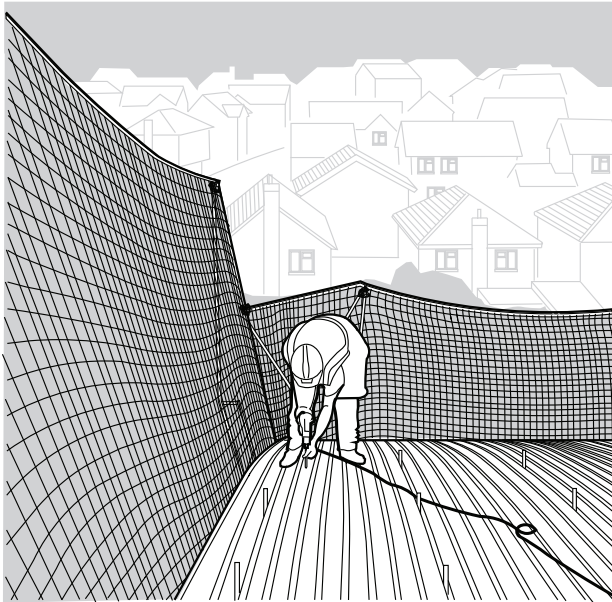


COMBISAFE®

Net Barrier System



USER INSTRUCTIONS

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General

The increasing bay sizes, greater eave heights, and a movement towards curved standing seam roofs on steel framed structures, when combined with the generally accepted “improvisation” culture within edge protection, have raised serious questions about the performance of existing edge protection solutions.

Two events have produced dramatic change in this area of work:

The publication of a European Performance Standard for Temporary Edge Protection, and the launch of the Net Barrier System from Combisafe International.

The European Standard sets specific technical performance criteria for all Temporary Edge Protection systems, irrespective of height, span, or the material from which they are made.

The Net Barrier System satisfies these criteria, offering a flexible edge protection solution to all manner of roof construction and, when combined with the internal safety netting, provides a confident cocoon within which the roofer can operate in complete safety.

Standards

Net Barrier System complies with the following Standards:

- European Standard for Temporary Edge Protection Systems EN 13374: 2004.
 - Net Barrier support frame and attachments have been tested to Class C of this Standard.
 - Net Barrier Netting, support frame and attachments have been tested to dynamic loading of Class C of this standard.
- European Standard for Safety Nets EN 1263:2002.
 - Net Barrier Netting, support frame and attachments have been tested to Dynamic loading of 2.0 KJ (drop height of 2 m) at the eaves overhang to cater for accidental falls into the net.
- GS approved to German Safety Standards in accordance with BGI807584.

Safety instructions

Always check products and equipment before use

Check all component parts to the Net Barrier System before assembly.

Never use damaged or rusty materials as this can affect safety.

Do not combine products

It is not recommended to install, combine or interconnect Net Barrier Systems using products other than those supplied by Combisafe. Combisafe product liability only applies to combinations with correctly fitted Combisafe products.

Always use personal fall arrest equipment

Personal fall arrest equipment must always be worn during assembly and dismantling when a risk of falling exists. This also applies to work carried out from a MEWP (mobile elevating working platform).

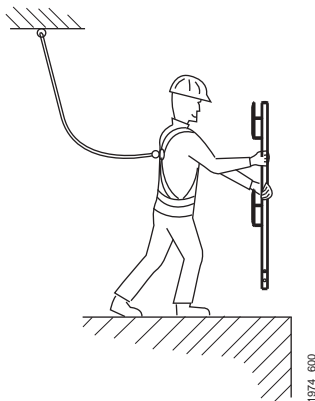


Figure 1. Personal fall arrest equipment

Inspection after a fall

If a guard rail is subject to an accident or exposed to a heavy load, the rail must be checked by a competent person. Contact Combisafe in the event of uncertainty.

