

## Working at height – A fall protection philosophy

Whether using personal fall protection equipment or not, there are two essential elements in the protection of persons working at a height. The first element is the **primary support** the person has and the second element is the **fall protection** measure employed. The fall protection measure chosen depends on the result of the hazard identification and risk assessment process. For example:

Scenario	Primary support	Fall protection
Work on a non-fragile roof	Roof	Scaffolding, providing edge protection
Erecting steel	MEWPs	Barrier <sup>1</sup>
Placing pre-cast units	Precast units positioned previously	Bean bags
Climbing a pylon	Step bolts	Vertical lifeline
Unloading a trailer	Trailer bed	Edge protection and/or bean bags
Fixing roof sheets	Adjacent roof sheets	Safety netting

Table 1 – Different fall protection measures

### Examples of work at height

The two photographs (below) give examples of work at height. The primary support is identified, along with the fall protection measure.



**Primary support:**

Non-fragile roof

**Fall protection:**

Scaffold edge protection; Safety net (below)



**Primary support:**

Precast plank

**Fall protection:**

Air bags

A number of other examples of work at height are given in the photographs following. These are used as examples in considering what constitutes the **primary support** and what constitutes the **fall protection**.

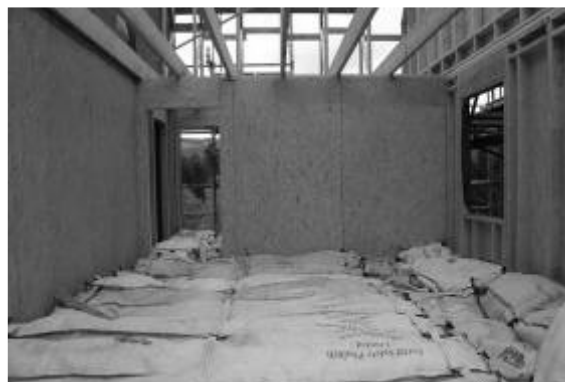
Some comments are added.

<sup>1</sup> Use of lanyard for restraint recommended. See: [www.ipaf.org](http://www.ipaf.org) (Document Ref. H10812).



Primary support: Ground  
 Fall protection: Not applicable

*Comment:* Work at height is eliminated.



Primary support: Platforms supported by ceiling joists  
 Fall protection: Crash mats ('bean bags')

*Comment:* These bags are set out 'low' and thus do not minimise the distance and consequence of a fall.



Primary support: Roof liner ('fully fixed')  
 Fall protection: Hand rail

*Comment:* The bottom gap is too large (common when the roof is curved) especially as the handrail is offset in plan; a third rail is required.



Primary support: Lining panel  
 Fall protection: Vertical safety net ('bagged' below gutter)

*Comment:* This netting does not **prevent** a fall, but does minimise the distance and consequences.



Primary support: Roof ('fully fixed')  
 Fall protection: Handrail

*Comment:* Protection is provided adjacent the handrail to protect the surface of the roof (In this instance, there are no roof lights to the right of the walkway).



Primary support: Elevated proprietary platform  
 Fall protection: Guardrail

*Comment:* As with all scaffolding, instruction and training in erection/dismantling are required (and any loading limitations understood).



Primary support: Flat bed of delivery truck  
 Fall protection: Handrail (side) and crash mat (rear)

*Comment: Access is via step-stairs, preferably. The handrail may need to be secured to the side of the flat-bed, or independently.*



Primary support: Steel girders  
 Fall protection: Safety netting

*Comment: Beam straddling is a 'last resort'. Decking-out should take place from a 'leading edge' (with any remaining edges protected).*



Primary support: Step bolts  
 Fall protection: Twin-tailed fall arrest lanyards

*Comment: Some pylons utilise a vertical guided-type fall arrester, e.g. wire, which provides continuous protection.*



Primary support: Step-stair  
 Fall protection: Guarded platform

*Comment: Ladders are normally 'bottom of the hierarchy'. It is usual not to work at the top of a stepladder. In this instance, the platform and guardrail has been designed to prevent falls.*



Primary support: MEWPs from floor slab  
 Fall protection: MEWP basket (and restraint lanyard)

*Comment: When working with MEWPs on pre-cast units check for damaged planks (as well as units that have been notched). In this state, the units are 'temporary works'.*



