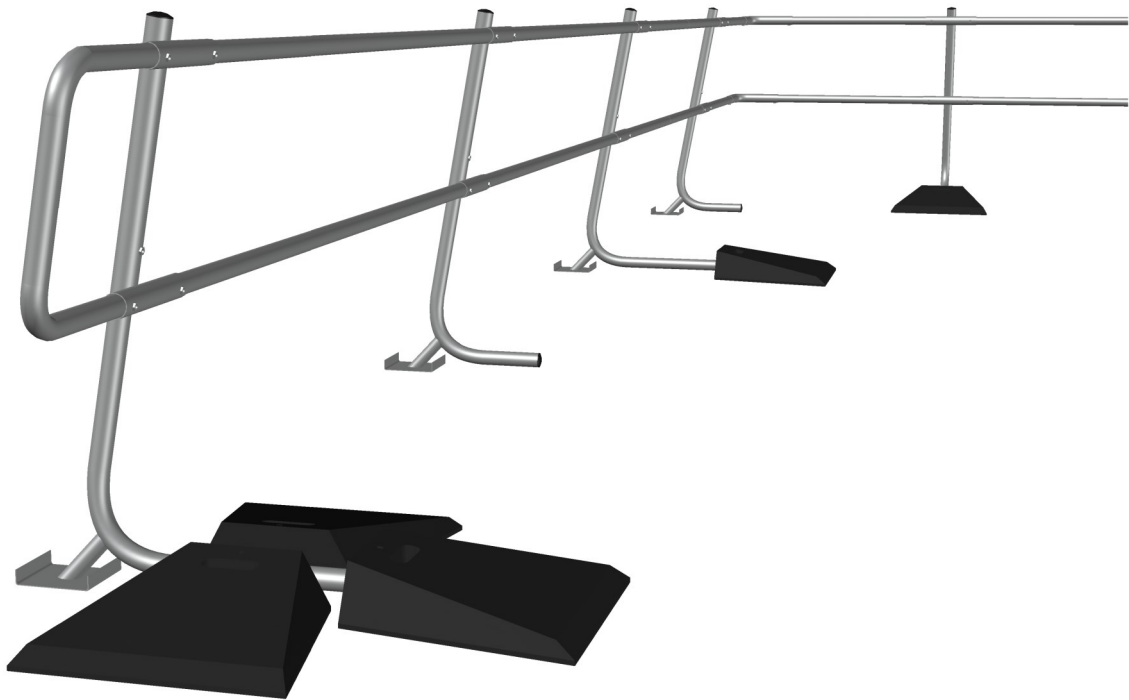




Freestanding Guardrail System

Operation & Maintenance Manual



Specification



Freestanding Edge Protection - System Specification

General Description

Our freestanding edge protection system is a cantilevered guardrail system that does not require any mechanical fixing into the roof surface. This system has been designed and manufactured to fully comply with current H.S.E regulations.

Material

The main and intermediate uprights are fabricated from 2mm hot dipped galvanised steel equivalent to BS EN ISO 1461.

The upper and lower cross rails manufactured from 1.5mm thick x 48.3mm external diameter steel tube, with a zinc/aluminium/magnesium coating.

The rubber counterweight is manufactured from 100% recycled PVC compound with the fixing screws manufactured from zinc-coated steel.

Safety Standards

Our freestanding guardrail is designed in accordance with and/or tested to the following safety standards:

- BS 13700:2021 - Permanent counterweighted guardrail systems.
- BS EN 13374:2013 - Class A - Temporary edge protection systems.
- BS EN ISO 14122-3:2016 - Stairs, stepladders and guard-rails.
- BS 6399-2:1995 - Code of practice for wind loads.
- HSG-33 - Health and safety in roof work.
- HSE INDG284 - Working on roofs.

Specification



Freestanding Edge Protection - System Specification

Test Procedure

Our freestanding guardrail has been tested to BS13700:2021 by Satra Technology Ltd. A summary of the testing details is shown below:

- All testing was carried out on a single ply membrane roof rig, built to a 5 degree pitch.
- All tests were repeated, for all samples, in both wet and dry conditions.
- All testing was carried out on a standard 8.5m run of guardrail.
- All the below tests were repeated on 4 independent samples.

