NASC

NATIONAL ACCESS & SCAFFOLDING CONFEDERATION

Revision A - 14 September 2023
HSE foreword and endorsement added

SG4:22 Preventing Falls in Scaffolding Operations

Safety Guidance 4: 2022

A guide to good practice for tube and fitting and system scaffolding

November 2022

HSE

BUILDUK Trade Association Member

Preventing Falls in Scaffolding Operations

Safety Guidance 4: 2022

National Access and Scaffolding Confederation
4th Floor, 12 Bridewell Place, London EC4V 6AP
enquiries@nasc.org.uk
www.nasc.org.uk
Tel: 020 7822 7400

NATIONAL ACCESS & SCAFFOLDING CONFEDERATION

Published by:

National Access & Scaffolding Confederation (NASC)
4th Floor, 12 Bridewell Place
London EC4V 6AP
Tel: 020 7822 7400
Email: enquiries@nasc.org.uk
Website: www.nasc.org.uk

© NASC 2022

First published 2022

ISBN 978-0-9934076-6-6

Designed by
Steve Phillips

Illustrated by
Steve Phillips
Computer and Design Services Ltd.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publisher and copyright owner.

The preparation of this NASC Guide to Preventing Falls in Scaffolding was entrusted to The NASC SG4 Working Party by the Council of the National Access and Scaffolding Confederation.

Technical Author
Simon Hughes CMIOSH, MIIRSM
Simian Risk Management Limited

This guide takes the form of recommendations and guidance. It should not be quoted as if it were a specification. It does not purport to include all the necessary provisions for a contract and users are responsible for their application.

The guide has been written on the assumption that the execution of its provisions is entrusted to appropriately qualified and experienced people and that construction and supervision of scaffolds will be carried out by capable and experienced organisations.

NASC and Simian Risk Management Limited shall be under no liability of whatsoever kind however caused whether or not due to the negligence or wilful default of NASC or their servants or agents arising out of or in connection with this document or any part thereof.

Amendments issued since publication

Amd. No. 1

Date 14th September 2023

Comments
Updated front cover with details of amendments and HSE logo.
Added new ISBN number.
Added the HSE Foreword on page vii.
Added a note regarding double lanyards to figure 49, page 28.
Updated figure 79 on page 47, to more clearly illustrate a double lanyard.

Contents

Figures

Foreword

PROTECTING PEOPLE
AND PLACES

HSE

Falls from height continue to be the largest cause of fatal and life changing injuries for workers across industry. Scaffolders, when erecting, altering or dismantling scaffolding are regularly exposed to the risk of a fall. This safety guidance clearly shows that with proper planning, preparation, provision and use of the correct equipment and systems of work, the risk of a fall can be eliminated or minimised.

SG4 continues to represent the good practice established in previous editions, this update includes reordering the content to reflect the law relating to working at height.

HSE will not hesitate to take enforcement action against employers and scaffolding operatives who fail to comply with their legal obligations and place themselves and others at risk of injury when working at height. Please ensure you read this guidance, which represents a sensible and proportionate approach to managing health and safety, and take the appropriate steps to turn the guidance contained herein into action.

Michael Thomas
Acting HM Chief Inspector of Construction,
Health and Safety Executive

Foreword

The application of consistently high standards is key to both safety and productivity on construction projects.

Scaffolding professionals provide temporary working platforms and other structures that are used throughout the construction sector and they often face significant risks in establishing safe temporary access and work environments for other workers. Specialist construction trades, such as scaffolders, perform a vital role in our supply-chain and we all rely upon current industry guidance to establish, and maintain, safe working practices that have become the benchmark for our members' projects.

Written by NASC and industry experts, over the years this guidance has challenged industry practices and has clearly demonstrated an impact in saving lives and preventing serious injury. All scaffolding operatives should hold a current CISRS card and be trained to *SG4:22 Preventing Falls in Scaffolding Operations* which sets the standard across the UK.

Suzannah Nichol MBE
Chief Executive Build UK

Preface

As a long-serving member and current President of the NASC, I have experienced first-hand the positive influence this flagship guidance has had on our industry. I am delighted to have witnessed a sea change in the attitudes and behaviours of scaffolding contractors and their scaffolders towards all matters relating to health and safety, and particularly work at height. The contribution this guidance has made in helping our industry to become a more professional trade cannot be over emphasised. The true impact of SG4 is evidenced by the 87% reduction in the rate of falls from height by NASC members with 93 in 1999 to 12 in 2021, these statistics speak for themselves and provide a clear demonstration that SG4 works!

NASC acknowledges that a scaffolder's work is generally hazardous and this guidance accepts that employers have responsibility to ensure that adequate measures are provided for employees to eliminate or minimise the risks involved. The NASC works hard to promote safety, not only amongst its members but also clients, site owners and the general public. We must continue to support our clients to demand increasing compliance levels with this key industry safety guidance on sites they control. For those who choose not to comply, we must demand more frequent and robust levels of action from all stakeholders, including client organisations and the enforcing authorities, thereby maintaining continuous improvements in the Health, Safety and Wellbeing of everyone working on or impacted by construction sites.

This revision has been more of a fine-tuning following a systematic review of the guidance and understanding the realisation of substantial health and safety improvements in work areas previously targeted. The core principles of SG4 remain unchanged, albeit with continued emphasis on the 'SCAFFOLDERS' SAFE ZONE' method of working.

The guidance has also been updated to reflect recent advances within our industry and particularly the broadened scope of the new *TG20:21 Operational guide – A comprehensive guide to good practice for tube and fittings scaffolding*. The NASC and its members are continuing their drive to move the industry forward on matters relating to safety and consistency, and it is our intention that this revised document will enable scaffolding contractors to continue their demonstration of industry good practice.

Lynn Way
NASC President

Note
Illustrations used in this publication use the following colour code:
Yellow - featured components and equipment
Red - indicates active collective protection

Introduction

Falls from height account for almost half of the fatal accidents in the construction sector. Falling from height is a significant risk faced by scaffolders when erecting, altering or dismantling scaffolding during most scaffolding operations.

The NASC and HSE acknowledges that scaffolders have to work in hazardous situations, and this guidance note accepts that employers have a responsibility to ensure that adequate measures are provided for employees during scaffolding operations to eliminate or minimise those risks.

The scaffolding industry has seen significant improvement over the last twenty years in working practices for improving health and safety performance. However, it remains evident that large elements of our industry continue to accept standards of work and levels of risk that fails to meet the minimum legal requirements and established industry good practice, exposing workers and others to significant risk of injury. NASC and its membership are committed to promoting good practice through our published guidance.

In recognition of the significant hazards and risks that scaffolders are exposed to day to day, the NASC have produced this edition of Safety Guidance Number 4 (SG4) as 'scaffolding industry good practice' for work at height. This updated guidance reflects the challenges facing our industry through new fall protection technology, updated Technical Guidance (TG20) and changing methods of construction and maintenance.

The NASC also recognises that statistics[1] have shown falls from height rarely involve scaffolders from our membership who are working from scaffold structures they have constructed themselves. We also recognise that the instances of fatal and RIDDOR[2] specified injuries resulting from falls of scaffolders have significantly reduced since the introduction of SG4 in the mid-1990s. The previous revisions of SG4 in 2000, 2005, 2010 and again in 2015 have seen changes to the methods of working that have been adopted by the industry.

NASC members accident statistics have shown that since 2000 there has been an 87% reduction in the number of falls recorded from scaffolding operations – from 93 in 1999 to 12 in 2021. This reduction is more remarkable when you consider there has been a 46% increase in the number of operatives working within the NASC membership, which represents an 88% reduction in the accident frequency rate during this period (*Figure 1*).

Note 1:
Figures obtained from NASC members' accident returns and annual safety report 1999-2021.

Note 2:
Reporting of injuries, diseases and dangerous occurrences regulations 2013.

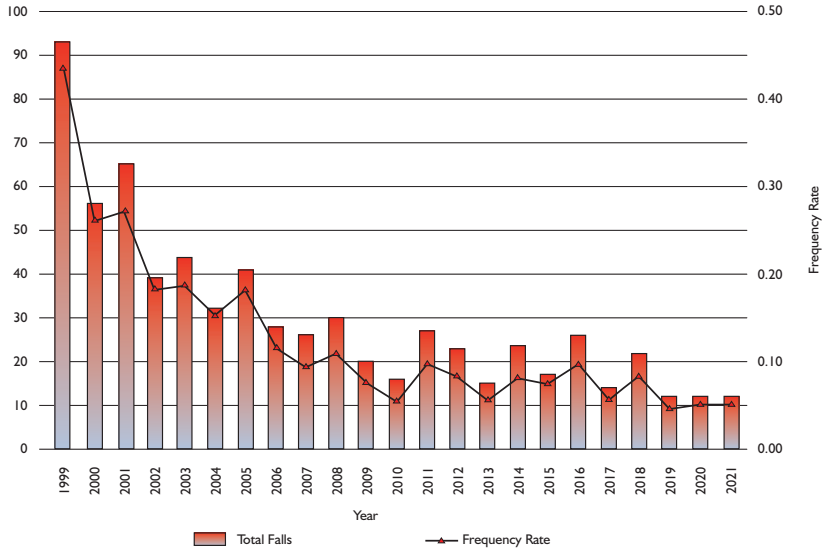


Figure 1: NASC Members' Falls from Height 1999-2021.

