bolts

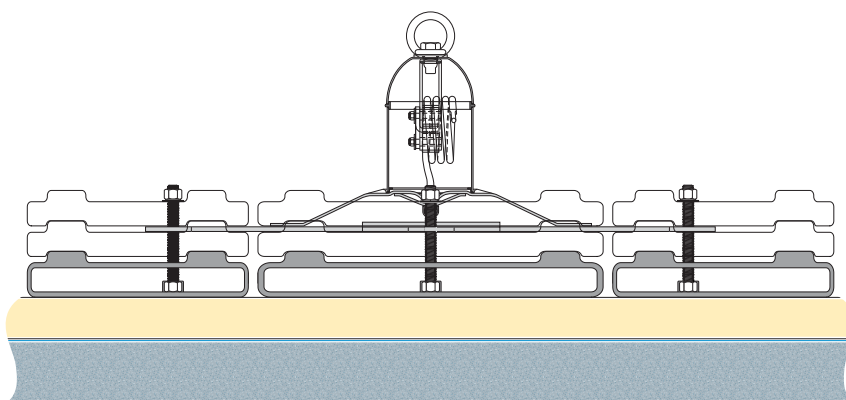
**Freestanding Constant Force post on flat built-up roofing — concrete deck**



**Consists of**  
weighted  
segments

### Freestanding Constant Force post

Freestanding Constant Force post is suitable for applications where roof penetration is not required or possible. It is available as a restraint or an arrest system and can be used singularly or in series, varying the number of sections to suit the application.



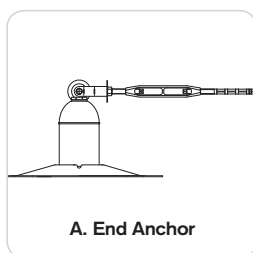
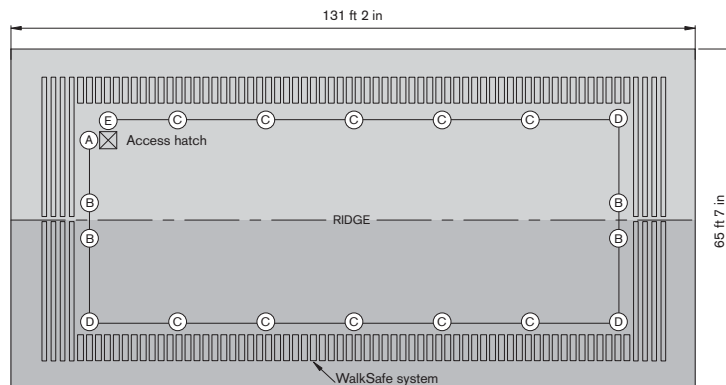
Dimensions of a 660 lb Freestanding Constant Force post



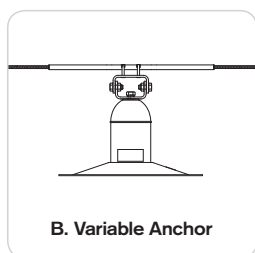
# Constant Force post: System design

A typical roof layout for a perimeter system is illustrated identifying the different system components. Posts must not be spaced more than 33 ft apart. Designers should try to ensure that access to all areas is achieved without the requirement for PPE (Personal Protective Equipment) adjustment. Latchways provides a bespoke system design service for your project requirements.

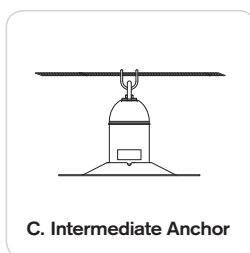
Email: [spec@latchways.com](mailto:spec@latchways.com) for more information.



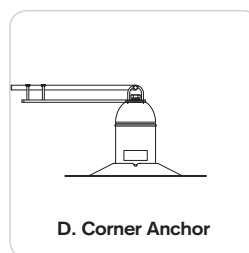
**A. End Anchor**



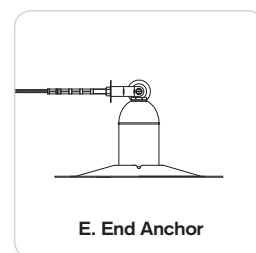
**B. Variable Anchor**



**C. Intermediate Anchor**



**D. Corner Anchor**



**E. End Anchor**

## System components

The following components complete the system allowing hands-free operation. Latchways' components are manufactured in marine-grade stainless steel and are individually numbered to allow complete traceability. Inspection and maintenance are required annually.

### Transfasteners

The user, wearing a full body harness and energy-absorbing lanyard, is continuously attached to the system with a Transfastener™, which rotates allowing it to pass through the intermediate cable supports. For systems on inclines over 15° a ClimbLatch device is required instead of the Transfastener.



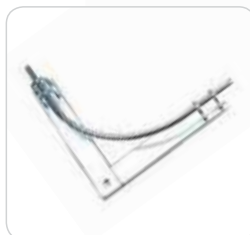
**Turnbuckle assembly**

The turnbuckle assembly provides a cable termination and method of tensioning the system. The integral indicator disc will spin when the correct tension is reached.



**Swage & Clevis**

The swage and clevis unit provides the method of terminating the cable at the opposite end of the system to the turnbuckle assembly.



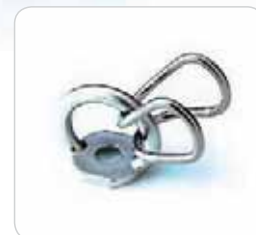
**90° Corner bracket**

This one-piece corner bracket attached to an intermediate post provides an angle change of 90° within the system.



**Variable bracket**

This bracket attaches to an intermediate post and provides an angle change of between 0 and 80° both in the horizontal and the vertical plane.



**D Ring & Hanger**

The D ring and hanger form an intermediate cable support. The cable is threaded through the hanger allowing the Transfastener to travel the length of the system without disconnecting.

# ManSafe for Roofing WalkSafe system

In nearly all instances it is impractical to prevent roof access, therefore the ideal solution is to create a level, anti-slip surface with all fall hazards protected against. Manufactured from recycled PVCu, WalkSafe has an anti-slip surface and is attached to the rooftop. OSHA states that it is an employers' responsibility to assess a working area, and determine if the walking/working surfaces on which employees are to walk/work have the strength and structural integrity to safely support them. In potentially highly trafficked areas of roofing, where regular access may be required for maintenance regimes, plant inspection, air quality monitoring, rooflight cleaning, etc, WalkSafe distributes the load evenly on the roof and thus reduces wear and tear on the roofing system itself.