Horizontal Loading:

- A 0.3kN load was applied horizontally to the top and middle rail at 8 points, identified by the standard. No deflection of greater than 55mm was observed.
- A 0.495kN load was applied horizontally to the top and middle rail at 8 points, identified by the standard. No identifiable yielding, fracture or separation was observed.
- A 0.2kN load was applied horizontally to the toe board at 4 points, identified by the standard. No deflection of greater than 55mm was observed.
- A 0.33kN load was applied horizontally to the toe board at 4 points, identified by the standard. No identifiable yielding, fracture or separation was observed.

Vertically downwards loading:

- A 0.3kN load was applied vertically downwards to the top and middle rail at 8 points, identified by the standard. No deflection of greater than 55mm was observed.
- A 1.25kN load was applied vertically downwards to the top rail at 4 points, identified by the standard. No deflection of greater than 300mm was observed.
- A 0.2kN load was applied vertically downward to the toe board at 4 points, identified by the standard. No deflection of greater than 55mm was observed.

Parallel loading:

- A 0.33kN load was applied horizontally to the top rail, middle rail, and toe board, as identified by the standard. No identifiable yielding, fracture or separation was observed.

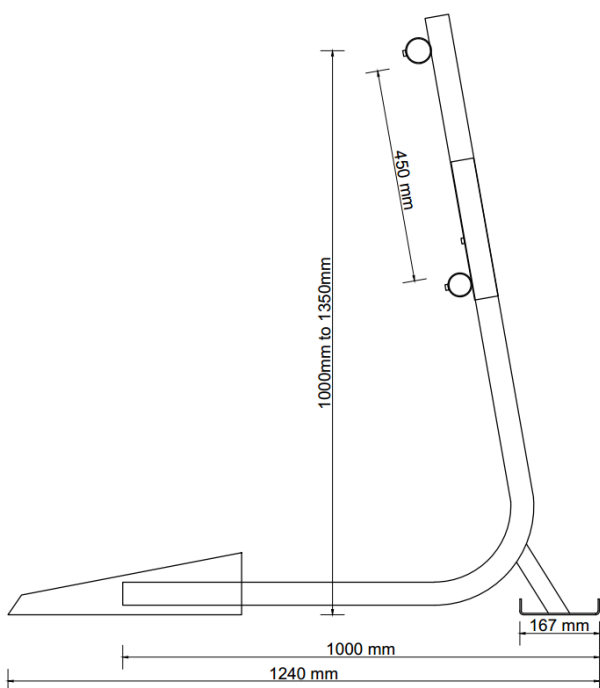
Vertically upwards loading:

- A 0.3kN load was applied vertically upwards to the top rail at 5 points, identified by the standard. No part of the system became detached.

Components



Freestanding Edge Protection - System Components



MSUP - Main Support Upright

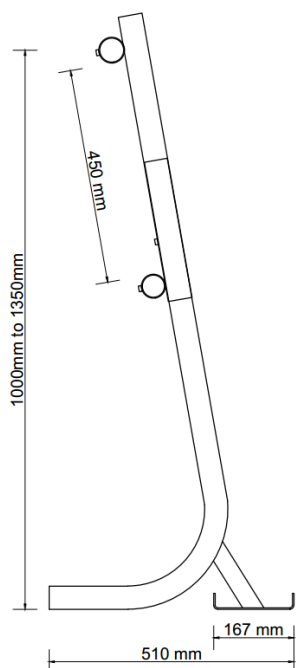
The main upright sits on the roof and has a 20kg counterbalance weight attached, and the adjustable top riser unit.

The foot of the upright which rests on the roof is protected by a rubber isolation pad. By loosening the fixing screws in the body of the top riser, the unit can be moved up and down the main upright to adjust the height of the top and middle rails or to raise and lower the main upright.

Materials

The main upright is manufactured from 2mm x 48.3mm steel tube, which has a hot dipped galvanised coating. It is also available powder coated to any RAL colour.

Please note: The main upright shown here has a counterweight attached to help give the full dimensions when installed. The counterweight is sold separately.



ISUP - Intermediate Support Upright

The intermediate upright is a shortened version of the main upright and is designed to be installed unweighted as an intermediate support. Just as with the long upright, this component consists of two separate components but is delivered pre-assembled ready to install.

The intermediate upright also features the protective rubber pad to isolate the foot from the roof membrane.