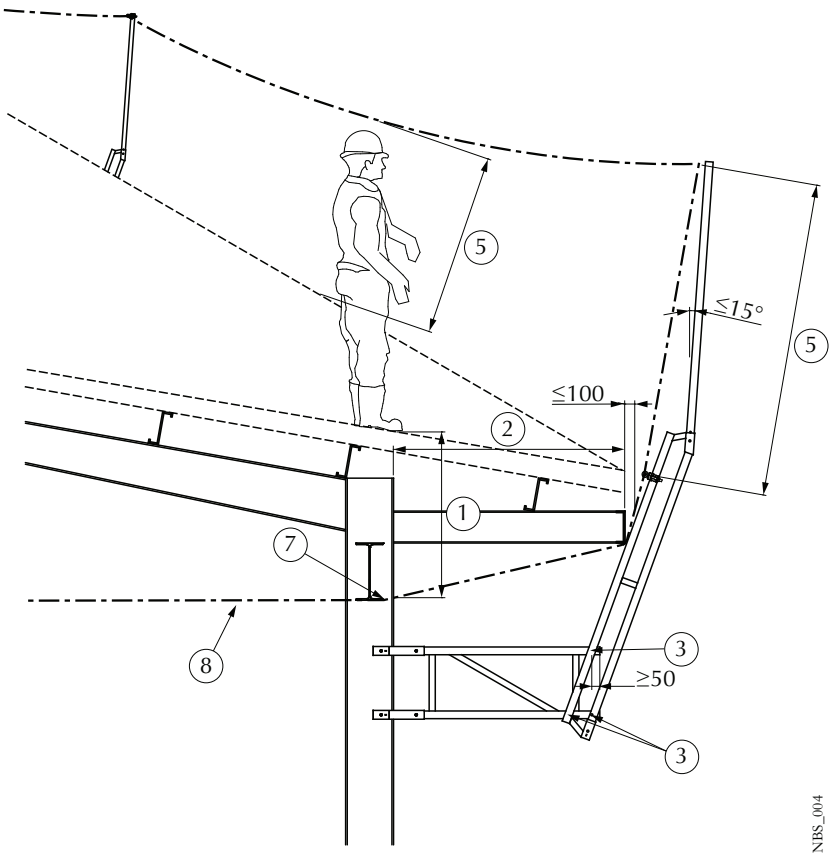
Remember

- Plan the fall guard at an early stage, this will benefit everyone.
- Only use inspected safety products.
- Cordon off below and around the assembly area in connection with the installation so that unauthorized personnel are not injured if, for example, you should drop tools or material.
- Use tools designed for the type of work to be carried out.
- Tighten screws properly and check that split pins lock correctly.
- Keep threads clean and lubricated.
- Keep the installation area in order.
- A safe workplace is an agreeable workplace.
- Many fall accidents occur from a low height.

Important assembly criteria

The numbers in the circles on figure 2 refer to the list below.

1. Maximum vertical distance of net under the roof cantilever from the working platform (roof level) must not exceed 1.0 m.
2. Maximum roof overhang not to exceed 1.4 m when using Steel Jaw Clamps and 1.6 m when using Strap Attachment.
3. When connecting Post Attachment to Truss Beam (1.2 m), use 2 No. Couplers on top boom and 1 No. Coupler on bottom boom. Couplers must be manufactured to EN74-1 Class B.
4. Maximum spacing of support assembly, i.e., Posts, not to exceed 10 m.
5. Height of perimeter Safety Posts and tensioned rope must be such that the radial height of the edge protection is at least 2 m at the Posts and 1.5 m midway between Posts.
6. Perimeter Nets must be manufactured to EN 1263-pt1 Type S. Bottom edge of Nets must be anchored to the permanent structure at 0.75 m maximum spacing. The permanent structure on to which the system is mounted must be able to withstand the imposed forces safely.
7. Roofing Net tied to perimeter Steel Beam on one end and COMBISAFE Post at the other.
8. Roofing Net tied to perimeter Steel Beam.



NBS_004

Figure 2. Assembly criteria. Note: See "Reach limits" on page 24

Technical data

4150 Safety Post 1800 mm

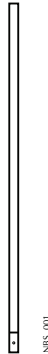


Figure 3. Safety Post 1800 mm

Weight: 2,8 kg

Surface treatment: Self coloured aluminium.

3550/3555 Post Attachments

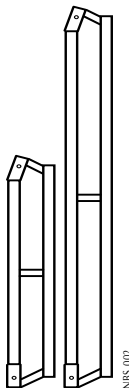


Figure 4. Post Attachments

Weight: 3550 Post Attachment 1,2 m 7,6 kg, 3555 Post Attachment 1,8 m 11,0 kg

Surface treatment: Hot dipped galvanized.

3572 Cantilever Truss Beam

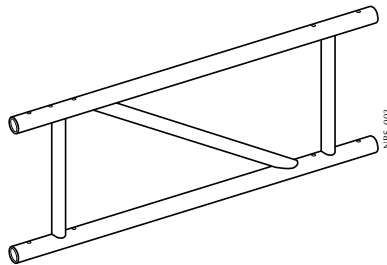


Figure 5. Cantilever Truss Beam

Weight: 5,1 kg

Surface treatment: Self coloured aluminium.

Pinned to Steel Jaw Clamp or Strap Attachment on one end and connected to Post Attachment at the other, using 3 No. Swivel Couplers.

4542 Steel Jaw Clamp

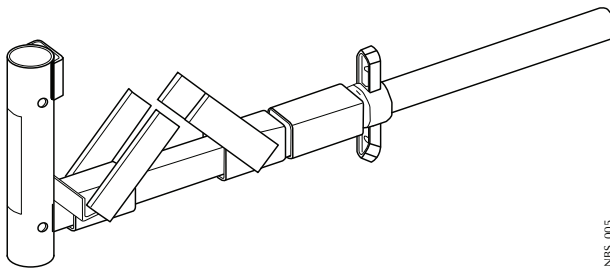


Figure 6. Steel Jaw Clamp

Weight: 7,4 kg

Surface treatment: Hot dipped galvanized.

Two Steel Jaw Clamps are used for attachment to steel columns. Works with both the Adapter Tube and the Cantilever Truss Beam

4545 Elbow

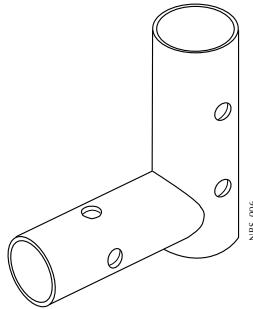


Figure 7. Elbow

Weight: 0,95 kg

Surface treatment: Hot dipped galvanized.

3560 Strap Attachment

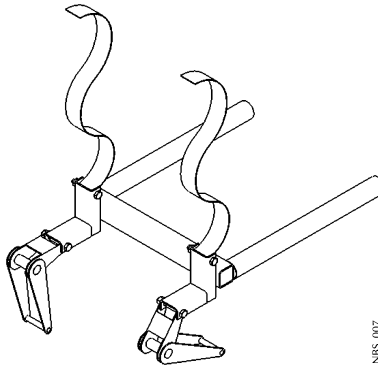


Figure 8. Strap Attachment

Weight: 10,4 kg

Surface treatment: Hot dipped galvanized.