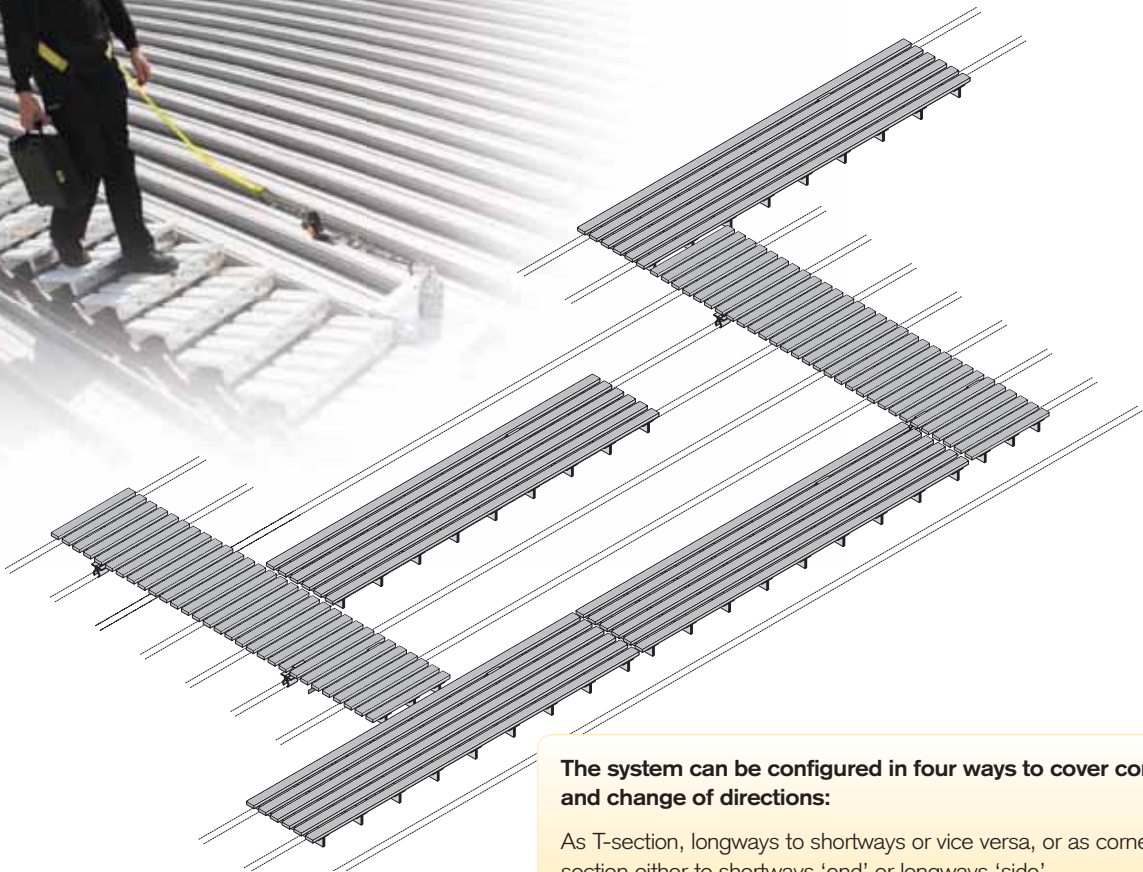
WalkSafe is designed to work on all major roof systems: standing-seam, composite, built-up-on-site, secret-fix and single-ply membrane. Bespoke WalkSafe solutions for cementitious, slate and bituminous roofing are available upon request.

## Key advantages

- Lifespan in excess of 25 years
- Certified for slip resistance
- Manufactured from re-chipped window profiles and can be recycled
- Lightweight construction
- Designed for use on all major roofing systems
- Manufactured in the UK
- Fire resistance—Class 1Y against B476 fire resistance test (UK test)
- Undergone full Fragility of Roofing Assemblies testing

## WalkSafe system layout

The orientation of the WalkSafe planks within a system is described as either shortways (running across the roofing profile) or longways (with the roofing profile).



### The system can be configured in four ways to cover corners and change of directions:

As T-section, longways to shortways or vice versa, or as corner section either to shortways 'end' or longways 'side'.

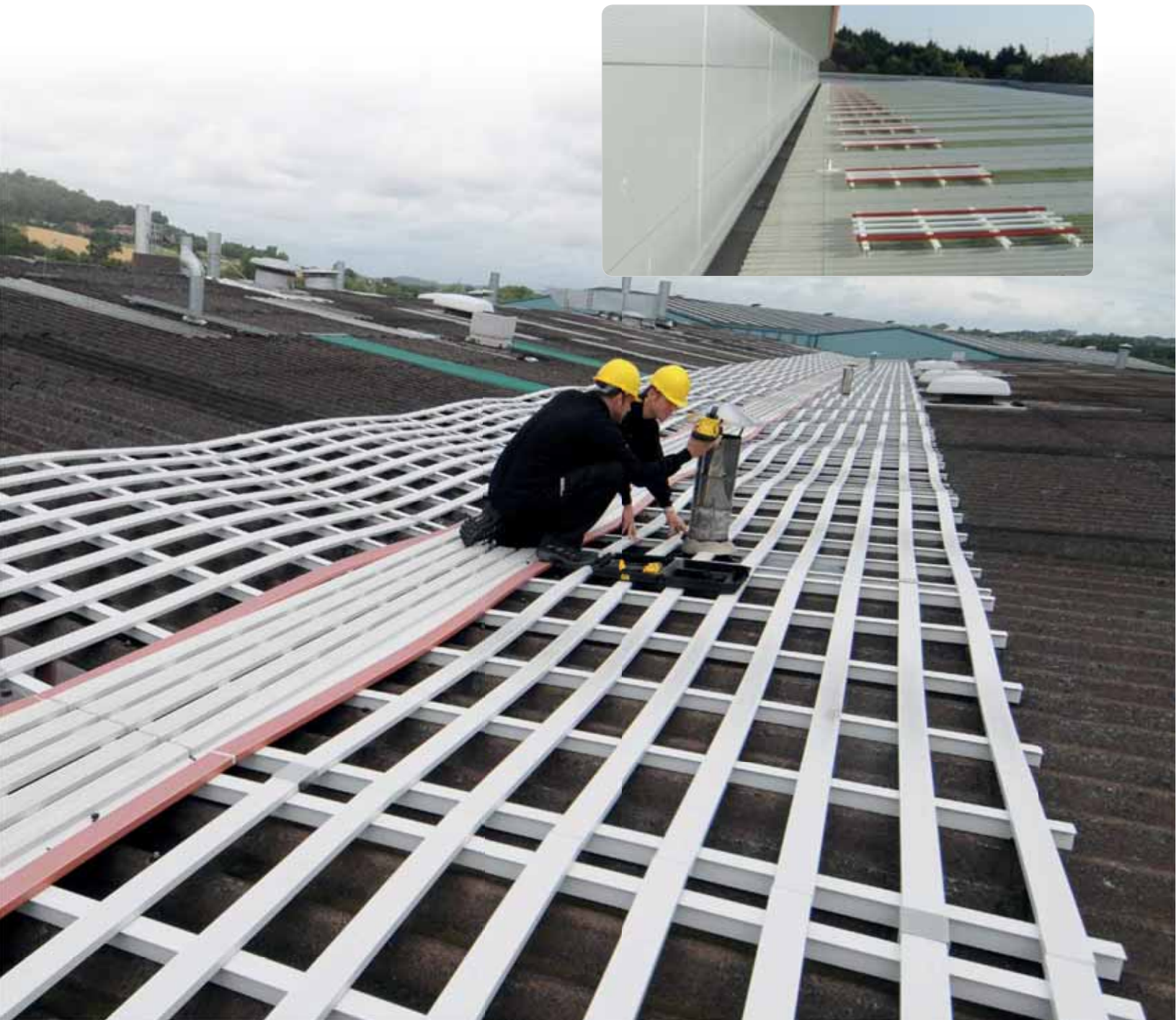
# WalkSafe: Fall Proof Covers and Rooflight Covers