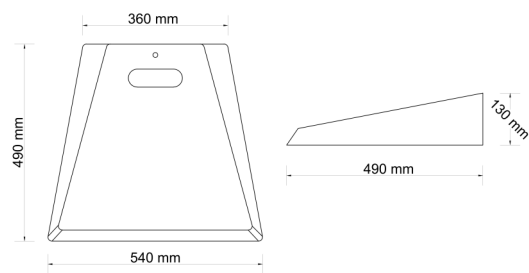
Materials

The intermediate upright is manufactured from 2mm x 48.30mm steel tube, which has a hot dipped galvanised coating. It is also available powder coated to any RAL colour.

Components



Freestanding Edge Protection - System Components

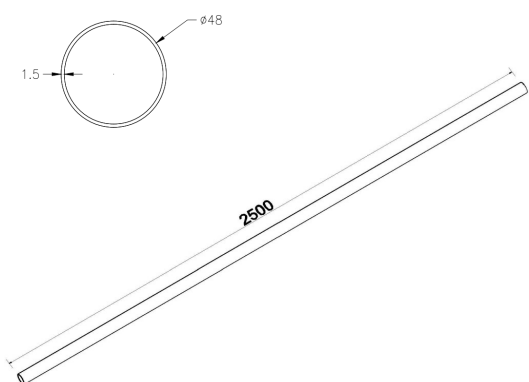


CW20 - 20kg Counterweight

The weight is designed to be attached to each of the main uprights, and is fixed in place with a small zinc coated grub screw which provides the necessary counterbalance weight to prevent the system from being moved.

Materials

The 20kg weight is manufactured from 100% recycled PVC compound.

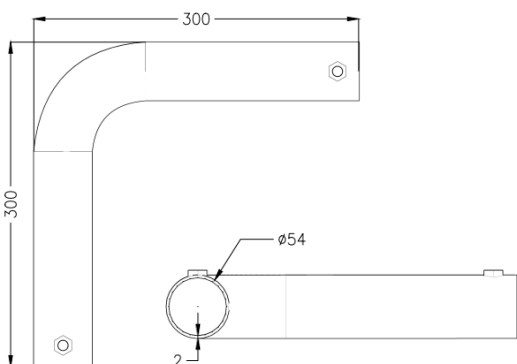


CR2.5 - 2.5m Cross Rail

The cross rails are supplied pre-cut to 2.5m in length for ease of installation. This fixed length means there is no need to measure or cut the tubes to ensure the uprights are spaced evenly.

Materials

The lightweight rail is manufactured from 1.5mm light gauge steel making it easy to cut and transport. It comes with a resistant coating made from zinc, aluminium and magnesium and can be powder coated to any RAL colour.

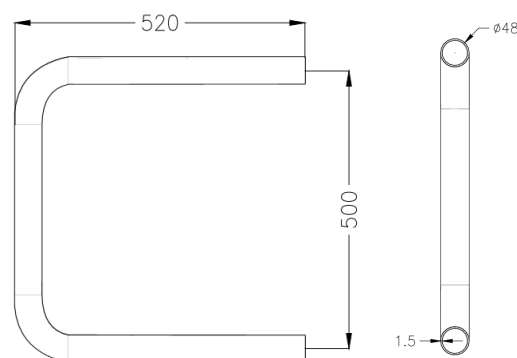


SC90 - Swept Bend

The SC90 is an ergonomically designed 90° swept bend. This flexible pre-formed component can be used for both horizontal and vertical bends. The fitting incorporates zinc coated grub screws for easy installation.

Materials

The swept bend is manufactured from 2mm x 54mm steel tube, which has a hot dipped galvanised coating. It is also available powder coated to any RAL colour.



DE180 - D-End Termination

The pre-formed 180° bend inserts into the top riser and is a quick and convenient way of terminating a run of guard-rail. This flexible pre-formed component can be used for both horizontal and vertical terminations.

Materials

The D-End is manufactured from 1.5mm light gauge steel making it easy to cut and transport. It comes with a resistant coating made from zinc, aluminium and magnesium and can be powder coated to any RAL colour.