3561 Strap Attachment (Truss Beam type)

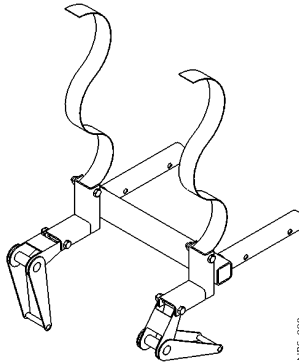


Figure 9. Strap Attachment (Truss Beam type)

Weight: 8,15 kg

Surface treatment: Hot dipped galvanized.

10764 Corner Protector for Strap Attachment

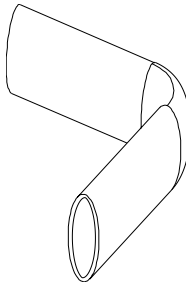


Figure 10. Corner Protector for Strap Attachment

Weight: 0,1 kg

3565 Adapter Tube

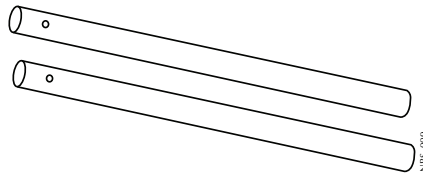


Figure 11. Adapter Tube

Weight: 2,3 kg

Surface treatment: Hot dipped galvanized.

Extension for the Steel Jaw Clamp used on small cantilevers (when the Truss Beam is not needed).

CT1916 Swivel Coupler

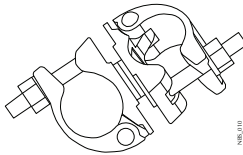


Figure 12. Swivel Coupler

Weight: 1,45 kg

Surface treatment: Hot dipped galvanized.

Heavy duty drop forged couplers manufactured to EN74-1 Class B used to connect Post Attachment to Truss Beam, Strap Attachment or Adapter Tube.

3573 Spigot Tube

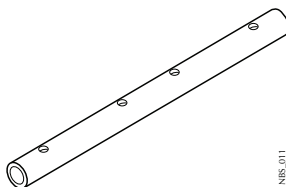


Figure 13. Spigot Tube

Weight: 0,85 kg

Surface treatment: Self coloured aluminium.

1901 Locking Pin and Wire

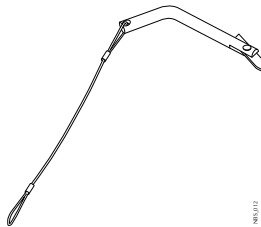


Figure 14. Locking Pin and Wire

Weight: 0,07 kg

Surface treatment: inc plated.

3585 Perimeter Safety Net (4.0x10.0 m)

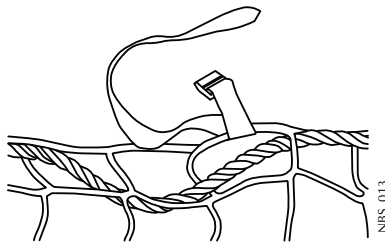


Figure 15. Primeter Safety Net (4.0x10.0 m)

Weight 8,5 kg

Manufactured to EN 1263-Pt. 1 Type S. Perimeter Safety Nets may be supplied with pre-stitched clips for connection to the structure.

200303 Bracing Tube 3.0 m



Figure 16. Bracing Tube 3.0 m

Weight: 4,25kg

3575 Pigtail Coupler

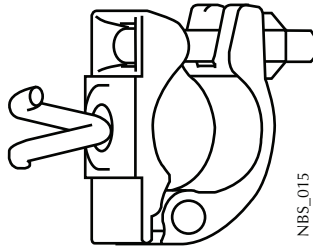


Figure 17. Pigtail Coupler

Weight: 0,75kg

Surface treatment: Hot dipped galvanized.

Assembly

It is strongly recommended that Net Barrier System is installed by competent erectors using MEWPS (Mobile Elevated Working Platforms) for access.

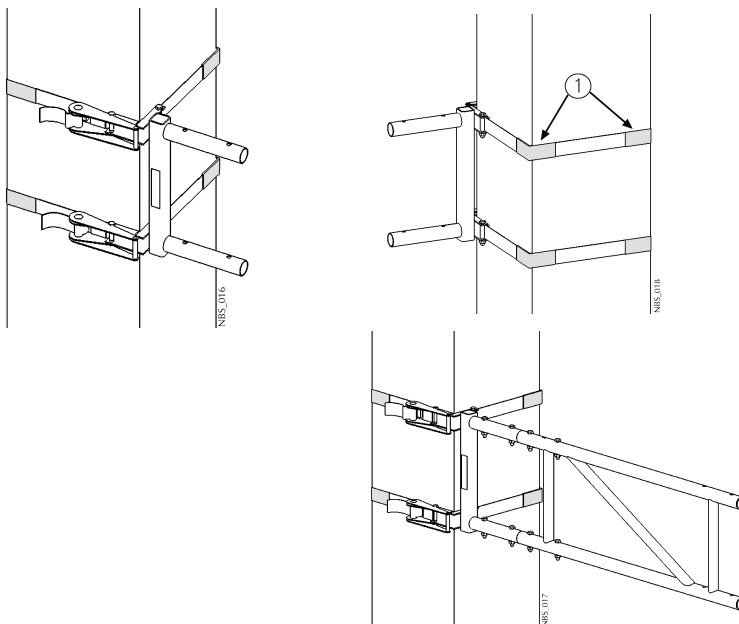
When working from a MEWP, ensure a firm and level ground, free of any obstructions, for at least 3m around the outer perimeter of the structure.