## Fall Proof Covers

WalkSafe can provide an ideal demarcation route, the use of Latchways Fall Proof Covers can also help to indicate to a worker an area of fragile roof—and therefore the need for additional attention whilst working in that area.

## Rooflight Covers

Manufactured from the same material as WalkSafe walkways, and compliant to OSHA standard 1910.23(a)(4), Latchways' Rooflight (skylight) Covers can provide a safe cover for both in-plane and barrel-vaulted skylights.





# ManSafe for Roofing

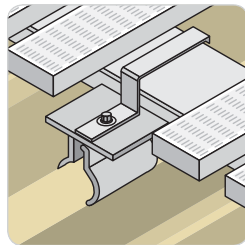
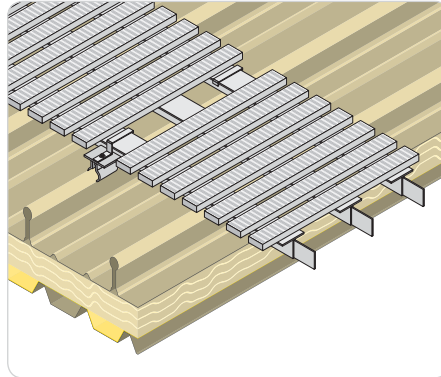
## WalkSafe: Fixing details

### Fixing information

The simplicity of the WalkSafe system allows a quick and easy installation.

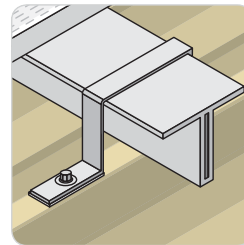
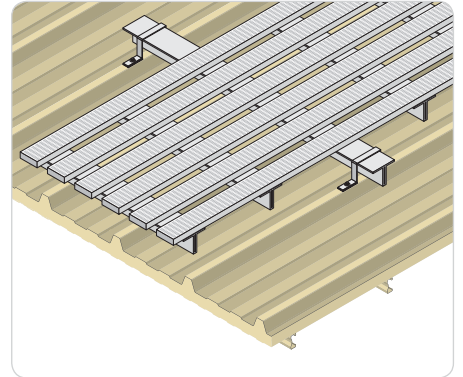
The 9 ft 10 in-long panels only require top fixing to the roofing system. In most cases the fixings are non-penetrative.

### Shortways system on pre-engineered standing-seam roofing



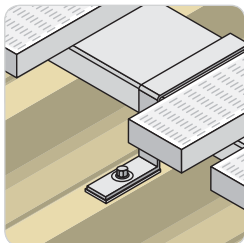
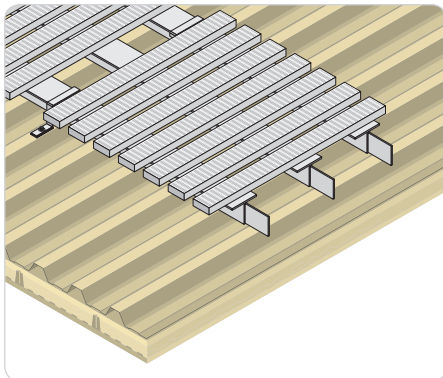
Fixing method:  
Standing-seam  
clamps

### Longways system on composite roofing



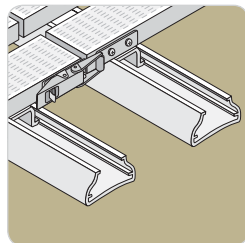
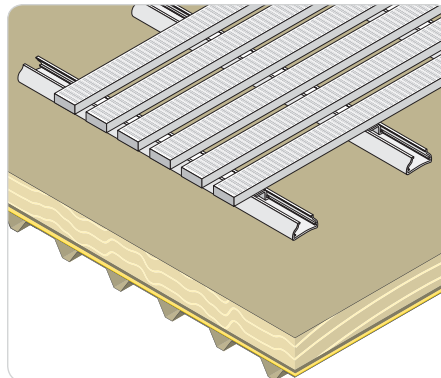
Fixing method:  
Retaining brackets

### Shortways system on built-up pre-engineered metal profile panel roofing



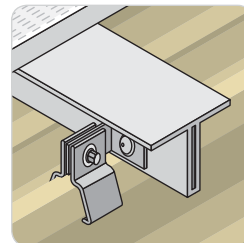
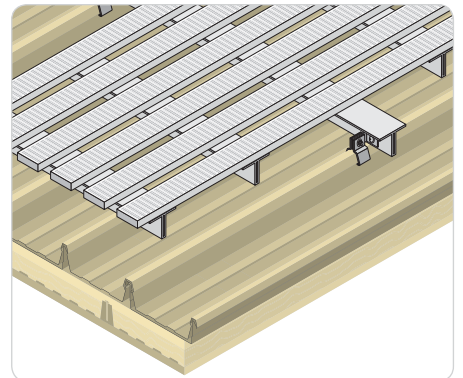
Fixing method:  
Retaining brackets