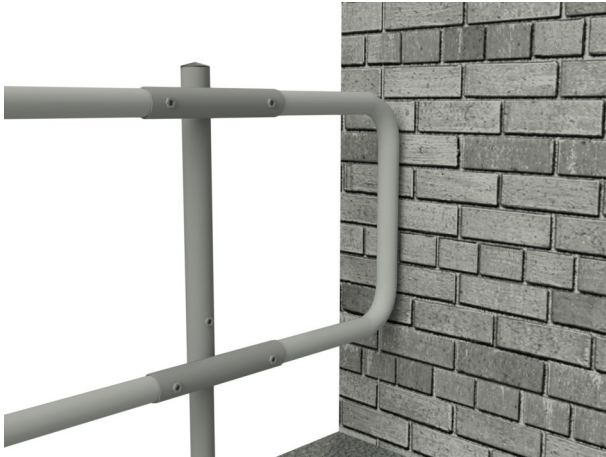
Configuration



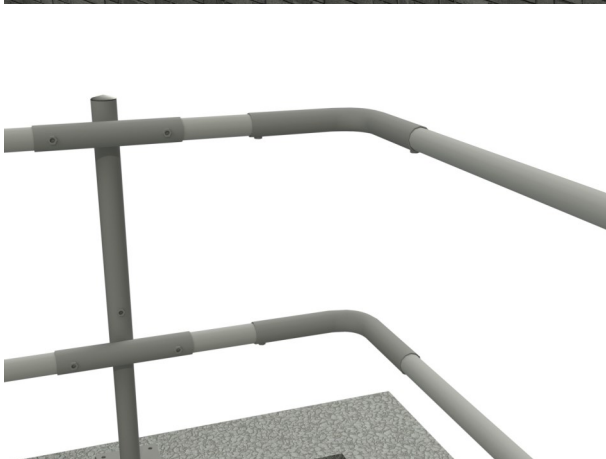
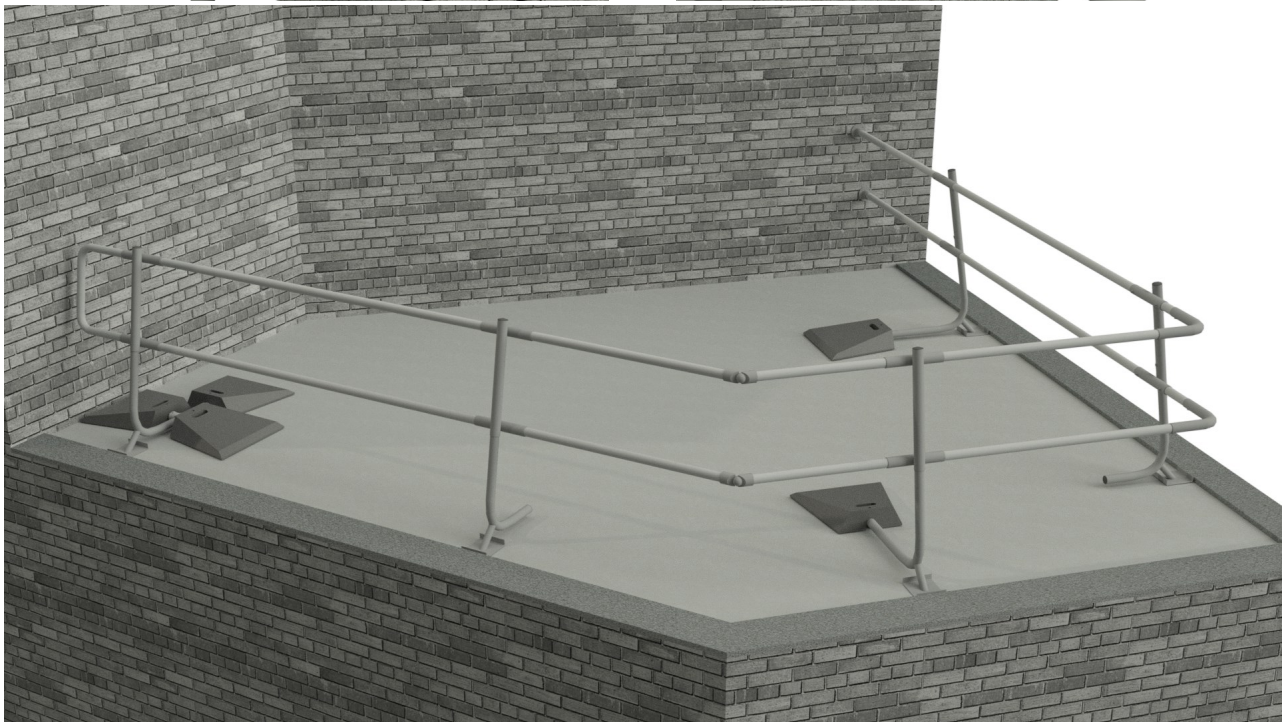
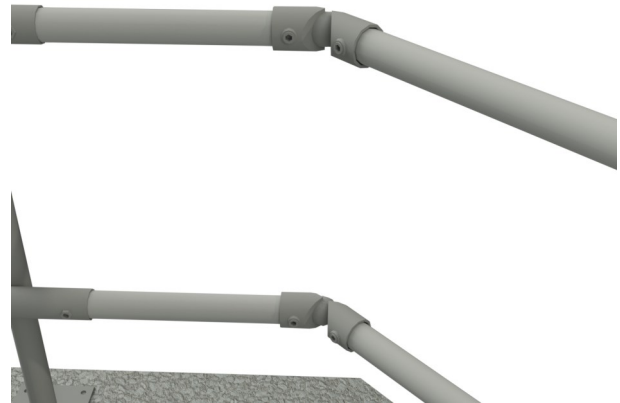
Freestanding Edge Protection - System Configuration