Zone off the area below and around the erection work.

Mounting Strap Attachment

Used on concrete, timber or steel columns for fast and efficient means of attachment.

Pass the tension straps around the column ensuring no twisting of straps and maintain correct connection height. Ensure that all straps have the Corner Protectors to prevent accidental damage.



Pos 1: Corner Protectors

Figure 18. Mounting Strap Attachment

Mounting of Steel Jaw Clamp and Adapter Tubes

Mount the Steel Jaw Clamps on the column 400 mm apart (minimum).

Mount the Steel Jaw Clamps as high as possible

The Steel Jaw Clamp can be mounted in two directions.

Engage the jaws over the column flange and tighten the wing nut with the aid of a hammer.

Mount the Adapter Tubes in the Steel Jaw Clamps with M12x65 bolts and nylock nuts.

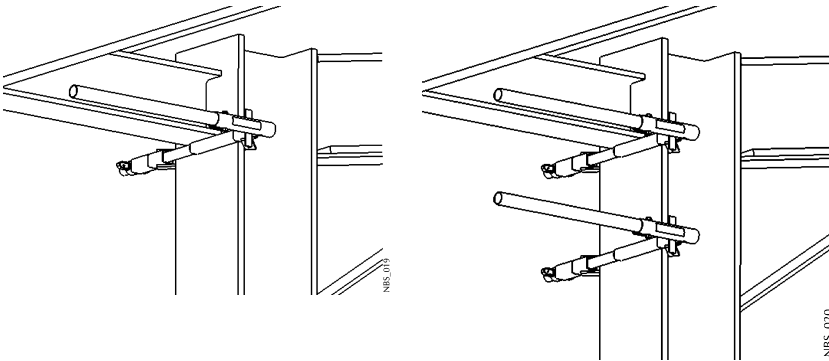


Figure 19. Mounting of Steel Jaw Clamp and Adapter Tube

Mounting of Steel Jaw Clamp and Truss Beam

Used on steel columns and beams with large overhangs for fast and efficient means of attachment

1. Mount the upper Steel Jaw Clamp first whilst ensuring correct position for final assembly. Engage the jaws over the column flange and tighten the wing nut with the aid of a hammer (See T.I Sheet 4540).
2. To mount the lower Steel Jaw Clamp, the truss frame is pinned to the upper clamp using an M12x65 bolt and nylock nut. The lower Steel Jaw Clamp is then fed through the lower boom of the frame and rotated into position. Engage the jaws over the flange and tighten the wing nut with the aid of a hammer (see picture below).

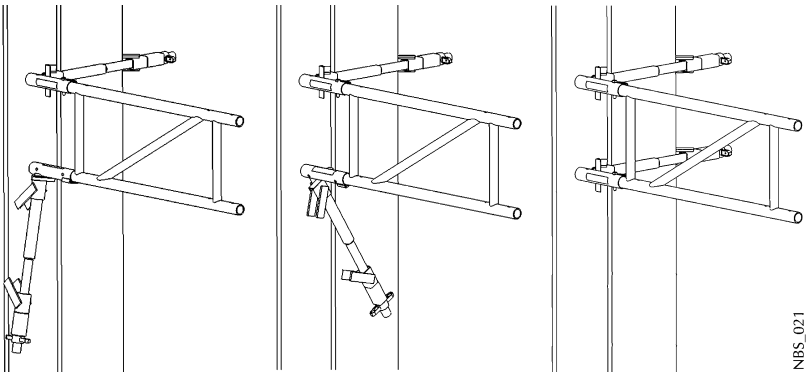


Figure 20. Mounting of Steel Jaw Clamp and Truss Beam

Mounting of Truss Beam on Steel Jaw Clamps

Truss Beam is connected to a pair of Steel Jaw Clamps using M12x70 bolts and nylock nuts. Always insert the bolt from the top and secure the nut at the bottom. Vibrations in the structure may have adverse effects on threaded bolts. Always use nylock nuts. See also “Mounting of Steel Jaw Clamp and Truss Beam”.

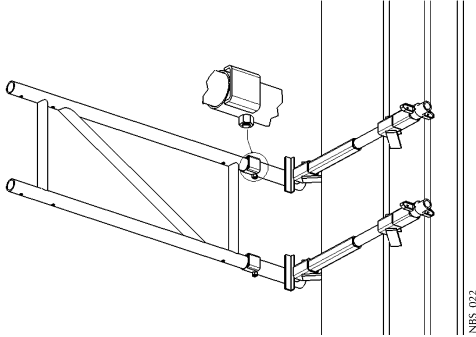


Figure 21. Mounting of Truss Beam on Steel Jaw Clamps

Mounting of Truss Beam on Strap Attachment

Connect the Truss Beam to Strap Attachment using the Spigot Tubes (3573) and Locking Pins (1901). Use 4 Locking Pins per Spigot Tube. Pins may be wire connected to clamps and frame for safety.