### Longways system on flat built-up roofing — single-ply membrane



Fixing method:  
Self weighted —  
panels are joined  
with toggle clamp

### Longways system on secret-fix roofing

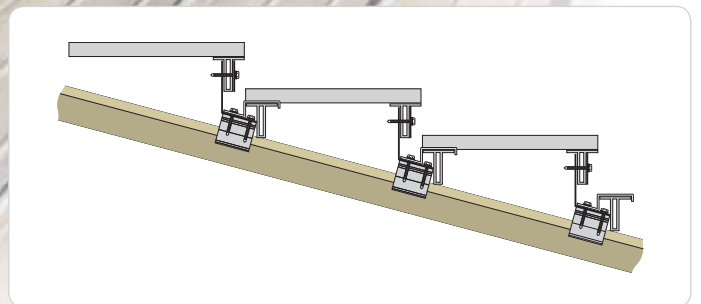
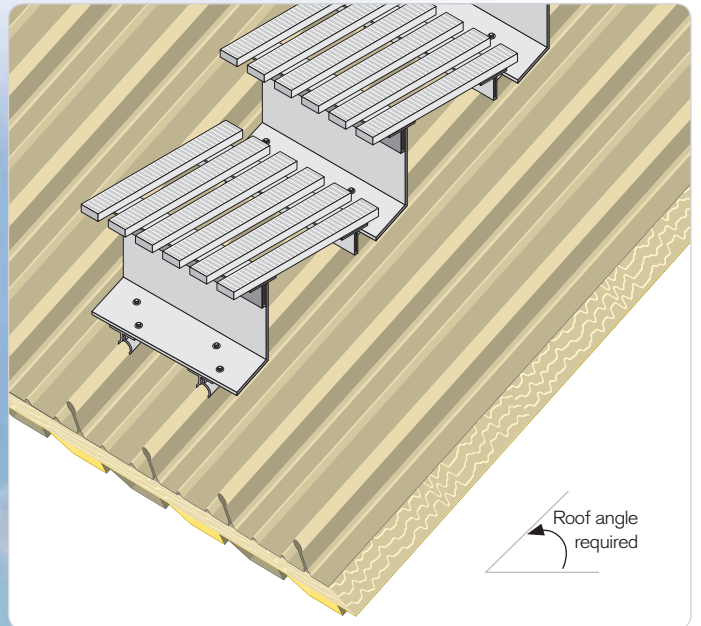


Fixing method:  
Secret-fix clamps

## WalkSafe: Pitched roof system

WalkSafe's design flexibility allows it to be used as levelled walkways allowing safe access to all parts of the roof on slopes up to 15°, or as steps on steeper gradients.

### Steps on pre-engineered standing-seam roofing

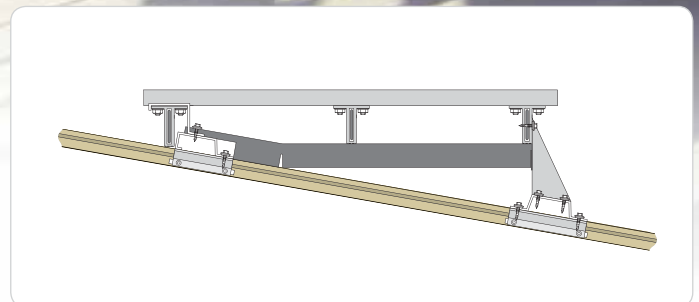
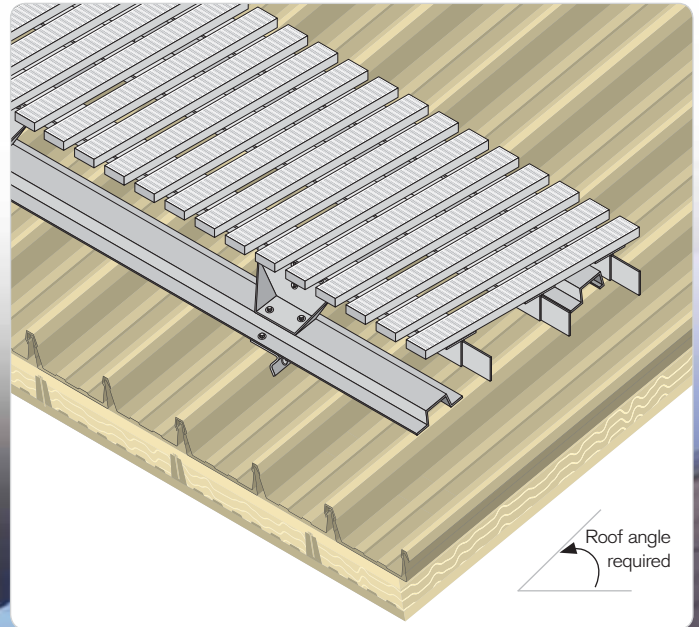




Where a level walkway is required it is key that the correct roof angle is identified as the levelling brackets are purpose-built for each job.