Typical Layout

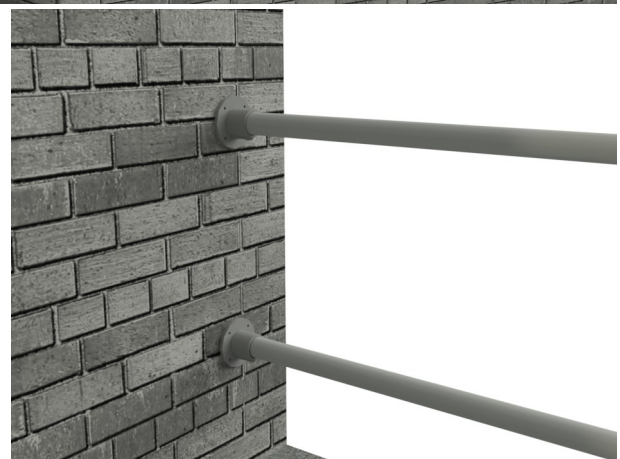
D-End Termination



Variable Corner / Elbow



90 Degree Swept Bend



Wall Flange Termination

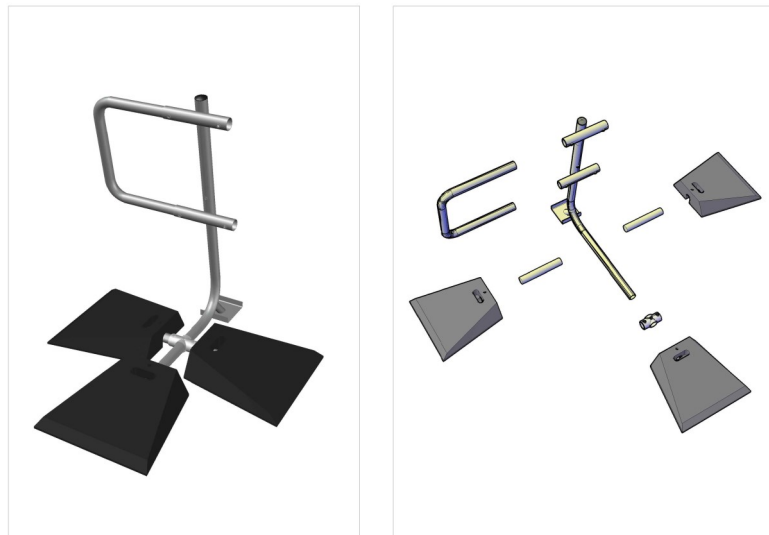
Configuration



Freestanding Edge Protection - System Configuration

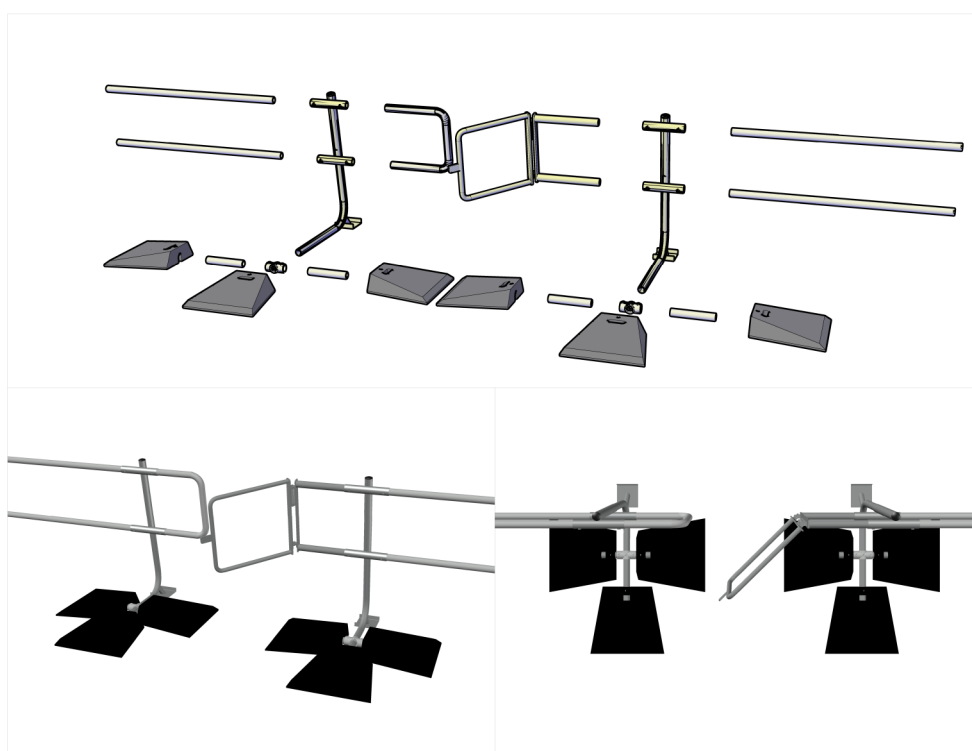
Typical Layout - Freestanding End

Three weights are required where a freestanding end is installed. This is done by using a two socket cross and two short lengths of tube.



Typical Layout - Spring Loaded Gate

When installing a spring loaded gate it creates two freestanding ends and therefore the system must finish on a weighted main upright, and have three weights. The gate has two welded tubes that fit into the top riser section of the upright. A D-End is installed on the opposing side for the gate to close onto. The gate should always open inwards towards the user on the roof.