The aim of this document remains the same and is to illustrate current preventative and protective measures which represent good industry practice that could be utilised when establishing safe systems of work to prevent and protect against falls from height during scaffolding operations. This edition of SG4 continues to focus on the measures scaffolding contractors and scaffolders have to take to create a **scaffolders' safe zone** where they are suitably protected against the risk of falling. The key priority and objective for scaffolders is to establish collective protection by creating a scaffolders' safe zone and therefore minimising the time exposed to a fall risk and reliance upon personal fall protection equipment (safety harnesses). The introduction of these collective methods of working will not completely remove the risk of a fall in all situations, therefore the NASC recognises that scaffolders will still be required to wear and use personal fall protection equipment in accordance with this Safety Guidance when working at height.

SECTION 01

Employers have legal duties to provide safe systems of work for employees and to carry out suitable and sufficient assessment of the risks to the health and safety of employees and others. This management guidance note is designed to be used as reference by employers, clients, designers, contractors and enforcing authorities when preparing and reviewing risk assessments for the erection, alteration and dismantling of temporary access and other structures by scaffolders. This guidance note is again supported by a user guide (SG4:You) to provide essential information to scaffolders in a user-friendly format. Other information and training aids are available via the NASC website (www.nasc.org.uk).

The types of structure, nature of work and environmental conditions vary considerably within the scaffolding trade. However, within the guidance the NASC has endeavoured to:

- Explain the legal requirements for work at height;
- Identify and explain the significant hazards that scaffolders are exposed to during typical scaffolding operations;
- Highlight practical solutions available to control the risks that arise from those hazards.

This guidance is not exhaustive and does not feature every scaffolding operation. However, it has been designed so that the basic principles contained within this document can be applied as solutions to most scaffolding operations.

Contractor fined for unsafe working

A concerned member of the public sent pictures of scaffolders working unsafely to the HSE.

The subsequent HSE investigation resulted in a prosecution based on the photographic evidence and the blatant safety failings. Magistrates were told there was nothing in place to prevent or mitigate them falling. HSE established that the work was poorly planned and managed, and two of the three-man scaffolding gang were lacking in training and accreditation to prove their competence.

The scaffolding contractor was fined £5,000 and ordered to pay £734 in costs.

Source: HSE

Planning for work at height

'Work at height' is defined by the Work at Height Regulations 2005 as 'work in any place... where, if measures required by these Regulations were not taken, a person could fall a distance liable to cause personal injury'. The Work at Height Regulations do not specify a distance that a person could fall before specific precautions must be taken.

Before scaffolders undertake work at height, it is essential to consider the work to be performed, taking account of any foreseeable hazards arising from that work and establish control measures to be implemented. This will ensure the safety of scaffolders and others that may be affected by scaffolding operations. It is essential that a competent person carries out a suitable risk assessment and prepares the method statement. For guidance reference should be made to NASC Safety Guidance 7 (SG7) Risk Assessments and Method Statements (RAMS). The more complex or hazardous the scaffolding structure, then the more detail needs to be identified within the planning and preparation of the RAMS.

Planning for work at height must consider the hierarchy of preventative and protective measures that are central to the Work at Height Regulations (WAHR), summarised as follows:

I. Avoid work at height

By virtue of the fact that a scaffolding contractor has been engaged, usually means that another party has made the decision not to avoid work at height (e.g. Client, Designer or Contractor). There are few options available to the scaffolding industry which enable the task to be performed without working at height e.g. fixing guardrails to precast stair sections at ground level before craning them into place, thus avoiding the need for the scaffolder to work at height (*Figure 2*).

However, there is greater opportunity to eliminate the need to work at height at the design and planning stages of a project by designers and principal contractors e.g. the pre-assembling of guardrails to steel beams prior to being installed by the steel erectors will eliminate the need for scaffolders to install the edge protection at height (*Figure 3*).

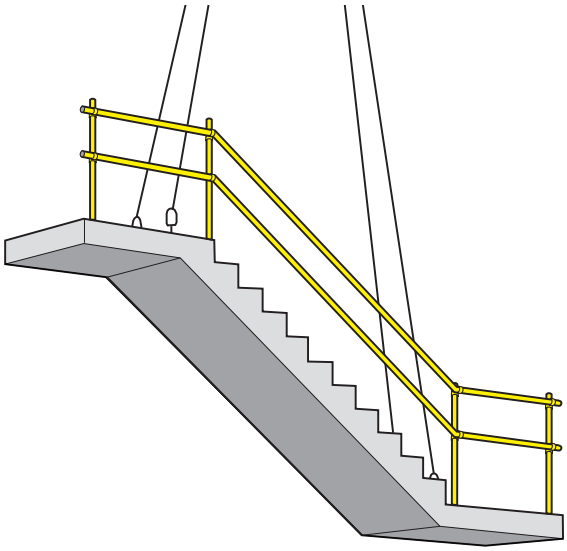


Figure 2: Guardrails attached to pre-cast concrete staircase sections before being lifted into place.

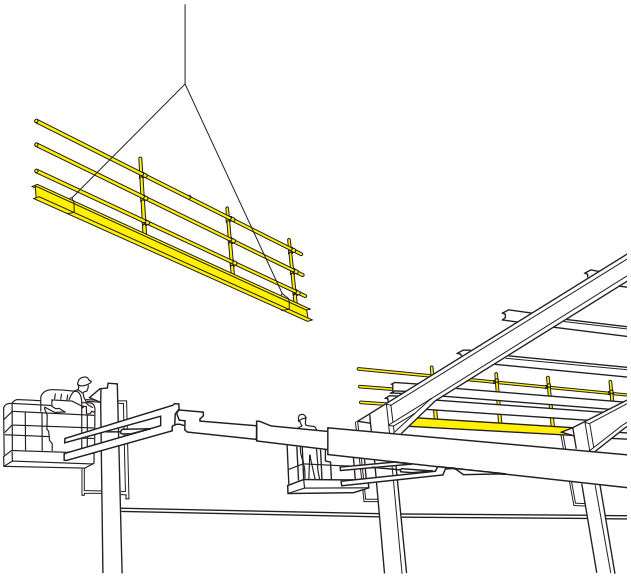


Figure 3: Pre-assembled guardrails – fixed to structural steel-work ('I' beams) prior to craning into position.

In some cases, innovative temporary works design for scaffolding structures can avoid certain higher risk aspects of work at height in the erection or dismantling sequence, thus reducing the risk of a fall by scaffolders. For example, assembling complex elements of a structure on the ground before lifting into position by crane (see *Figure 4* – example of pre-assembled modular sections of scaffolding erected on the ground and lifted into place to avoid erection at height and the associated risk).

Figure 4: Example of pre-assembled modular sections of complex scaffolding lifted into place to avoid significant risks associated with working at height.

If avoiding work at height is not possible then you must consider the next stage of the hierarchy – prevent falls.

II. Prevent falls

Scaffolding contractors should consider measures that create a safe zone (*Figure 5*) by preventing falls from height, such as providing adequate work platforms with suitable guardrails or other collective measures (see Section 4 – Collective Fall Prevention), before resorting to personal fall protection equipment as the primary means of protection (see Section 5 – Personal Fall Protection). Scaffolders are not permitted to work at height while being exposed to a risk of a fall, without taking appropriate actions to prevent or protect against a fall from height.

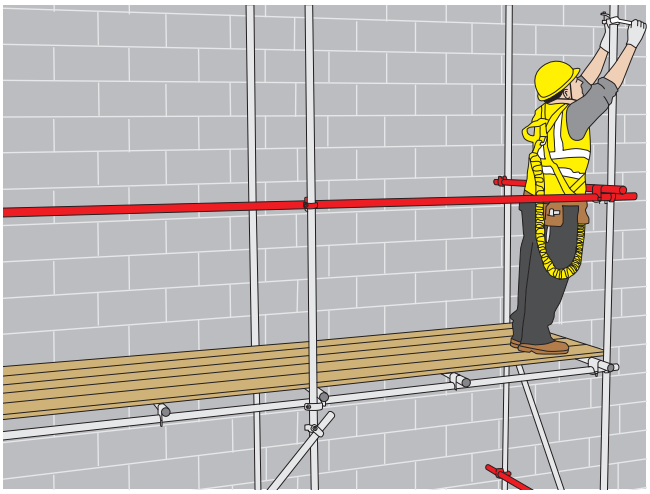


Figure 5: Scaffolder protected by a guardrail in the scaffolders' safe zone.

III. Mitigate the distance and consequences of a fall

Whatever methods of work are chosen, if it is not reasonably practicable to prevent a fall, then both the distance and the consequences of a potential fall must be minimised. For example, if a fall arrest harness is used with a fixed length lanyard then it should be attached to a suitable anchor point as high above the working platform as practicable, then should a fall occur the distance would be minimal compared with an attachment at foot level.

IV. Collective over personal protection

At all stages in the WAHR hierarchy (*Figure 6*), scaffolding contractors must consider collective protection over personal protection. This means using measures that protect everyone working at height at all times, (e.g. guardrails or other collective measures) before specifying personal fall arrest equipment (e.g. safety harnesses) as the primary control measure.