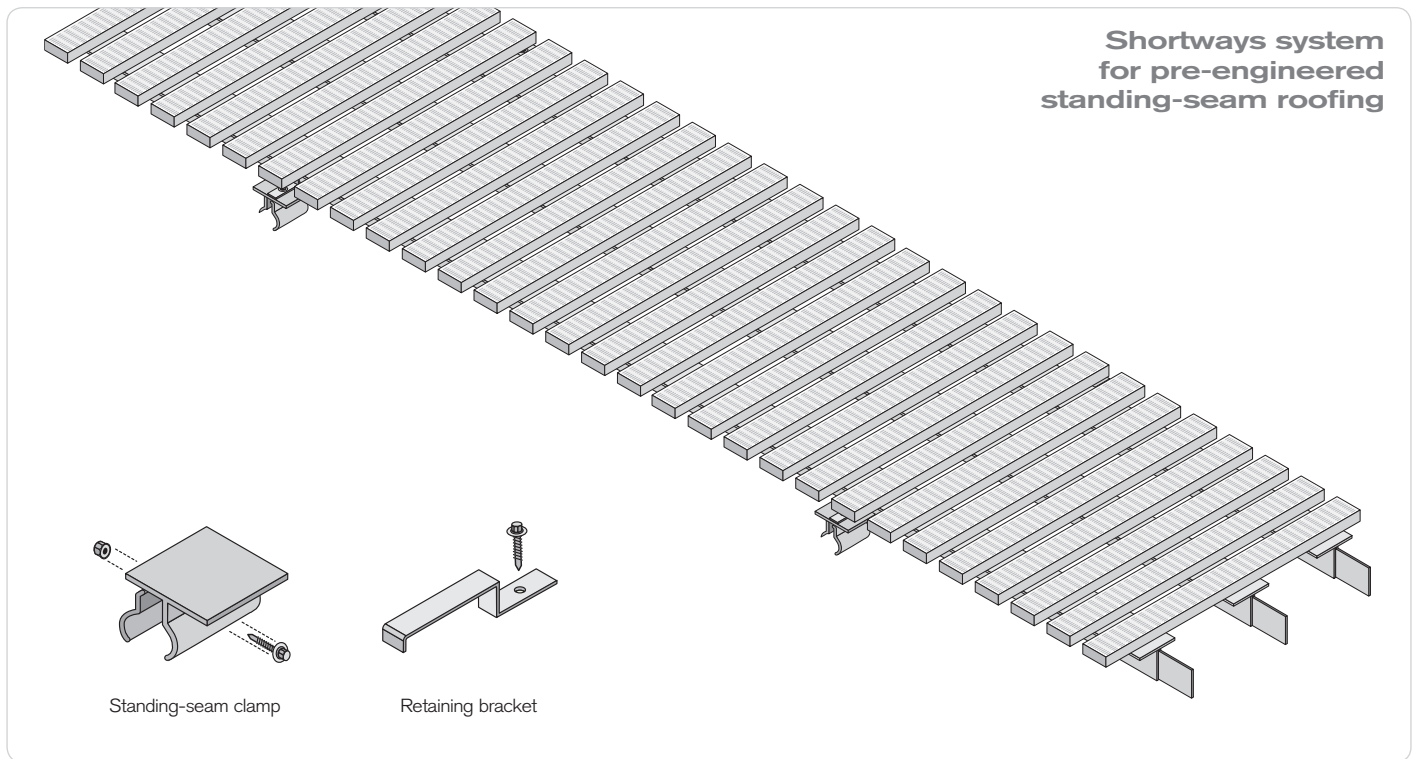
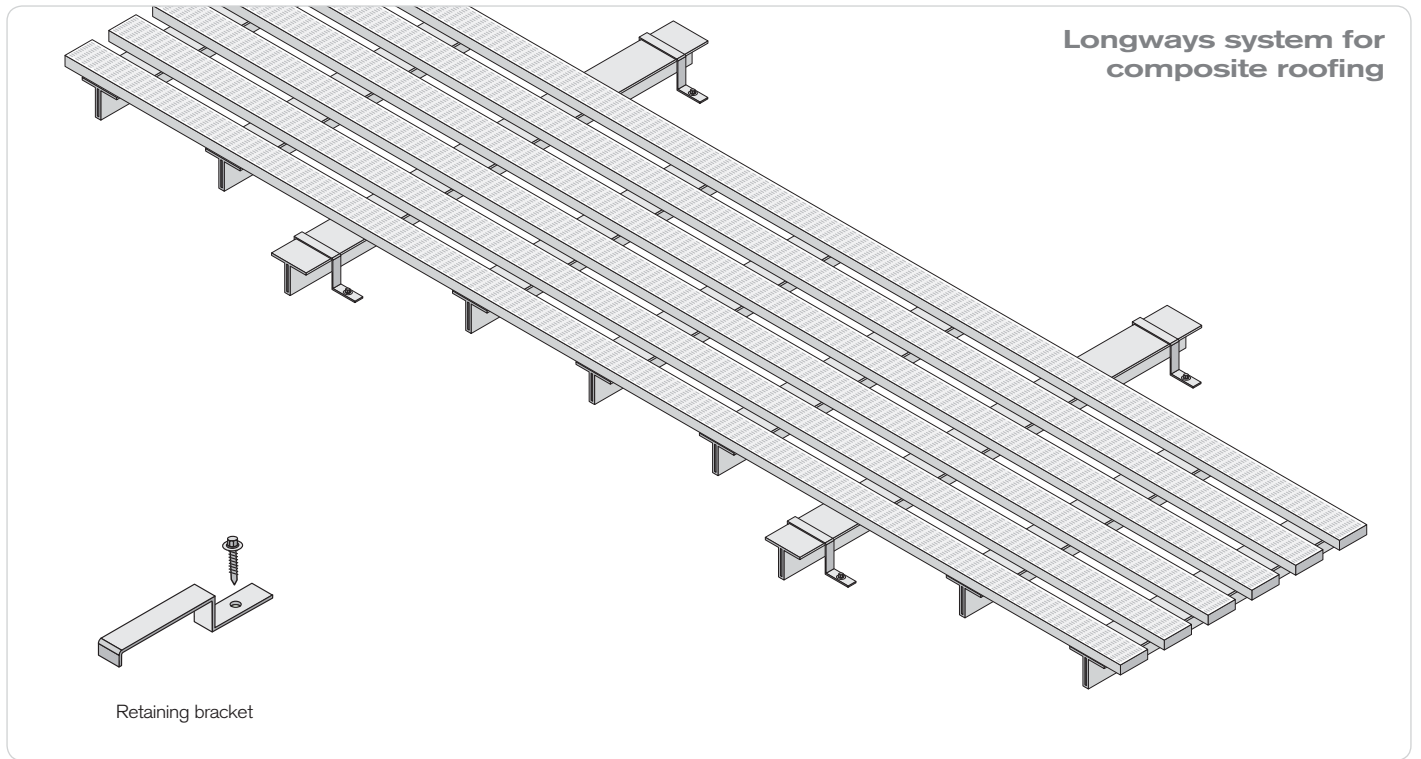
Traversing WalkSafe systems utilize different components to the stepped systems, therefore careful consideration must be given when detailing those areas which require access.