Installation



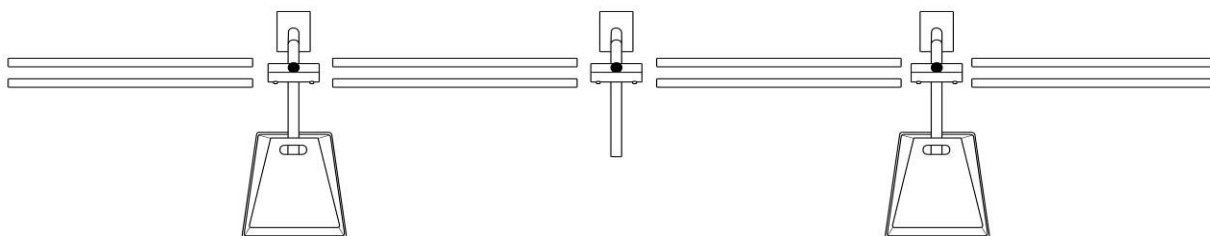
Freestanding Edge Protection - System Installation

Wherever possible the starting point for all installations should be the end termination, or at a corner for perimeter systems, remembering to carry out the initial setting out a minimum distance of 2m from the edge of the roof.

Step 1 - Setting Out

Starting at a termination if a straight run or a corner if a perimeter system, place the 2.5m CR2.5's end to end in pairs along the length of the roof. Then alternate an MSUP and an ISUP between each pair of CR2.5's.

Once the MSUP and ISUP's are in place connect a CW20 counterweight to each MSUP.

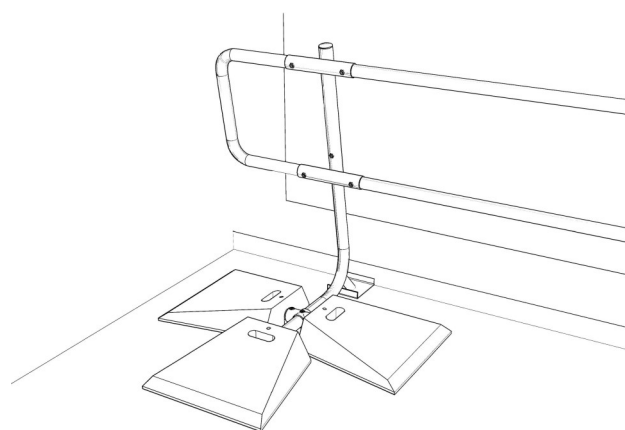
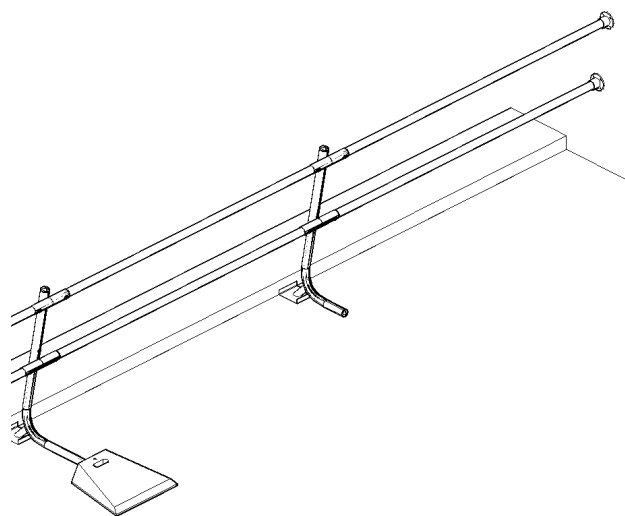