For collective protection in scaffolding operations see Section 4 – Collective fall protection.

The use of personal fall protection equipment (safety harnesses) requires discipline from the users to ensure they are used correctly. Scaffolders must wear and use harnesses when they are exposed to a risk of falling and are not protected by the collective measures in a scaffolders' safe zone. It is not acceptable for scaffolders to be working at height and be exposed to a risk of a fall that could cause personal injury, without, as a minimum, being clipped on to a suitable anchor-point.

In simple terms, when working at height, scaffolders must not traverse or climb the scaffolding structure without suitable collective or personal fall protection in place and the law requires that preference should be given to using collective measures first.

WORK AT HEIGHT REGULATIONS 2005 HIERARCHY OF CONTROLS

Avoid work at height

Avoid work at height so far as is reasonably practicable:

- Not normally an option for the scaffolding contractor.
- Designers and principal contractors should identify opportunities to avoid work at height.
- Scaffolding contractors should promote innovations to their clients that can avoid work at height.

Prevent falls

GIVE COLLECTIVE PROTECTION PRIORITY OVER PERSONAL PROTECTION

Where it is not reasonably practicable to avoid work at height you should:

- Prevent all falls from height where there is a risk of injury, irrespective of the height.
- Consider collective fall protection measures to create a safe zone before resorting to personal fall protection equipment such as harnesses and lanyards.
- Establish a **scaffolders' safe zone** with a boarded platform and guardrail protection, as a priority, to prevent falls occurring.

Mitigate the distance and consequences of a fall

GIVE COLLECTIVE PROTECTION PRIORITY OVER PERSONAL PROTECTION

Where it is not reasonably practicable to avoid or prevent falls; then,

- The distance a person can fall and the consequences (potential injury) must be minimised.
- Collective protection in the form of soft landing systems (e.g. soft landing bags, air-bags and safety nets) are not commonly a practical solution for scaffolding.
- Personal fall protection systems (safety harnesses) **MUST** be worn and attached to a suitable anchor point when at risk of a fall in accordance with this guide.

Figure 6: This diagram is a simple illustration of how the 'Work at Height Regulations 2005 Hierarchy of Controls' could be interpreted for scaffolding operations.

SECTION 02

2.1 Competence and capability

The Work at Height Regulations require that any person who carries out work at height is deemed competent to do so by their employer (Regulation 5). Competence is defined as a combination of relevant practical and theoretical knowledge, training and experience. Scaffolders should be selected who have appropriate attitude, aptitude, fitness, training, knowledge and experience for the particular work to be completed. When considering scaffolder competence reference should be made to the Construction Industry Scaffolders' Record Scheme (CISRS). The scaffolders competence and CISRS record cards should be relevant to the work being undertaken (e.g. Scaffolder or Advanced Scaffolder) and current, as they require renewal every five years (*Figure 7*).

When allocating work at height duties, employers must consider the competence and capabilities of all members of the working party. Each gang should be led by a Scaffolder or Advanced Scaffolder. Inexperienced or trainee scaffolders who are working towards their industry accredited qualifications must work under the supervision of a competent scaffolder. Employers must also consider the limited skills of labourers and trainee scaffolders by restricting work at height activities until they have been assessed as competent and hold the appropriate Scaffolder or Advanced Scaffolder CISRS record card.

Figure 7: CISRS cards.

Trainee scaffolder killed in 18 metre fall from unsafe scaffold

A 17 year old trainee scaffolder was tragically killed when he fell approximately 18 metres while erecting an access birdcage scaffold.

In the subsequent prosecution by the Health and Safety Executive (HSE), the court heard that the scaffold was constructed with incomplete working platforms, a lack of guardrails and inadequate ladder access. The competence and supervision of the scaffolding gang was also insufficient. Other issues included were inadequacies regarding the use of personal fall protection equipment (harnesses).

The supervisor was found guilty of failing to take reasonable care for the health and safety of others affected by his acts or omissions at work (HSW Act 1974, Section 7(1)). He was fined £7,500 and ordered to pay £15,000 in costs.

Three companies were prosecuted (including the scaffolding contractor) with fines totalling £217,500 plus £125,000 costs.

Source: HSE

2.2 Training and instruction

All scaffolders should have received appropriate and recorded training in the requirements of this safety guidance, together with any specific instructions to be followed for a particular task (e.g. method(s) for creating the scaffolders' safe zone, other protective measures, the rescue plan etc.) in accordance with the risk assessment and method statement.

Employers must ensure training and instruction is provided for any new fall protection equipment or rescue equipment introduced to the workers. Training should be properly organised and include both theory and practical elements. Line-management responsible for the supervision and monitoring of scaffolding operations also need training to raise their level of awareness of the requirements for work at height. Induction training and toolbox talk programmes should be used by employers to reinforce the requirements of SG4 and maintain levels of awareness with scaffolding operatives. In addition, employers should also ensure that refresher training is provided periodically and records kept.

Other operatives supporting scaffolding operations (such as labourers) who are required to work at height must be provided with safe access and egress and safe working platforms complete with guardrails and toeboards to the equivalent standard of a completed scaffold structure.

Labourers should receive basic skills and safety awareness training through the CISRS operative training scheme (COTS).

Trainee scaffolders and apprentices may work at height in accordance with the training and instruction received and only under the direct supervision of a competent scaffolder (see supervision below).

2.3 Supervision

Employers should ensure appropriate levels of competent supervision are provided when considering the nature of the work and competence of the scaffolders involved.

Supervision on site may be full-time or a visiting role. The NASC recognises that the core skills required for supervision in contract scaffolding are covered by the Construction Industry Scaffolders' Record Scheme (CISRS) scaffolding supervisor training course.

However, typically the designated role of a 'Supervisor' in scaffolding, due to the peripatetic nature of the industry, is often a visiting role where they may look after several sites or gangs which are visited periodically. For example, a Supervisor would be responsible for a number of sites or gangs, each gang should have a nominated Charge-hand Scaffolder. The Charge-hand Scaffolder would be responsible for supervising the activities of the gang. For a large site with a number of gangs there may also be a nominated Lead Scaffolder in either a working or non-working capacity (e.g. dedicated to supervisory duties). The NASC recommends that records of supervisory visits are retained.

Inexperienced workers require a higher degree of supervision, direction and control. Trainees should be periodically assessed to determine their knowledge, experience and individual capability and must work under the direct supervision of a qualified scaffolder, who must be made aware of any limitations by their Chargehand Scaffolder, Supervisor or Manager. For example, a newly appointed trainee scaffolder, in the early stages of their development may be restricted from certain higher risk activities until formal training has been completed and training records updated. For further information on scaffolder training and assessment refer to the CISRS general information booklet (CAP609) – www.cisrs.org.uk.

Employers who gain high degrees of employee co-operation and compliance also demonstrate a positive attitude, management commitment to safety and effective supervisory control. Engaging with employees and soliciting their opinion can help encourage support for safety initiatives and greater co-operation.

Apprentice injured following scaffolding fall

A scaffolding firm has been fined £100,000 for breaching safety regulations after an apprentice suffered a number of injuries following a fall from scaffolding.

The apprentice was working on scaffolding at a construction site when his foot became caught between the scaffolding and loading bay whilst passing materials to a colleague. This caused him to fall backwards under a single guard rail and subsequently fall 4 feet to the ground. From the accident the 16-year-old suffered from injured ribs, a broken wrist, a fractured cheekbone and required thirteen stitches above his left eye.

An investigation carried out by the Health & Safety Executive (HSE) found that the scaffolding company had failed to include an intermediate guard-rail or toe board on the loading bay edge protection, which could have prevented the apprentice's foot from becoming caught in the first place.

The case was heard at the Magistrates' Court, during which the scaffolding company plead guilty to the breach of Regulation 8(a) of the Work at Height Regulations 2005, and was ultimately fined a substantial penalty of £100,000 plus HSE investigation costs recovered under 'Fee for Intervention' or 'FFI', The Health and Safety and Nuclear (Fees) Regulations.

SECTION 02

2.4 Site inspection and risk assessment

When carrying out a risk assessment, it is recommended that an inspection of the site is undertaken by a suitably competent person before work commences. The purpose of the assessment is to take due account of all foreseeable hazards in the workplace, in addition to any commercial considerations for the job. The risk assessment must identify all the preventative and protective control measures required to eliminate or reduce the risk of injury. These controls should then be recorded in the scaffolding risk assessment and method statement documents (RAMS). See NASC Safety Guidance 7 (SG7) *Risk Assessments and Method Statements*.

When selecting the most suitable preventative and protective measures as part of the risk assessment process, the primary consideration should always be safety of employees and others. However, employers should take into account; the logistical effort, productivity and financial impact of using the methods selected.

Due considerations need to be made to safeguard against falls from height whilst surveying a location for scaffolding e.g. accessing roofs, refurbishment work, emergency protection, retention or shoring scaffolds for dangerous buildings etc. Many employers are using technology to survey buildings and other structures at height to avoid the need to work at height. This technology includes long-reach pole cameras, laser measures, digital mapping, drones and building information modelling (BIM).