### Traversing secret-fix



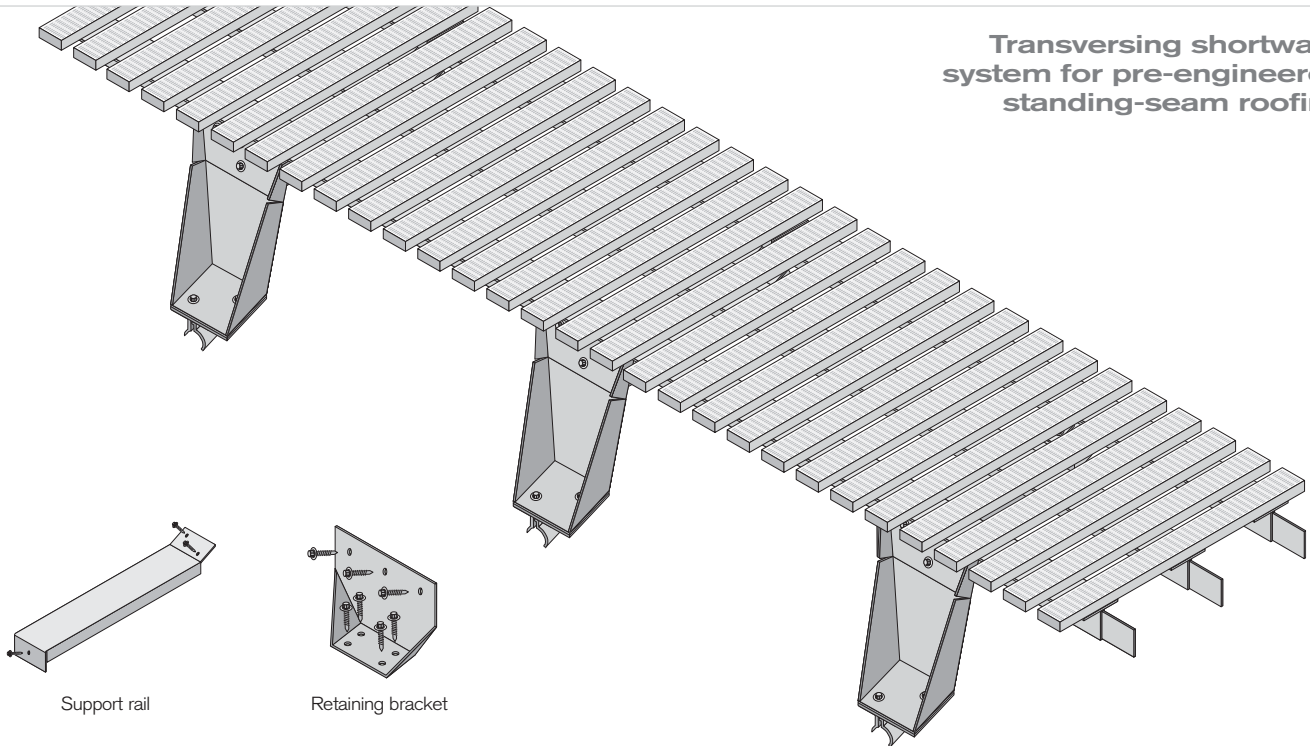


## WalkSafe: System components

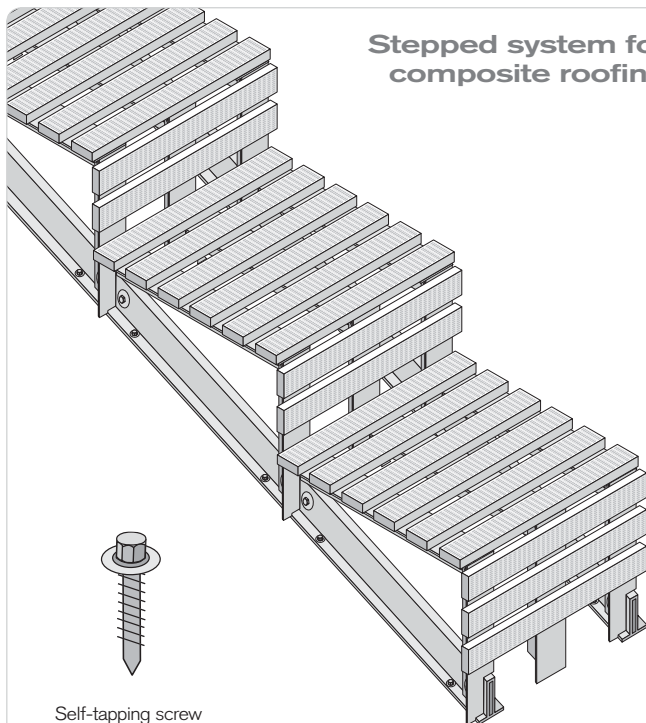


# ManSafe for Roofing

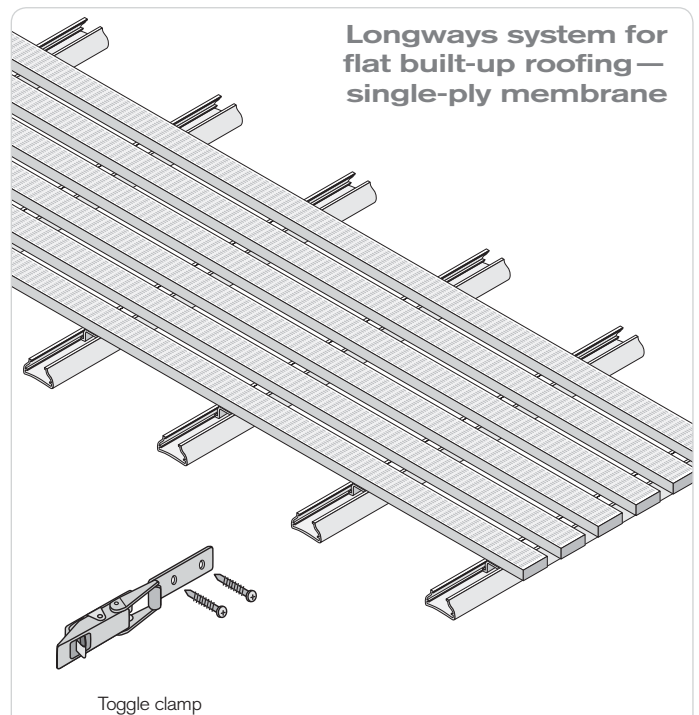
**Transversing shortways system for pre-engineered standing-seam roofing**



**Stepped system for composite roofing**



**Longways system for flat built-up roofing — single-ply membrane**





# VersiRail system

Where you need to restrict exposure to the hazard, the VersiRail® range offers an aesthetically-pleasing collective protection solution for flat surfaces up to a 10° slope. VersiRail comes as either a freestanding option where there is no need to drill or penetrate the roof, or as a fixed option which can be permanently attached to the roof.

Both freestanding and fixed solutions are available in three style choices; straight, curved or inclined and three finishes; natural, polished or powder coated to a RAL colour.

Freestanding VersiRail can also be supplied in a folding option to lie flat on the roof when the system is not in use.

A guardrail system should be designed to always provide a minimum edge protection height of 3 ft 7¼ in. The fixed VersiRail system has upright supports that are available in various heights (from 11¾ in – 3 ft 7¼ in) to accommodate different parapet heights. For added safety VersiRail is supplied with kneerails as standard. Additional kneerails can be provided to meet individual requirement.