Step 2 - End Termination

Once the setting out is complete, start by assembling the first end termination.

For a wall flange termination, place an upright against the wall and mark where the top and bottom tubes will finish. Then drill and attach the wall flange in the area marked. The first tube and upright can now be assembled and attached.

For a D-End Termination, attach a D-End to an MSUP and then make sure you have the correct amount of 20kg Counterweights and components to weight the end correctly. If the system is being installed on a PVC Single Ply roof then the D-End Termination needs three weights. If the system is being installed on a Bituminous Membrane roof then the D-End Termination only requires two weights.



Installation



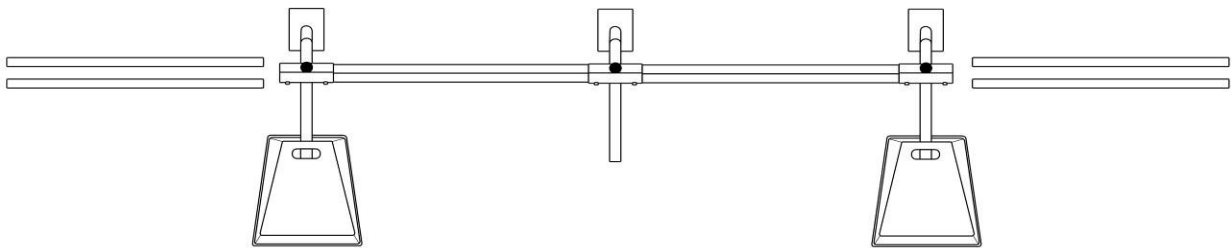
Freestanding Edge Protection - System Installation

Step 3 - Section Assembly

Once the setting out and end terminations are complete, continue to assemble the first two bay section by connecting the second and third pair of CR2.5's to the first and second MSUP's and fully tighten the screws.

Join these two MSUP assemblies together using an ISUP. You now have a completed two bay section.

Repeat the above process until all the two bay sections are assembled.



Step 4 - Corner Assembly

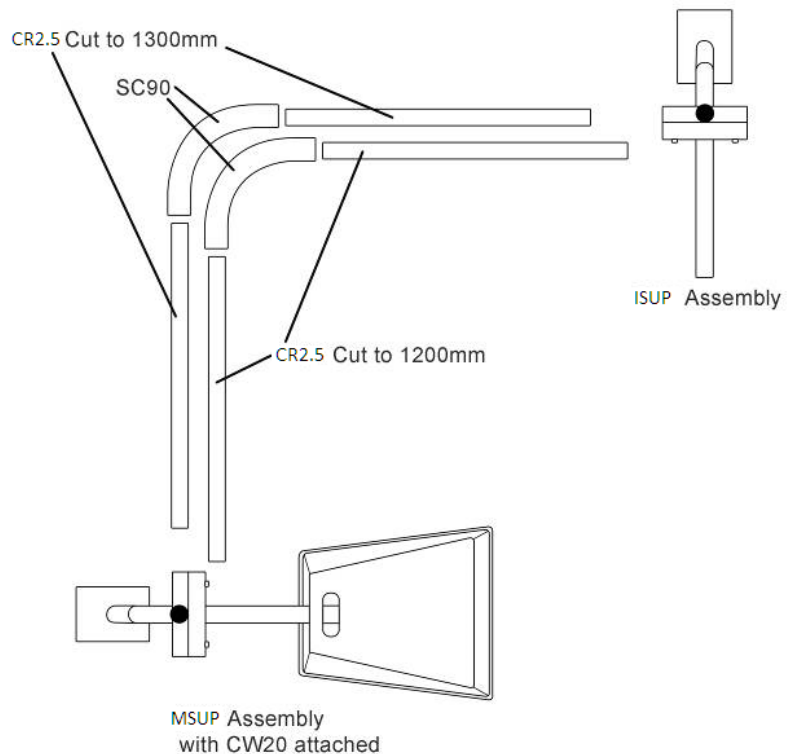
Begin by assembling a complete corner unit consisting of one MSUP, one ISUP, one CW20, two SC90 and two CR2.5's cut to length.