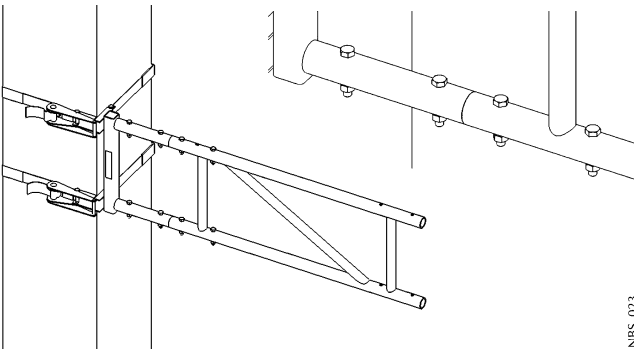
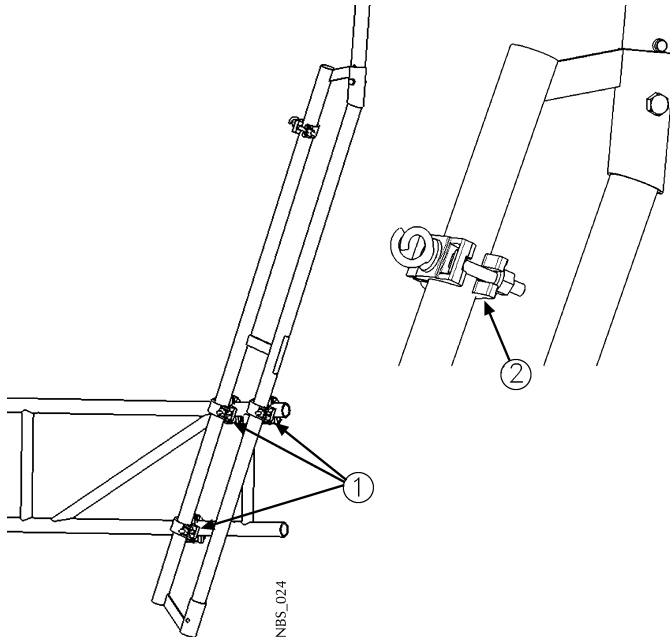


Figure 22. Mounting of Truss Beam on Strap Attachment

Mounting Post Attachment

The Post Attachments whether std.(3550) or king size (3555) are always connected using a minimum of 3 couplers regardless of attachment type used. Connect 2 couplers on top tube and 1 coupler to the bottom tube of the Truss Beam or the Adapter Tube.



Pos 1: Swivel Coupler

Pos 2: Pigtail Coupler

Figure 23. Mounting Post Attachment

Tip: Connect the Swivel Couplers to the Truss Beam first ensuring correct distance from the structure. Mount the Post Attachment on the lower coupler at the correct height and allow to swing to correct angle before attaching the top 2 couplers.

Tip: Post angle of 10 degrees is recommended. An offset of 70 mm between top and bottom coupler on the Truss Beam will achieve this angle.

Tip: Pre-mount the Pigtail Couplers to the Post Attachments (approx. 200 mm down, the right way round!!) before mounting in position.

Mounting Posts and Nets

Place the Safety Post (4150) in the Post Attachment and secure using a Locking Pin or an m12x65 bolt and nylock nut.

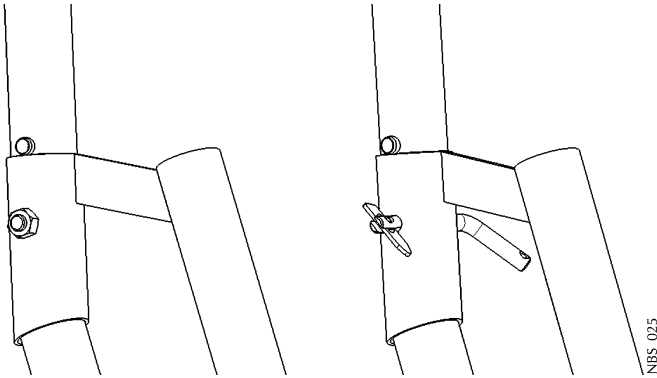


Figure 24. Mounting Posts

Tip: Pre-mount the Pigtail Couplers to the Posts (as high as possible, the right way round!!) before mounting in position.

Tip: Ensure that the 2.0 m minimum height from the roof level can be achieved before proceeding any further.

Perimeter rope on the upper section of the Net is fed through the Pigtail Coupler previously connected to uppermost part of the king size Post. Intermediate rope pre-threaded within the Net, is then progressively fed through the lower Pigtail Coupler.

Pull the Nets tight and attach to the Posts so that there is as little sag as possible. Net clips or tie cords may be used to connect the Nets to one another as well as to the structure at 750 mm centres.