## Key advantages

- Durable aluminium, corrosion-resistant construction
- Lightweight—quick and easy installation
- 30% lighter than steel alternative
- Fixed or freestanding (including folding) options
- Designer looks—three finishes available
- Adaptable, modular easy-fix system
- Fully weatherproof
- Meets the requirements of OSHA 1926.502 and relevant Canadian building codes.
- No need for annual inspection
- Versatile—can be designed for any flat roof plan
- Available in three styles—straight, curved, inclined
- Freestanding option—no need to penetrate the roof
- Fixed option—a range of different heights to meet your needs (11¾ in, 1 ft 7¾ in, 2 ft 3½ in, 2 ft 11½ in, 3 ft 3½ in and 3 ft 7¼ in)



**VersiRail: Freestanding upright**



**VersiRail: Fixed upright**



# ManSafe for Roofing

## VersiRail: System options

### Straight upright

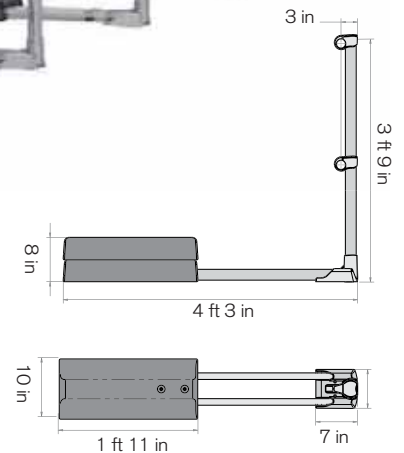
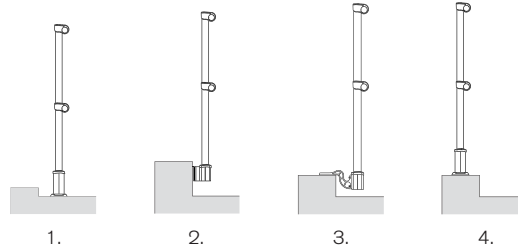
This simple design fits in perfectly with the clean lines and contours of a building.

The straight upright system is particularly suitable for protection at access points and demarking walkways.



Straight upright system with:

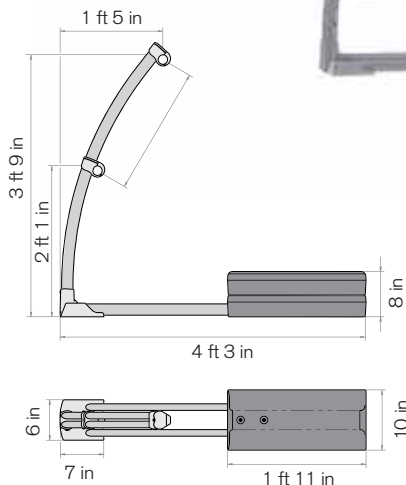
- 1) Slab mounting plate
- 2) Wall mounting plate
- 3) Z-type mounting plate
- 4) Parapet mounting plate



### Curved upright

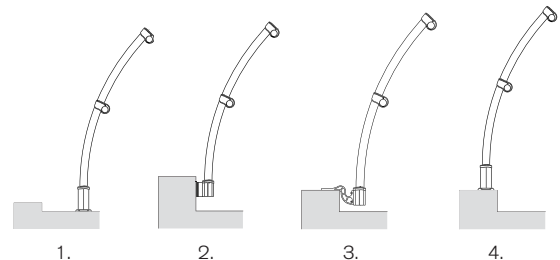
Whilst providing the primary function of collective protection, the curved upright system complements the design of a building.

This solution also keeps people further from the roof edge, providing a greater level of safety.



Curved upright system with:

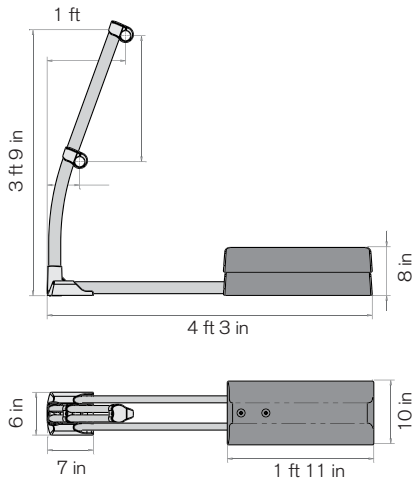
- 1) Slab mounting plate
- 2) Wall mounting plate
- 3) Z-type mounting plate
- 4) Parapet mounting plate



# VersiRail: System options

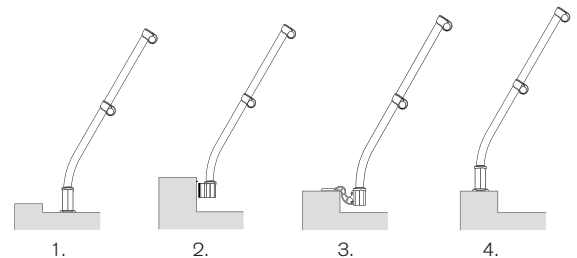
## Inclined upright

This variation is inclined at 20°, which adds to the aesthetics of the system whilst making the system less visible from ground level. The result is better integration of VersiRail into the building design.



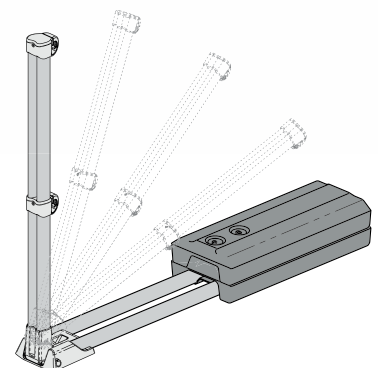
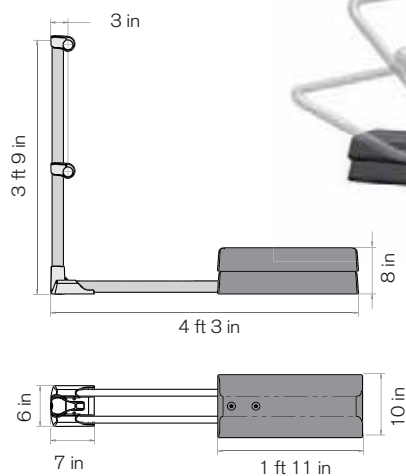
Inclined upright system with:

- 1) Slab mounting plate
- 2) Wall mounting plate
- 3) Z-type mounting plate
- 4) Parapet mounting plate



## Freestanding folding

When collective protection is not being used, the folding uprights of this variation lie flat and are concealed when viewed from ground level, combining safe with architectural aesthetics. Available in straight, curved or inclined styles.

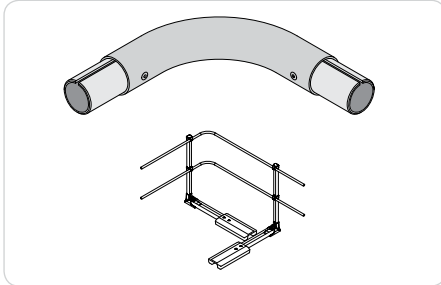


# ManSafe for Roofing

## VersiRail: System components

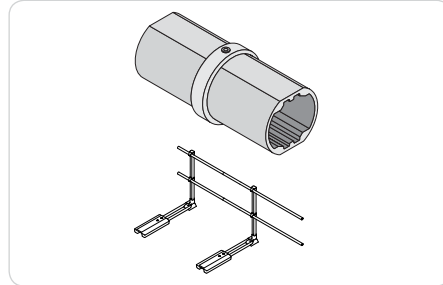
### Ancillary items

VersiRail is exceptionally flexible in its application through modular easy-fix components allowing a wide range of configurations.