Cut two CR2.5's down to form two tubes at 1200mm and two at 1300mm.

Take the MSUP's and connect a CW20, insert one 1200mm tube into the top of the TRS, and one 1300mm tube into the bottom of the TRS, fully tightening the screws as you do so. Repeat the process for connecting the cut tubes to the ISUP.

Join the MSUP and ISUP assemblies using two SC90's ensuring that all the screws are fully tightened.

Using two people carry the corner assembly to the roof edge, being careful to remain behind the assembly at all times.



Installation

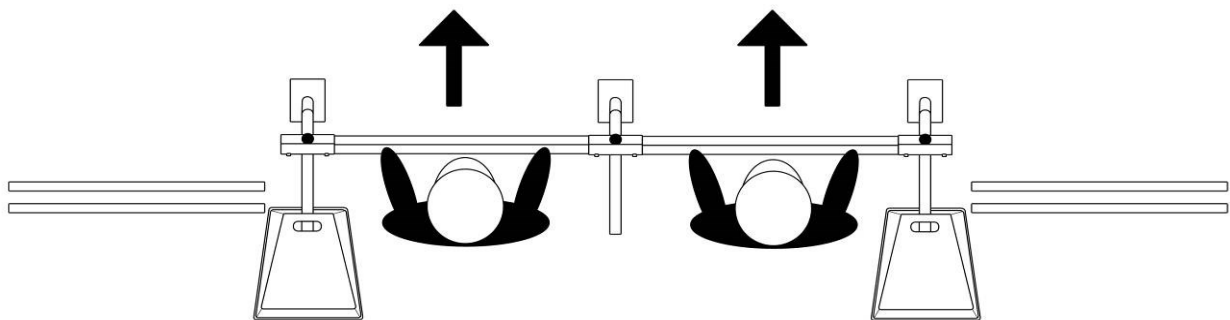


Freestanding Edge Protection - System Installation

Step 5 - Positioning

Using at least two people positioned behind the assembly, carefully carry a two bay into position at the edge of the roof.

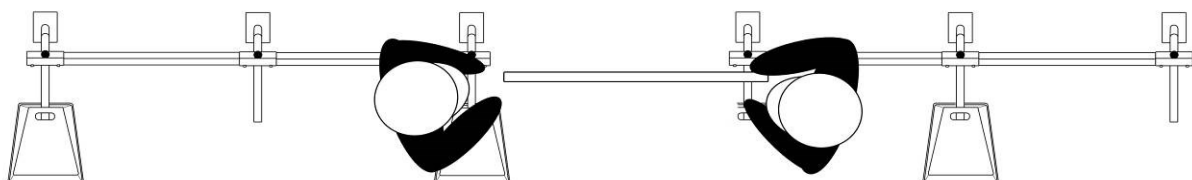
The two bay sections should be positioned leaving a single bay between each one.



Step 6 - Final Assembly

The remaining 2.5m Cross Rails are now attached in between the two bay assemblies.

By placing one person either side of the opening behind the existing handrail assemblies, connect the remaining CR2.5's into the top and bottom of the TRS on each upright fully tightening the screws as you go.



Maintenance



Freestanding Edge Protection - System Maintenance

The system is maintenance free, however if cleaning is required, use only a mild detergent and water (such as a domestic washing up liquid) in order not to damage any of the galvanised coating.



Certification

Freestanding Edge Protection - System Certification

- It is our recommendation, along with it being a BS13700 requirement, that the guardrail installation should be inspected annually by a competent person.
- A written wind calculation is available upon request.
- A visual inspection of the complete installation in accordance with the current needs of the client should be undertaken. As well as checking if any new equipment has been installed on the roof that may require further guardrail protection.
- Check against the original installation drawing to see if any part of the installation has been modified.
- Check all screws and fixings are in place and sufficiently tightened.
- Check the height of the top rails and that they are level.



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