2.5 Rescue planning

Arrangements for emergencies and rescue from height also need to be considered as part of the planning and risk assessment for each task by employers. It is a legal requirement for scaffolding contractors and their clients to address the need for timely evacuation and rescue in an emergency when working at height. See further information for rescue planning in Section 7 and in NASC Safety Guidance 19 (SG19) – *A Guide to Formulating a Rescue Plan.*

2.6 Collective fall protection (Third party)

This guidance focuses on the various methods of creating and using collective fall protection for scaffolding operations (erecting, altering and dismantling). In certain situations both the scaffolders and the users of the scaffolding could be faced with a risk of a fall, where protection measures may be the responsibility of a third party to establish and maintain. For example, the Principal Contractor may be responsible for ensuring that safety netting is rigged for roof work or internal safety decking is provided for brickwork, which will also offer protection for falls from the external scaffolding.

Collective fall arrest systems are commonplace throughout the construction industry (e.g. safety nets, soft landing systems, platform decking etc.), however their application in routine scaffolding operations is limited. Employers must co-operate and co-ordinate activities to ensure such third-party fall protection measures are in place and are suitable before work at height can continue. Otherwise scaffolding contractors would have to ensure suitable alternative protection is provided, such as temporary guardrails installed.

Use of technology to avoid work at height

Scaffolding contractors are embracing technology to avoid work at height and the associated risks when undertaking site surveys, inspections and risk assessments for scaffolding operations. Site wide features can be assessed using internet-based maps and street views from the comfort of an office. Drone images allow surveys to be undertaken from the ground without the need to work at height. Digital mapping using drones and laser scanners enable the use of 3D modelling software for existing building to establish millimetre-accurate dimensions without manual measurements at height.

2.7 Weather conditions

Weather conditions must be considered as part of the risk assessment and planning for work at height. Adverse weather conditions can significantly increase the risk of a fall when scaffolding at height e.g. lightning, high winds, rain, snow, ice and extreme temperatures. High winds and icy or wet surfaces can be especially hazardous. The employer's risk assessment should consider all aspects of working in adverse weather conditions, and not just simply specify protective clothing, footwear or sun cream.

2.8 Fragile Surfaces

Erecting scaffolding to existing buildings often presents the risk of falls through fragile surfaces (e.g. cement fibre roofs or fragile rooflights). Every year scaffolders are killed or seriously injured falling through fragile roofs or rooflights.

Site surveys as part of the employer's risk assessment process should consider the risks associated with falls through potentially fragile surfaces. When planning for work on or near fragile surfaces the client and contractors should work closely together to agree arrangements for managing the risk.

Scaffolders should be made aware of the general risks associated with fragile roofs through awareness and occupational skills training (such as the CISRS scheme). Where scaffolders are working at height and identify the presence of a potential fragile surface hazard, not previously identified in the planning stages, they should stop work and report to their employer so that suitable protective measures can be implemented.

The WAHR (Regulation 9) places duties on employers and is summarised in *Figure 8* below:

WORK AT HEIGHT REGULATIONS 2005 – Regulation 9 Fragile Surfaces

Avoid fragile surfaces

Avoid accessing near, across or on fragile surfaces:

- Planning to consider alternative methods of work that avoid the risks from fragile surfaces.
- Working from a MEWP above or below the surface.

Prevent falls

Prevent falls through fragile surfaces:

- Provide platforms, coverings, guardrails, or similar protection to prevent falls through fragile surfaces.
- Work from stagings or platforms with guardrails.
- Use a harness system to prevent access on or near a fragile surface (work restraint).

Mitigate falls

Mitigate falls through fragile surfaces:

- Mitigate falls where scaffolders are providing coverings, platforms, guardrails etc to protect other workers.
- Take suitable and sufficient steps to minimise the consequences and distance of a fall through a fragile surface.
- Install safety netting or protection decking below the surface.
- Use a harness system with adequate anchorage points (fall arrest).

Warnings

Provide instructions and warnings:

- All roofs accessed by scaffolders should be treated as fragile until a competent person has confirmed they are not!
- Post warning signs on the approaches to the fragile surface area.
- Scaffolders to receive specific information, instruction and training before commencing the work on or near a fragile surface (e.g. pre-work briefing of the RAMS, training in the use of equipment etc.).

Figure 8: Summary of Regulation 9 of the Work at Height Regulations 2005 for fragile surfaces.

SECTION 02

Occasionally scaffolders need to access or work on roofs, where there is a risk of a fall through a fragile surface, such as cement roof sheets or fragile roof lights. Clients should provide all available information regarding fragile roof surfaces to the scaffolding contractor. Scaffolders must not walk on or next to fragile materials unless fall prevention or fall mitigation measures are in place and used. These may include one or a combination of; barriers, covers, crawling boards, personal fall protection systems (safety harnesses). Where it is not practical to cover the fragile materials, fall arrest safety nets (*Figure 9*) or similar collective protection (*Figure 10*) could be used on the underside of the structure to protect against any such fall. Where collective fall arrest systems are chosen, they must be installed in accordance with manufacturers' instructions and any recognised training scheme.

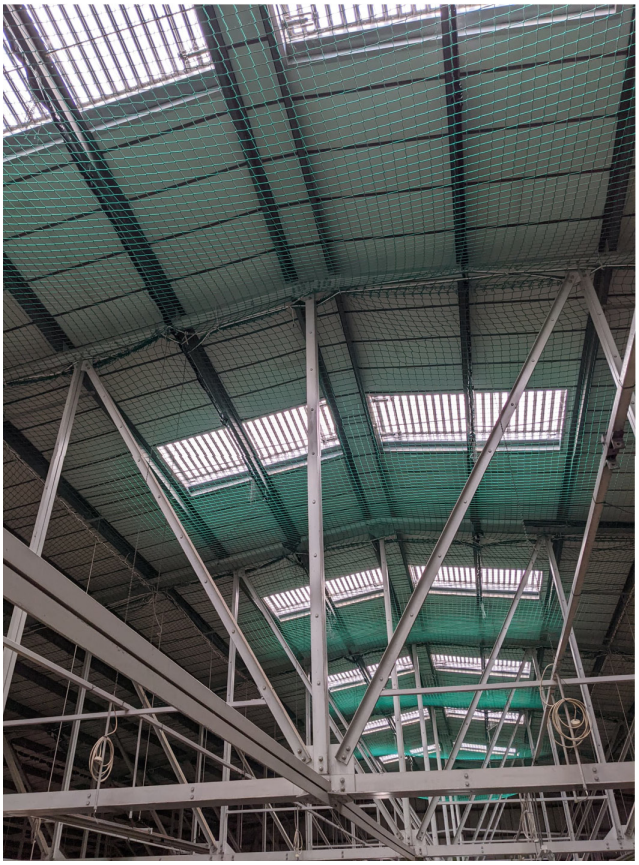


Figure 9: Example of protective measures for fragile surfaces with safety netting rigged below the roof surface. Source: FASET.

Scaffolder fell to his death through fragile roof

A scaffolding firm and a roofing contractor have been prosecuted by the HSE after a 26 year old scaffolder died following a fall through a fragile roof during construction work at a factory.

The Crown Court heard how a scaffold company employee was fatally injured after falling approximately 11.5 metres through a fragile roof. The employee was working on the asbestos cement roof to move and fit temporary scaffold guardrails as part of a roof refurbishment project at the site.

An investigation by the Health and Safety Executive (HSE) found that the scaffolding contractor failed to ensure the health and safety of his employees in relation to the work taking place on the fragile roof at the site. The investigation also found that a roofing contractor who was in overall control of the roof refurbishment project, failed to ensure that people not in its employment were not exposed to risks arising from work on the fragile roof.

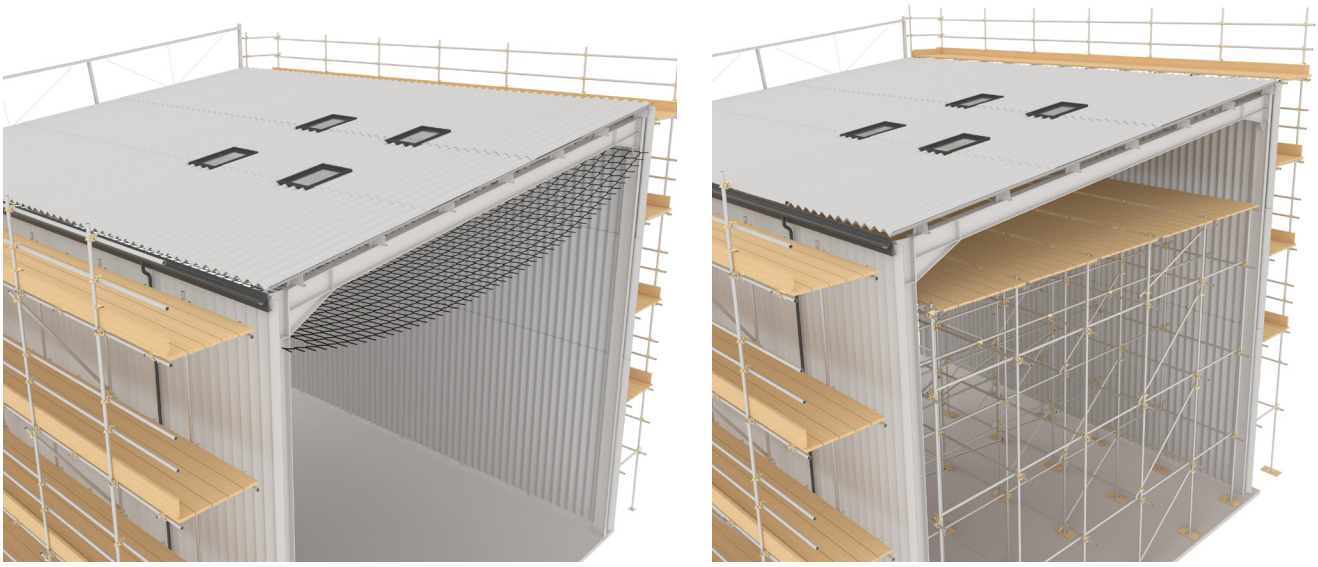
Speaking after the hearing, the HSE inspector said:

"Falls through fragile roof materials remain one of the most common causes of work-related fatalities during construction work. These risks are well known, and the required control measures well documented in both HSE and industry guidance. This was a tragic and wholly avoidable accident that led to the death of a young man. This death could easily have been prevented if suitable safe systems of work had been in place."