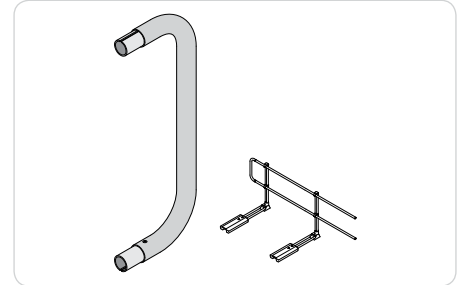
#### Corner sections

Where a change in system direction is required a standard 90° corner section can be supplied, or specific corner sections of between 45° to 175° can be made to order.



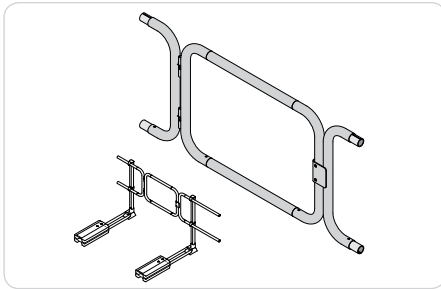
#### Connecting elements

T-Junctions, 45 – 45 corner sections and junction parts are all available to accommodate all system layouts.



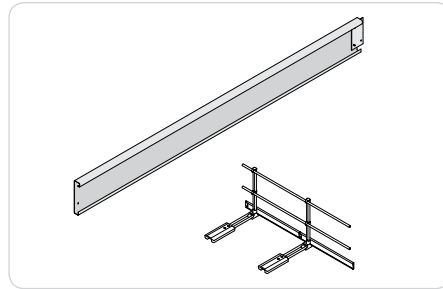
#### Closure bends

In situations where VersiRail needs to terminate and cannot be attached directly to a structural element, a closure bend can be specified. This same part can be incorporated into a length of system to designate a safe entry/exit point.



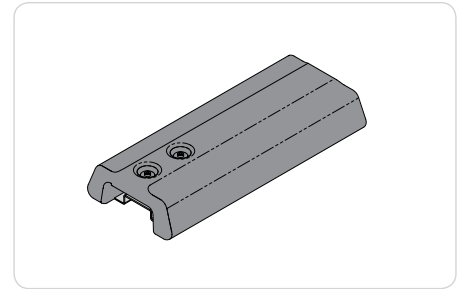
#### Access gate

Where VersiRail prevents access to a fall hazard such as a rooftop or trap door, but access may be needed for maintenance, the access gate can provide trained personnel controlled access to these areas.



#### Toeboard

On rooftops or surfaces where there is no parapet at the fall edge (or a parapet of less than 4 in high) a toeboard can be affixed to the base of the VersiRail.

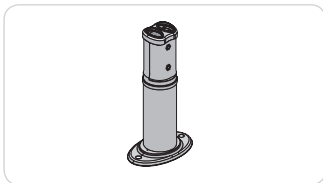


#### Additional counterweights

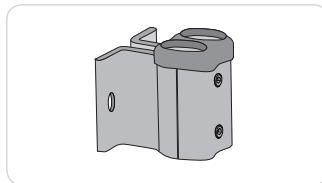
Where a closure bend, corner or specific access point occurs within a system, additional weights may be required to increase stability.

### Fixing options

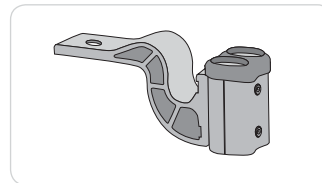
There are a number of brackets available for fixing on or to parapet walls using either M10 or M12 bolts. These fixings should also be chemically sealed where possible. It is essential to check the suitability of material that the fixed VersiRail is to be installed on.



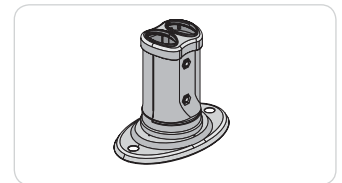
Slab mounting plate  
(7¾ in, 9¾ in or 11¾ in high)



Wall mounting plate  
(open option available)



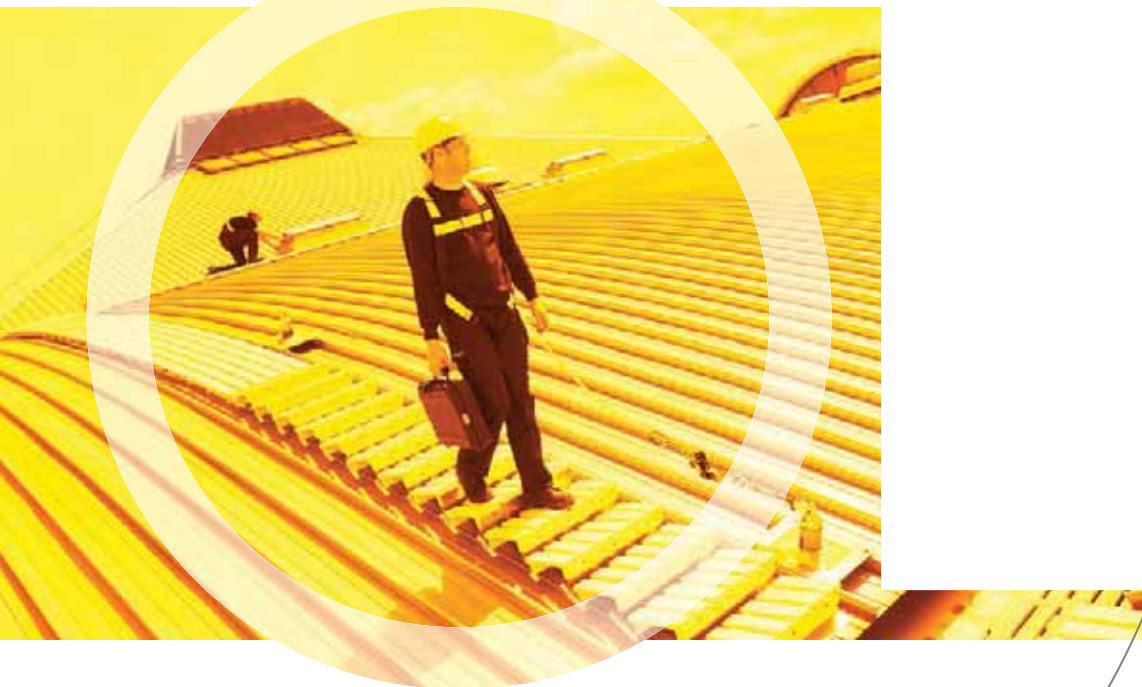
Z-type mounting plate



Parapet mounting plate



# ManSafe®



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