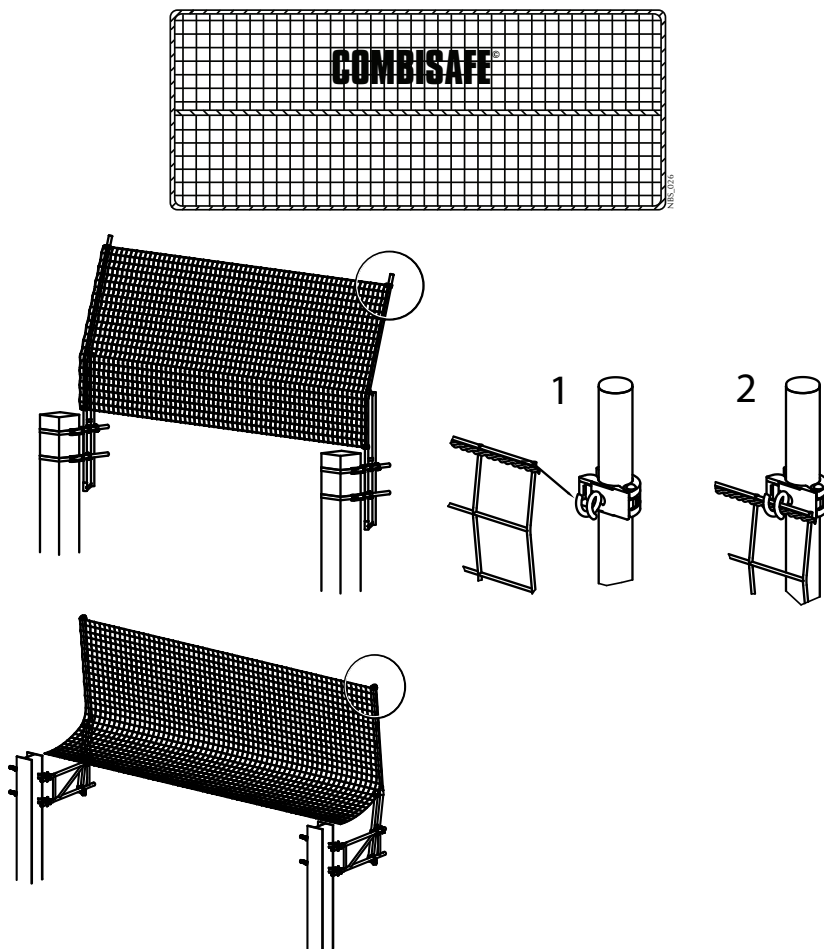


Figure 25. Mounting Nets

Mounting corner assembly/bracing

Using 3.0 m aluminium tubes and Swivel Couplers, a cross brace arrangement is formed on all corners of the edge protection. Tube bracing is to connect the top of Post Attachment on one side to the bottom of the Post Attachment on the other.