The owner of the scaffolding business pleaded guilty to breaching Section 2(1) of the Health and Safety at Work etc. Act 1974. He was sentenced to six months imprisonment suspended for two years, 180 hours of unpaid community service and ordered to pay costs of £14,000.

The Stourbridge-based roofing contractor pleaded guilty to breaching Section 3(1) of the Health and Safety at Work etc. Act 1974 and was fined in excess of £41,000 plus £33,000 costs.

Source: SIMIAN



(i) (ii)

Figure 10: Cross-sections showing examples of collective fall arrest below fragile surfaces, (i) fall arrest safety netting and (ii) birdcage protection deck.

2.9 Temporary works design

When designing scaffolding structures, engineers have a duty as designers under the Construction (Design and Management) Regulations (regulations 9 and 11) to consider the risks to health and safety of those who erect, alter and dismantle temporary works and those who use the equipment. Section 2 of BS 5975 is a code of practice for procedural control of temporary works that can be used to assist the management of all construction temporary works, including access scaffolding. Many clients and contractors already follow BS 5975 procedures as they assist the parties to ensure that all aspects of the procurement, design and use of temporary structures is suitable.

Designs and calculations should consider fall protection measures that will form part of the scaffolding structure and those used during scaffolding operations e.g. scaffolders' guardrails, transoms for non-working lifts and guardrails for internal fall hazards, where appropriate. Also ensuring compliance with the relevant generally recognised standards to ensure scaffolds are suitably secured and stable i.e. British and European Standards, NASC Technical Guidance notes (including TG20 compliance sheets for tube and fitting scaffolds) and manufacturers' instruction manuals for proprietary equipment.

The use of digital design technology, such as BIM and 3D modelling software now allows engineers to identify significant hazards and hazardous build sequences as part of their design risk assessment process. This technology better enables engineers to design-in fall prevention and protection solutions at design stage and to provide accurate details, animations and images to assist employers with the operational risk assessments and method statements.

Designers must include adequate health and safety information about significant hazards that remain in the design and the resulting risks. It is good design practice for scaffolding designers to highlight on the drawings any known significant hazards or hazardous work sequences critical to the design that require particular consideration. Caution signs and notes are commonly used to draw attention to important detail (*Figure 11*). TG20 compliance sheets and manufacturers' instructions should also include health and safety information from the designers. Residual risk from the design and the control measures established should be included in the operational risk assessment and method statement (RAMS) by the scaffolding contractor and communicated to the scaffolders before commencing the work.

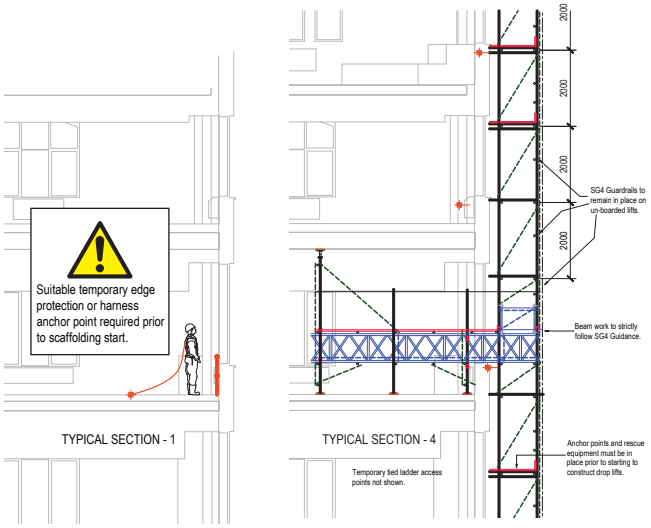


Figure 11: Extract from a drawing showing hazard warning. Source: MSS.

2.10 Scaffolding operatives' responsibilities

All employees have legal duties under health and safety law to take reasonable care of themselves and others who may be affected by what they do, or fail to do, at work and to co-operate with their employer to enable them to carry out their duties. Serious breaches of health and safety law by employees can result in them being personally prosecuted with fines and possible imprisonment.

With particular consideration for working at height and the potential hazards involved, scaffolders should always:

- take positive steps to understand the hazards involved and requirements of the risk assessment and method statement (RAMS);
- utilise techniques and equipment provided to prevent or protect against falls, in accordance with instruction and training received and not to act in a reckless or careless manner;
- establish a scaffolders' safe zone, wherever possible, as the priority when working at height;
- not tamper with or modify equipment provided, or use equipment that is not authorised by the employer;
- check fall arrest equipment daily and report to their employer any damaged or defective equipment identified, for example badly worn or cut webbing on a harness or lanyard;
- report to their employer any additional or emergent hazards not previously considered so that appropriate corrective actions can be taken to avoid any potential incidents;
- not work at height if affected by drugs or alcohol (including prescription medication that may affect ability to work safely);
- inform employers of any medical condition that may affect ability to work safely at height.

Daredevil scaffolder avoids jail

An experienced Scaffolder was seen working at a height of approximately 20m without using any fall protection measures, was spared jail after a court heard that his actions were 'a moment of stupidity'. At the Magistrates Court, the scaffolder was told that his actions… posed a risk to himself and to others during scaffolding work in a busy city centre. He was not working to established industry guidance and although he was wearing a safety harness it was not attached to the scaffolding. He made his way safely down from the scaffold, only to learn later that his actions had been spotted by a former HSE Inspector, who took a photograph.
His employer had demonstrated with records that the correct safety equipment, ample training and sufficient time, so that he was not under pressure to complete the scaffolding work quickly.
Speaking after the case, the Health and Safety Executive said, "This result goes to show the HSE will prosecute where we see people being put at risk or killed. We are grateful to the court for recognising that, while no one was hurt, the potential risk of harm or death was very real."
The scaffolder was given a six-month suspended prison sentence with 100 hours community service and ordered to pay £615 in costs and victim surcharge.

Source: HSE

Principles of fall prevention and protection

The priority for any scaffolder working at height is to use safe methods of access and egress and to prevent falls by using suitable collective measures as their primary means of protection, before resorting to personal protection. The NASC defines this collective protection as the **'Scaffolders' Safe Zone'** (see Section 4 below for further information).

This guidance identifies a range of control measures that can be considered by employers when designing the most suitable safe systems of work for various scaffolding operations. The control measures featured in this guidance have been divided into two key categories defined by the primary means of protection used in each scenario – **'Collective Fall Protection'** and **'Personal Fall Protection'** (*Figures 12 & 13*).

The WAHR hierarchy of control measures places a legal duty on all employers to select measures that offer collective protection before resorting to personal protection at each stage of the hierarchy (see Section 2, *Figure 6*, *Planning for Work at Height*).

The NASC acknowledge that collective fall protection is not a practicable solution for all scaffolding operations and in certain circumstances Personal Fall Protection Equipment (PFPE) is the most suitable means of primary protection.

In some scaffolding operations there is an inherent risk of a fall that cannot be eliminated and will require scaffolders to use PFPE as the primary means of fall protection (see *Figure 14* – examples of the inherent risk). It is also recognised that some of the Collective Fall Protection measures featured in this guidance require scaffolders to use PFPE as a secondary means of fall protection. For example, using a scaffolders step to install guardrails requires scaffolders to use their harnesses and remain clipped on (see Section 4 and *Figures 26 & 27*).

When scaffolding operations require the use of PFPE as the primary means of protection, scaffolders must sequence the work to prioritise the creation of a scaffolders' safe zone (e.g. remaining clipped on until a working platform and guardrail protection is installed). The scaffolders' safe zone should be installed or removed progressively to minimise the time a scaffolder is exposed to a risk of a fall and is therefore relying on their PFPE as primary protection (see Section 5).

The recommendations for the use of collective fall protection and methods for creating a scaffolders' safe zone are aimed at reducing the time scaffolders are exposed to the risk of a fall and their reliance on PFPE.