Primary support: MEWP (Scissor lift)  
 Fall protection: MEWP basket

*Comment: In this instance a worker fell through the adjacent roof light, not protected by the 'magic carpet'.*



Primary support: Walk-on netting  
 Fall protection: Secondary safety netting (below)

*Comment: In designing the walk-on netting account should be taken of 'local failure', i.e. does local failure of the system cause catastrophic and/or progressive failure of the walk-on netting?*



Primary support: Roof top  
 Fall protection: Raised edge

*Comment: The height of the perimeter upstand is too low. The roof light (left), shown covered, was "fragile" and damaged following a fall from height ('major injury').*





Primary support: Step-stairs  
 Fall protection: Guard rail

*Comment: Some manufacturers will design bespoke access platforms.*



Primary support: Flat bed  
 Fall protection: Guard rail (moveable or fixed)

*Comment: The edge protection needs to be such that it takes into account the maximum height of the load transported on the vehicle.*



Primary support: Step bolts  
 Fall protection: Twin-tailed fall arrest lanyards



Primary support: Ladder hook over roof  
 Fall protection: Twin-tailed lanyard (anchored as high as possible) and a temporary vertical lifeline.



Primary support: Working rope (and legs)  
Fall protection: Back-up rope

*Comment: Work positioning requires a back-up line (required at the point the working line is in tension and essential to maintaining position without falling)*



Primary support: Ladder stiles  
Fall protection: Vertical fall arrest system ('slider')

*Comment: See HSE Safety Warning: <http://www.hse.gov.uk/press/2004/e04074.htm>*



Primary support: Casualty's deployed lanyard  
Fall protection: None

*Comment: This is a **training** exercise and both the 'casualty' (right) and the 'rescuer' (left) have back-up systems. In the event of a real-life rescue the rescuer would descend using a rescue descender on a single rope (Where possible rescue should be planned to be undertaken remotely, with lowering preferred to raising).*

*A system may comprise a single rope where a risk assessment has demonstrated that the use of a second line would entail higher risk; in this instance, the distance to be climbed, weight of the rescue kit, managing the casualty unloading of the back-up rope if the back-up device becomes snagged, etc.*



Primary support: Work restraint lanyard (and legs)  
Fall protection: Fall arrest lanyard

*Comment: For the eagle-eyed, the helmet chin strap should be under the chin and not over the helmet!*



Primary support: MEWP  
 Fall protection: Platform guardrail

*Comment: This would normally be accepted to be 'collective protection'; although there is an argument that small single-user equipment is 'individual protection'.*



Primary support: Rooftop  
 Fall protection: Permanent horizontal anchor line (fall arrest system)

*Comment: The end-post position, and the lanyard length, should limit the distance to the edge in order to **prevent** a fall. Arguably, the anchor line could be designed for the smaller forces that occur during work restraint, but it is usual to take account of 'reasonably foreseeable misuse' and design it for fall arrest loadings.*



Primary support: Platform  
 Fall protection: Guardrails

*Comment: During erection, this platform utilises an 'advance guardrail'.*



Primary support: Platform  
 Fall protection: Guardrails

*Comment: This tower is erected using the 'through-the-trap' (3T) technique. The operative is protected, sat in the trap, whilst twisting to erect the handrails (there remains a risk of falling through the hatch to the level below).*



Primary support: Rooftop  
 Fall protection: Restraint lanyard

*Comment: The length of the lanyard ensures that a fall is **prevented**. Take care if an adjustable length lanyard is used! Consider whether additional supervision is required, as a supplementary control measure.*



Primary support: Tallescope  
 Fall protection: Basket/guardrail

*Comment: As with the small platform (above) there is an argument that the Tallescope is 'individual protection'. As with all kit, ensure that the user instructions are available and read. Stability may be an issue.*



Primary support: Tower structure  
 Fall protection: Fall arrest lanyards ('twin tailed')

*Comment: When at the place of work a work positioning lanyard may be used (retaining an energy absorbing lanyard as the back-up)*



Primary support: Gantry: an 'existing place of work'  
 Fall protection: ---

*Comment: No additional measures are required (the platform is already guarded)*





Primary support: Ladder  
Fall protection: None

*Comment: Sometimes referred to as a 'last resort' ladders are not banned! Their selection just needs to be appropriate to the use.*

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