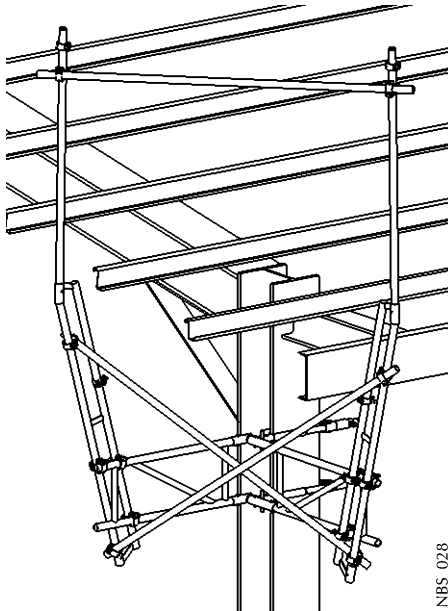


Figure 26. Mounting corner assembly/bracing

Mounting internal corner assembly

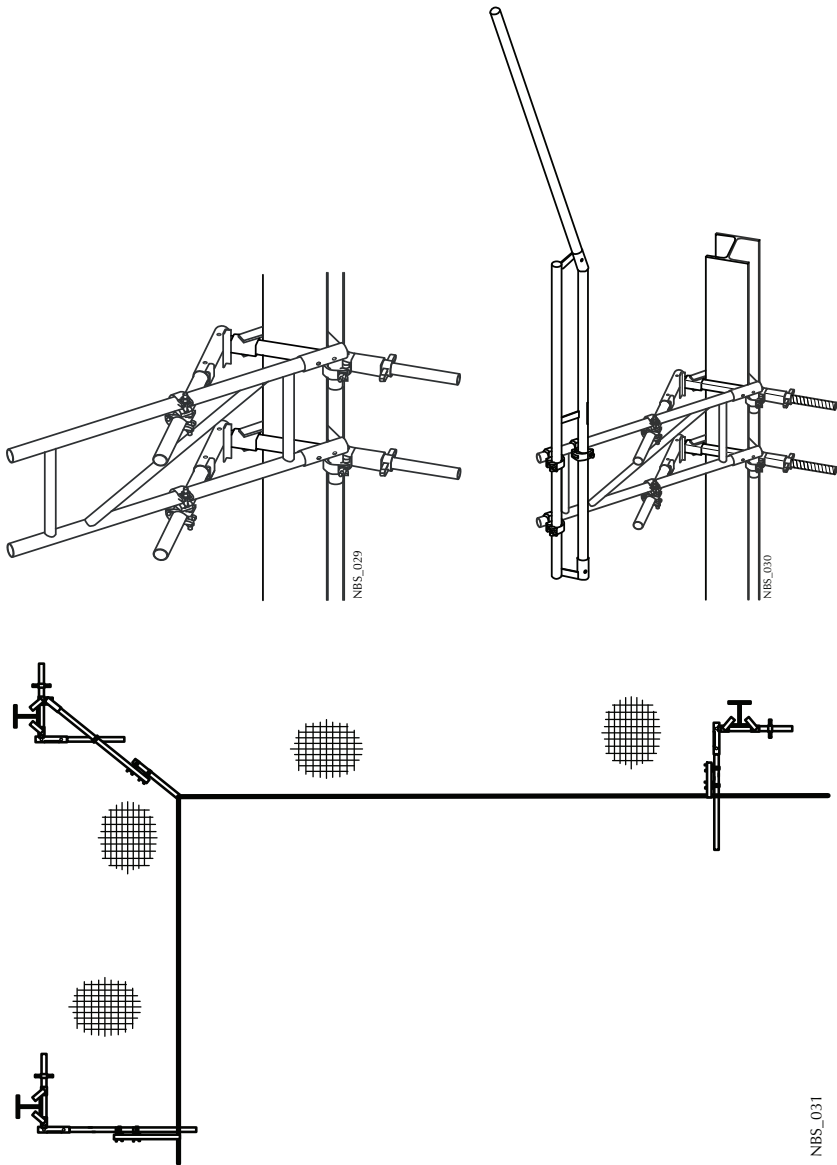


Figure 27. Mounting internal corner assembly

Reach limits

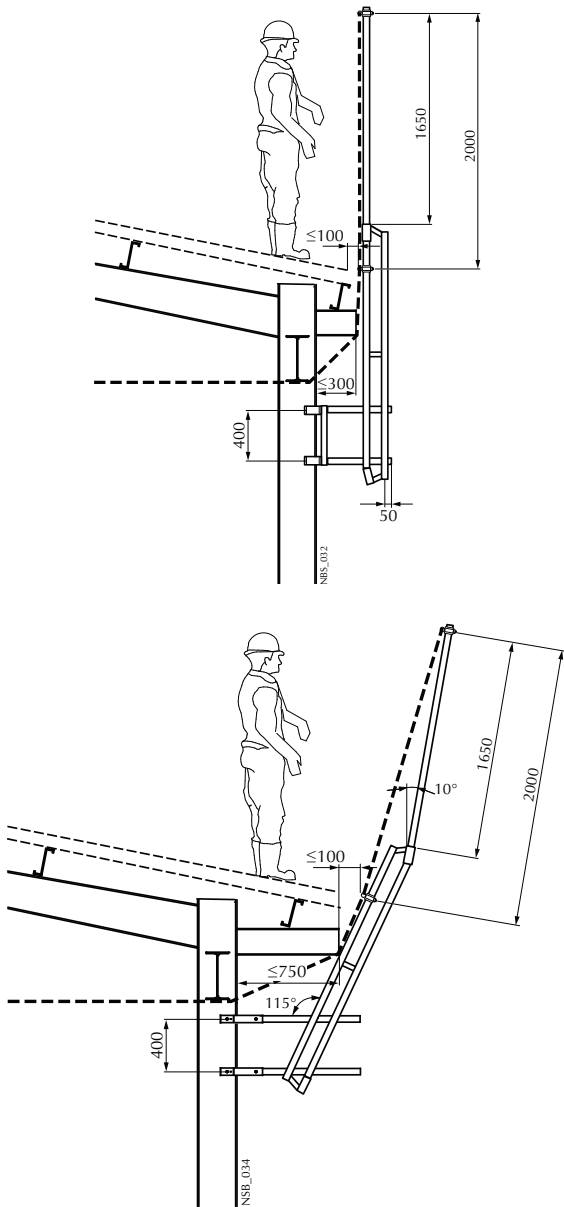


Figure 28. Reach limits

Reach limits contd.

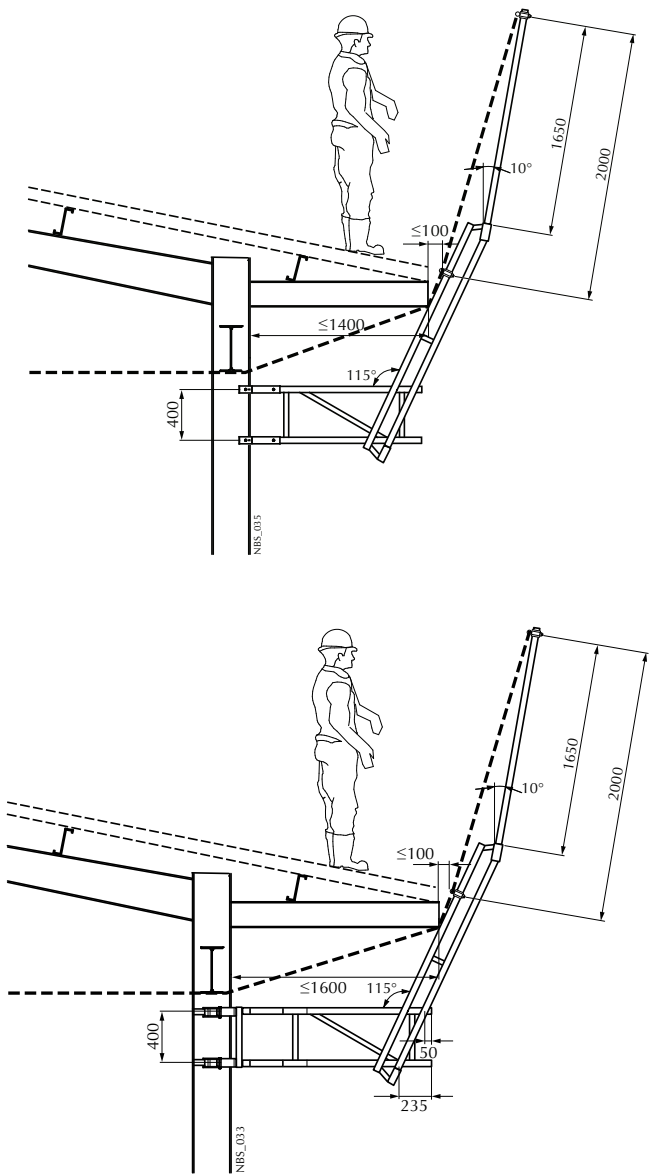


Figure 29. Reach limits contd.