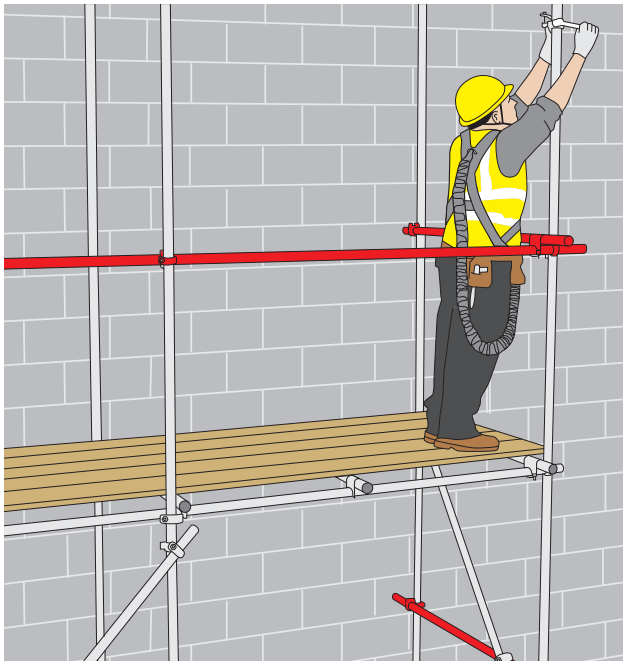


Figure 12: Example of Collective Fall Protection.

Figure 13: Example of Personal Fall Protection.

SECTION 04

Collective Fall Protection

4.1 The Scaffolders' safe zone

A **scaffolders' safe zone** is a form of collective fall protection utilising platforms and guardrails. This section identifies what a scaffolders' safe zone is, and how to safely create it.

Scaffolders must focus upon creating a scaffolders' safe zone utilising one, or a combination, of the methods detailed in this section, as a priority when working at height, with a minimum of:

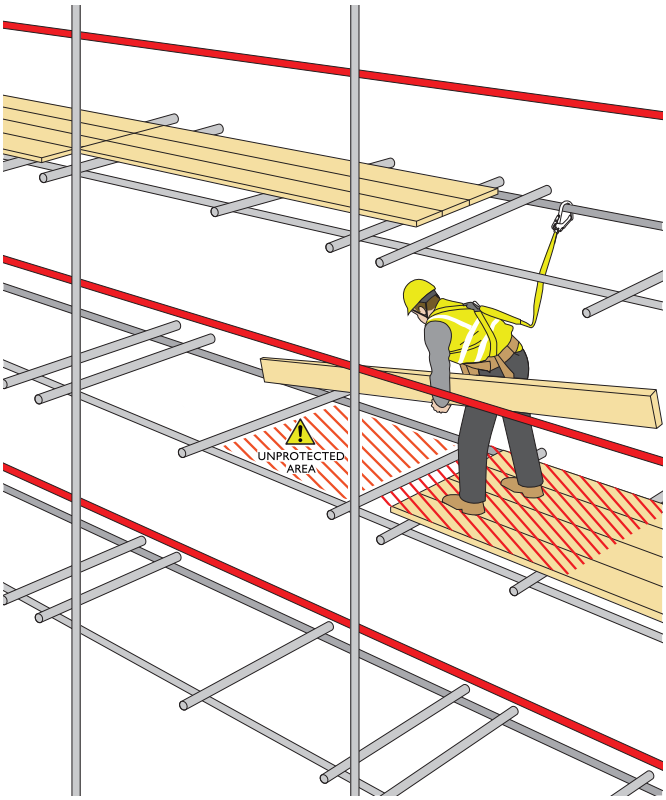
- a correctly boarded and supported platform without gaps through which someone could fall (see Section 4.2 – Working Platforms); and,
- a single main guardrail (minimum of 950mm above the platform) where there is a risk of a fall.

The principles of creating a scaffolders' safe zone should be adopted for all scaffolding operations where suitable. Scaffolders should focus on establishing a scaffolders' safe zone as their priority when working at height, where appropriate, to reduce reliance on personal fall protection equipment (PFPE). Employers should choose the most suitable method of installing the scaffolders' safe zone that best suits the scaffolding application contemplated.

It must be recognised that the scaffolders' safe zone does not completely eliminate the risk of a fall for all scaffolding operations, for example when raising or lowering working platform boards as the erection or dismantling of the scaffold progresses. Personal fall protection equipment (safety harnesses) will still be required at some point in the system of work unless every lift remains fully boarded and all edges are protected with guardrails or similar. In addition, some methods of creating a scaffolders' safe zone and elements of work within a scaffolders' safe zone may also expose scaffolders to a risk of a fall and necessitate the need for personal fall protection equipment to be used (see Section 5 Personal Fall Protection).

When scaffolders are working without a fully boarded platform (e.g. raising or lowering platform boards) or without guardrail protection, then they must remain continually clipped on to a suitable anchor point when exposed to the risk of a fall (*Figure 14*).

Before scaffolders encroach from a scaffolders' safe zone to within 1 metre of an area not protected by guardrails they are considered 'at risk' and personal fall protection equipment must be clipped on and remain attached (*Figure 15*).



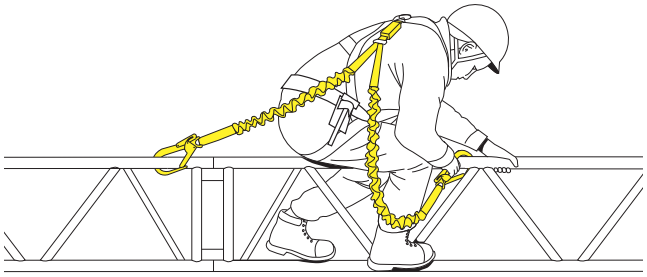


Figure 14: These illustrations show examples of the inherent risk of a fall in scaffolding where personal fall protection equipment will be the primary method of fall protection (e.g. (i) raising and lowering boards and (ii) working without a scaffolders' safe zone).

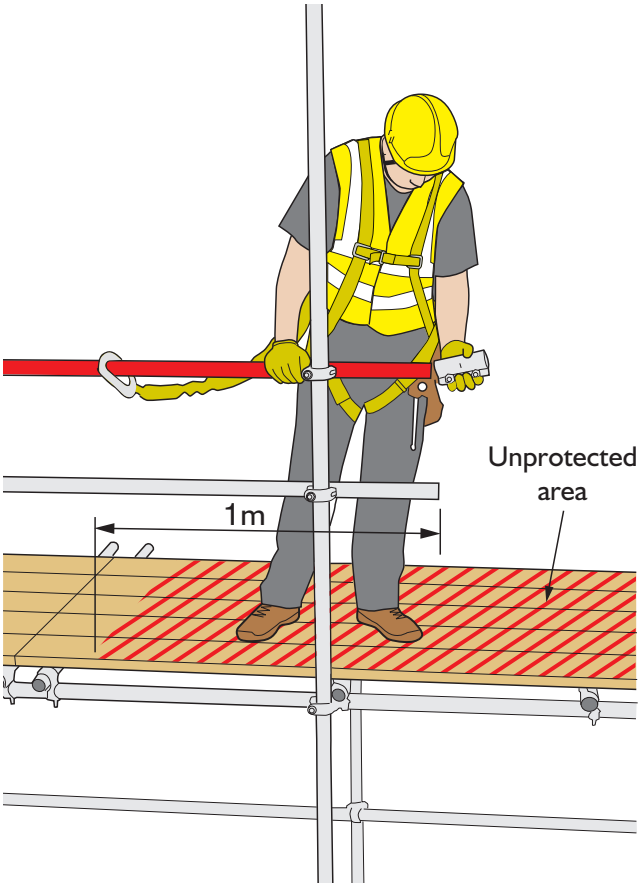


Figure 15: Shows a scaffolder exposed to a risk of falling at a leading edge (within 1 metre from the edge of the scaffolders' safe zone).

4.2 Working platforms

It is important to identify that there are different types of working platforms used in scaffolding. The term 'working platform' applies to a temporary platform provided for access at various stages of the erection, use, alteration and dismantling of scaffolding, these include:

- The finished working platform (Used by others)
- Platforms for other purposes (e.g. loading towers for materials that require personnel access)
- Platforms for the erection, alteration or dismantling of scaffolding **ONLY!** (The scaffolders' safe zone)

Scaffolders must consider the following working platform requirements for creating the scaffolders' safe zone:

- Scaffolders should install a minimum of a single guardrail, at least 950mm above the platform, on all faces of the scaffold from where a fall could occur (*Figure 16*). On finished working platforms for others, progressively install the double guardrails and toeboards (with no gap greater than 470mm). (*Figure 17*).

- Inside gaps (greater than 225mm) between the inner standard of the working platform and façade or structure and openings in the façade (e.g. windows), where scaffolders face a risk of falling, need to be protected with guardrails in same manner as the outer faces of the platform or, as a last resort, scaffolders need to utilise their PFPE (also see NASC Safety Guidance 29 (SG29) *Internal edge protection on scaffold platforms*).

- Guardrails should be erected and left in place for the duration of the works (e.g. for alterations or dismantling).

- Scaffolders' guardrails should be installed on all lifts where the lift height is substantially greater than 950mm (e.g. progressive bricklayers' lifts 1.35-1.5 metres).

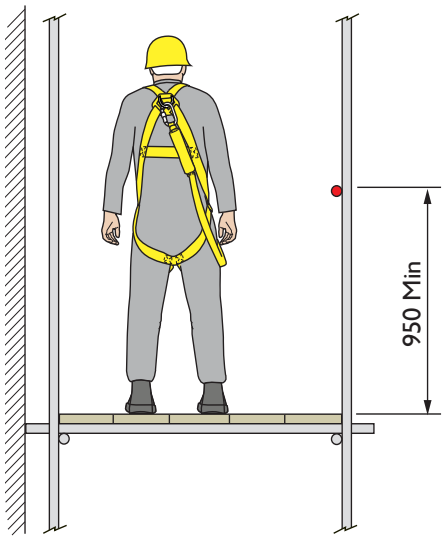


Figure 16: A cross-section of temporary scaffolders working platform to form the minimum scaffolders' safe zone.

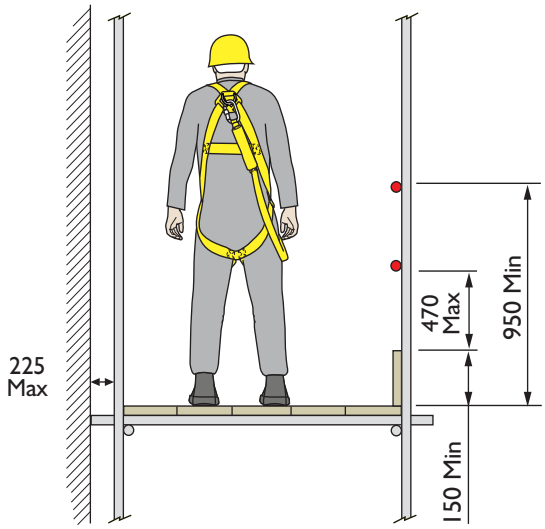


Figure 17: A cross-section of a finished working platform for users

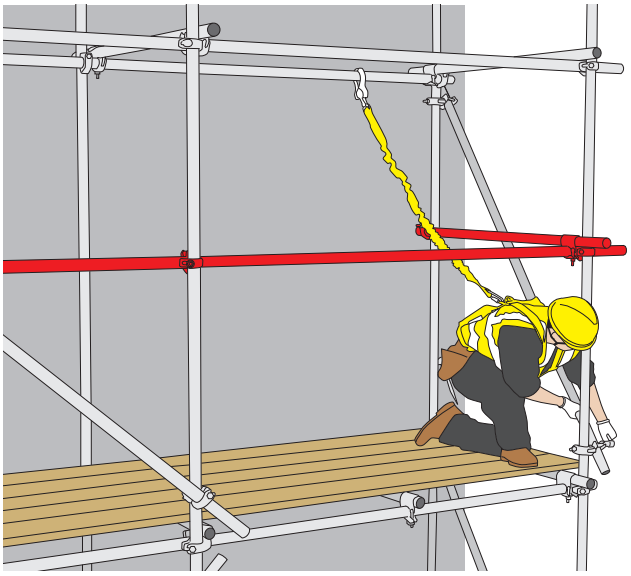


Figure 18: A scaffolder reaching below the single guardrail must be clipped on.

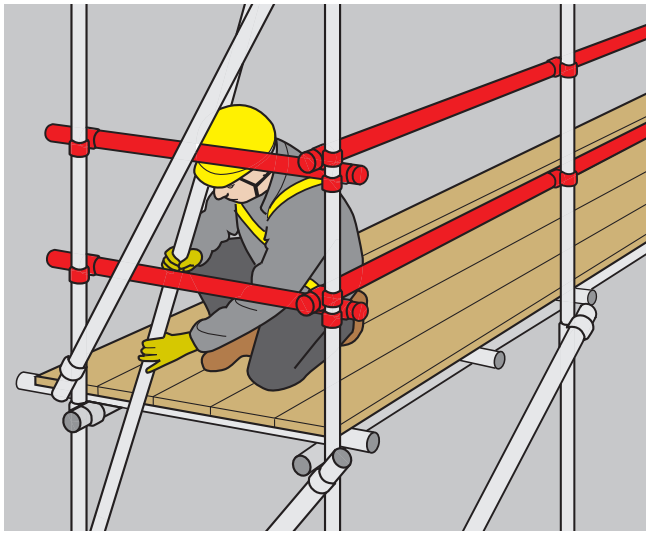


Figure 19: Safe handling bay. This illustration shows a scaffolder using a safe handling bay with double guardrails (including stop-end returns) for raising or lowering materials, without the need to be clipped on.

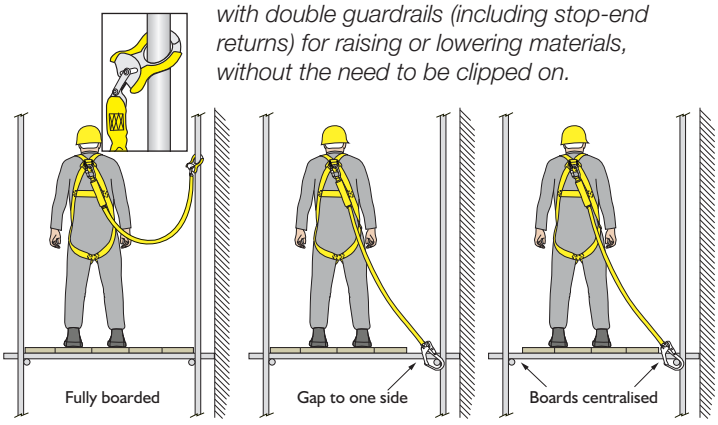


Figure 20: Shows the options for a boarded platform when anchorage is required to the structure. A maximum gap equivalent to the width of one board (225mm) may be permitted only if required to access the ledger below the platform as an anchor point.

- When it is necessary to reach below a single guardrail scaffolders must be clipped on to the highest available anchor point (e.g. when fixing bracing or handling materials below the height of the single guardrail see *Figure 18*).
- When raising or lowering materials scaffolders should be clipped-on or create a safe handling platform with double guardrails, including stop-ends so that there is no gap greater than 470mm through which a scaffolder could fall (*Figure 19*).
- Scaffolders must remain clipped on when moving, raising or lowering platform boards, working less than 1 metre from an exposed edge or outside of guardrail fall protection, where exposed to a risk of a fall (*Figures 14 & 15*).
- The working platform should be fully boarded out, without gaps through which a person could fall, except when access is required to a ledger below the lift for attaching fall arrest equipment, then one board may be omitted for ease of access to the ledger as an anchor point (*Figure 20*).
- Scaffold boards must be correctly supported by transoms or bearers in accordance with NASC Technical Guide TG20 Operational Guide (Tables 6.3, 6.4 and 6.5). For example, 38mm thickness timber scaffold boards for scaffold load classes 1 to 3 must be supported a minimum of every 1.2 metres. Exceeding the specified maximum span of scaffold boards increases the risk of a fall due to the board failing.
- Ensure boards are suitably stable and trap-ends avoided by not exceeding minimum or maximum specified overhangs (TG20 Operational Guide, table 6.3). For example, 38mm thick timber scaffold boards (BS 2482) have a minimum overhang of 50mm and a maximum overhang of 150mm.
- Gaps formed in working platforms to create ladder access traps should be protected against accidental falls once the scaffold is completed. Scaffolders should install these measures progressively to provide protection for themselves as the job progresses (see Section 6 – Methods of access and egress and NASC Safety Guidance Note 25 (SG25) *Access and egress from scaffolds*).
- The first lift should, where possible, be boarded out from below to avoid the risk of a fall when working at low level (*Figure 21*).
- All other lifts, where practical, should be boarded out and removed from below.
- All guardrails should be secured so that they cannot become accidentally displaced should someone fall against them.
- Lateral gaps in guardrails are only permitted at a point of access to a ladder or stairway where a gap is necessary (see Section 6 – Methods of access and egress).

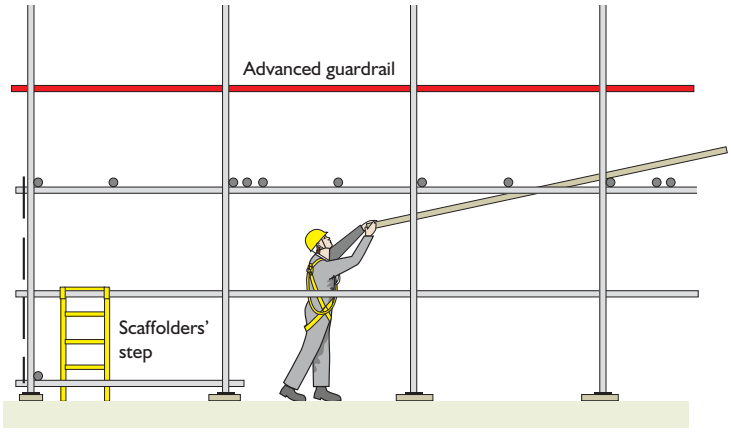


Figure 21: Boarding out the first lift from below.