Inspection

Checks and general visual inspection is strongly recommended to ensure that the Edge Protection is “fit for purpose”.

All Edge Protection must be inspected by a competent person:

- before first use
- after any major alteration
- after any event likely to have affected its suitability, e.g. fall of a person, strong winds, snow fall
- at regular intervals not exceeding seven days.

REMEMBER weather conditions can affect the tightness of bolts/clamps previously checked.

Regular inspection and safety checks

Must include:

- Tension in Perimeter Net.
- Height of edge protection at supports and midway between supports.
- Tension in perimeter ropes.
- Tightness of clamps and straps.
- Tightness of couplers.
- Missing items, vandalism and plant and wind damage to components and Nets.

Checklist for inspection of rigged Net Barrier System

- Check base structure and area of work for suitability.
- Meets the demands in EN 13374?
- Height of Perimeter Safety Net is at least 2 m from working surface (finished roof level) at support locations and 1.5 m midway between supports?
- Are the support/post centres within the 10 m allowable span?
- Are the roof overhangs within 1.4 m when using Steel Jaw Clamps and 1.6 m when using Strap Attachment?
- Are there 3 couplers connecting Post Attachment to Truss Beam (1.2 m), with 2 No. Couplers on top boom and 1 No. Coupler on bottom boom? Are the couplers manufactured to EN74-1 Class B?
- Check that the vertical distance of Net under the roof cantilever is within 1 m from the working platform (roof level).
- Check that the Perimeter Nets are manufactured to EN1263-1 Type S and their annual inspection is up to date.
- Check that all corners and stop ends are properly braced.
- Are cross brace tubes properly connected at corners?
- If the edge protection is covered with sheeting material, is it checked for wind loading?
- Are bolts and nuts tightened correctly?
- Check that the Perimeter Nets are bagged and tied to Roofing Nets or the structure at centres not exceeding 750 mm.
- Check that the angle of inclination of the Perimeter Net and Post does not exceed 15° (305 mm batter over 2 m height).
- Distance of Perimeter Net to the edge of the structure not to exceed 100 mm.
- Check that there are no gaps or unlaced butted joints in the Perimeter Nets.

Dismantling

When dismantling the edge protection, Nets are removed progressively from a safe working platform. Use of a MEWP (Mobile Elevated Working Platforms) is strongly recommended.

Zone off the area below and around the dismantling work.

Do not attempt to save time by dismantling a number of parts at the same time.

Maintenance

Safety checks

Safety checks are to be made before use and after dismantling and before parts are placed in the store.

Safety checks are to be carried out by competent personnel. Combisafe recommends that only competent personnel trained by us carry out the safety checks.

Check that:

- no parts are cut or joined
- no parts are buckled or heavily bent/damaged
- no new drill holes have been made
- no corrosion has occurred that can affect strength
- no visible cracks have occurred in welds or the material
- parts fit together, e.g. that Posts fit in the Net Barrier System consoles and that attachments and telescope arms fit in the Net Barrier System consoles.

Reconditioning

Repairs can be performed on parts that have been rejected by the safety check, according to the following conditions.

Reconditioning must be carried out by competent personnel. Combisafe recommends that only competent personnel trained by us carry out such work.

Recondition according to the following guidelines:

- Clean the parts.
- Only cold processing is permitted.
- Parts that after straightening show any indication of fracture may not be used, they must be scrapped instead.
- Replace damaged parts that cannot be reconditioned and parts that have been lost during handling.

Scrapping

Those parts identified during the safety checks and which have not been possible to recondition should be discarded and destroyed so that they cannot be used.

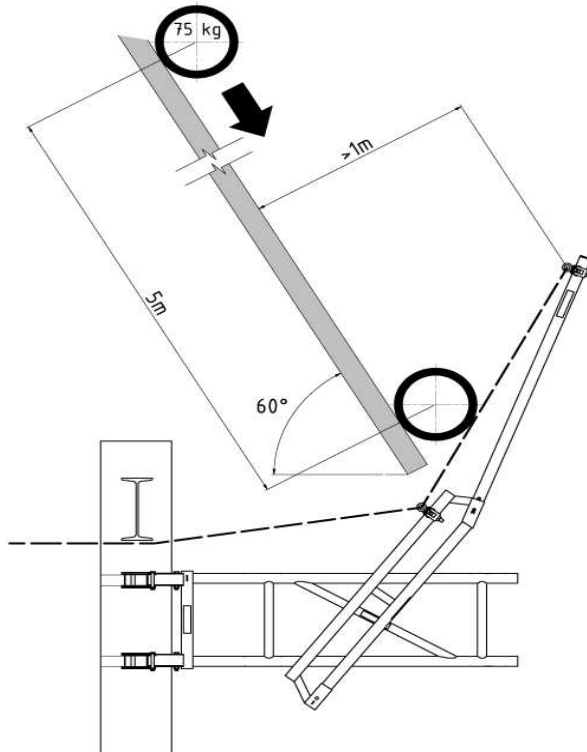
Most Combisafe products are manufactured of steel and can be scrapped as steel in their entirety. Some non conformity does occur, check with Combisafe if in doubt.

Storage

Store Combisafe products protected from external influences in a dry and ventilated area protected from the effects of the weather and from corrosive substances.

Testing

Tests and calculations have been carried out for the load case in EN 13374 class C according to picture below.



q_1 (working wind) $0,2\text{ kN/m}^2$

q_2 (max wind) $= 0,6\text{ kN/m}^2$

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