- When a 3rd party has agreed to provide collective protection for use by a scaffolding contractor, work should not proceed without such measures in place, unless alternative steps have been taken e.g. installing a scaffolders' safe zone or using personal fall protection equipment (safety harnesses). A common example is the traditional building process, such as home building, where the fall risk to the interior of the building from the external scaffolding is often protected with a collective fall arrest system, rather than guardrails or internal scaffold platforms (see *Figure 23*). For further information and guidance see NASC Safety Guidance Note 29 (*SG29*)*: Internal edge protection on scaffold platforms*.

- Any incomplete scaffold working platform, where someone may fall or where an object could fall and injure someone, needs to be clearly identified with warning signs, and access restricted by suitable physical measures to prevent unauthorised access (e.g. guardrails and toeboards, ladder access removed or ladder guarded) (*Figure 24*). For further information on restricting access to incomplete scaffolding see NASC Safety Guidance *25* (*SG25*)*: Access and Egress from Scaffolding*.

- Where boards or decking remain in place on non-working lifts solely for the purpose of erecting, altering or dismantling scaffolding, employers must ensure the following measures are taken:

  - All scaffolders encroaching within 1 metre of an incomplete platform must use their PFPE and remain attached to a suitable anchor point.

  - Any boards or decking left in place are secured to prevent accidental displacement (e.g. wind uplift).

  - The additional boards or decking have been considered in the design and calculations for the structure.

  - Access to incomplete working platforms is restricted with physical barriers and warning signs (as above).

4.2.1 System Scaffold Decking

In the case of system scaffolding using proprietary decking (or battens), the decking must be erected, altered and dismantled in accordance with manufacturer's instructions and follow the same principles of this guidance, as outlined above (section 4.2).

All manufacturers and suppliers of proprietary system scaffolding have a legal duty to provide instructions for the safe erection, altering, dismantling and use of their products (also see Section 7.2 Proprietary System Scaffolding, page 44). Manufacturer's instructions for the safe system of work for erecting, altering or dismantling is particularly important if the design incorporates un-boarded lifts. The instructions should include methods of installing and removing decking for scaffolding structures that do not require every lift to be a boarded working platform.

For such partially boarded structures manufacturers and employers should consider the following examples for the safe erection, alteration and dismantling of system scaffolding in accordance with the principles of this guidance:

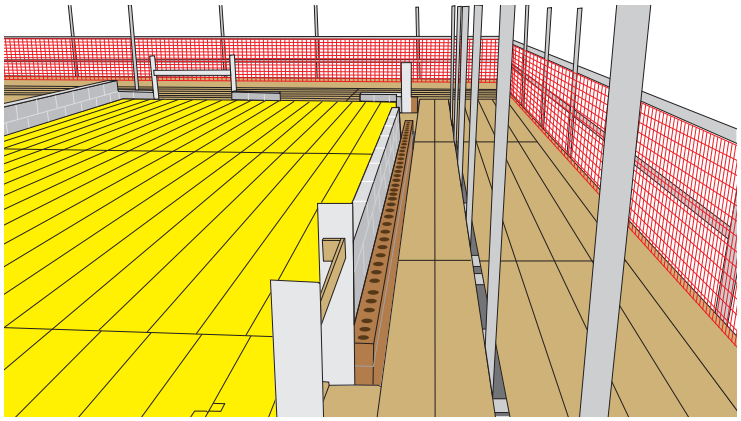
- **Install decking on every lift** to allow all decks to be installed and removed from the lift below.

- **Retain decking on alternate lifts** to allow temporary decking to be installed and removed from the lift below.

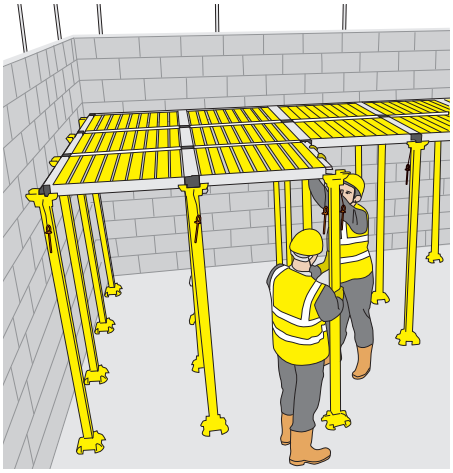
- **Use assembly aids** that allow decks to be installed and removed from a scaffolders safe zone and avoid the need to climb the structure, such as temporary boards that allow system decks to be slid into position (*Figure 22*), use of temporary erection decks, or other similar devices and techniques.

The practice of leaving partly boarded bays behind for future alteration or dismantling purposes should be avoided. However where this is necessary and cannot be avoided decks must be secured against accidental displacement. Methods of work that allow scaffolders to install and remove decking from a boarded working platform or scaffolders safe zone should be used at all times.

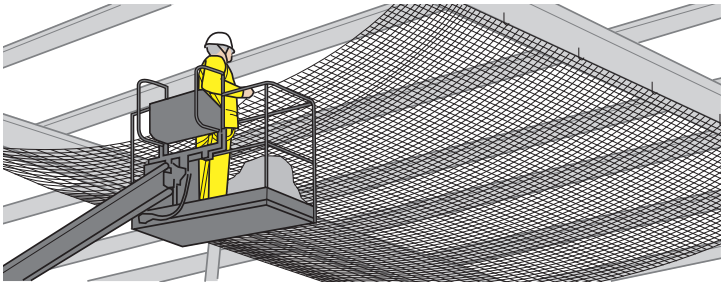
Figure 22: Example of an assembly aid to place and remove decking.



i.



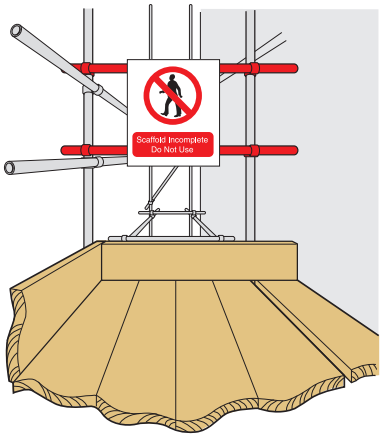
ii.

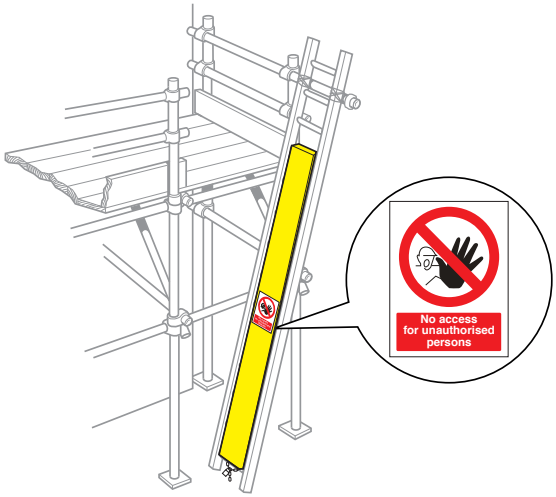


iii.

Figure 23: Examples of other collective fall arrest systems to provide internal fall protection (i. Internal scaffolding birdcage, ii. Proprietary decking system and iii. Fall arrest safety netting).

Figure 24: Restricted access. Shows examples for restricting access by physical means with warning signs for access by authorised personnel ONLY!





Scaffolder lost leg in fall from unprotected platform

An unqualified scaffolder lost his leg in a 4 metre fall from an unprotected platform. He was not wearing a safety harness and the platform he was standing on was only two boards wide. He sustained life-changing injuries, spent almost a year in hospital and underwent several operations. In court it was established that the worker had not been given any training in the safe erection or dismantling of scaffolding. The employer pleaded guilty to breaching the Work at Height Regulations 2005 (amongst other breaches) and was fined £15,000, plus £1,118 costs.

Source: HSE

4.3 Collective Fall Protection methods

This guidance establishes the principle of creating a **scaffolders' safe zone** with a suitable platform and guardrails installed as a priority, where possible, when working at height. To assist employers, when completing their risk assessment and selecting the most appropriate method of creating the scaffolders' safe zone for the task, a range of established and proven solutions are featured in this section.

This section highlights products and methods of working that provides collective protection for scaffolders working at height as the primary means of protection. Some of these methods of work provide the same levels of collective fall protection as similar proprietary products, but utilise standard scaffolding materials without the need to invest in specialist equipment (e.g. short-lift method).

When selecting the most appropriate system or method of working, (or a combination of systems), employers must always consider:

- The suitability of the method(s) chosen for the scaffolding application.
- The requirements of the manufacturer's instructions for the use of proprietary equipment.
- Different techniques required e.g. hemping a standard over a guardrail (*see Figure 25*).
- The tasks to be performed from a smaller platform (e.g. handling long materials or the risk of over-reaching from a scaffolders' step).
- Are all fall risks protected e.g. stop-end guardrails, inside face, access traps (ladder openings) or leading edge?
- Is additional personal fall protection equipment (safety harnesses) required for safe use (e.g. clipping on as secondary protection when using a scaffolders' step)?
- Can the equipment be used as an anchor point for personal fall protection equipment (e.g. an advanced guardrail system may not be used as an anchor point)?
- Any training or instruction the scaffolders may need to ensure safe use.
- Arrangements for the handling, delivery and storage of special equipment.
- Any inspection and maintenance arrangements required for special equipment used.

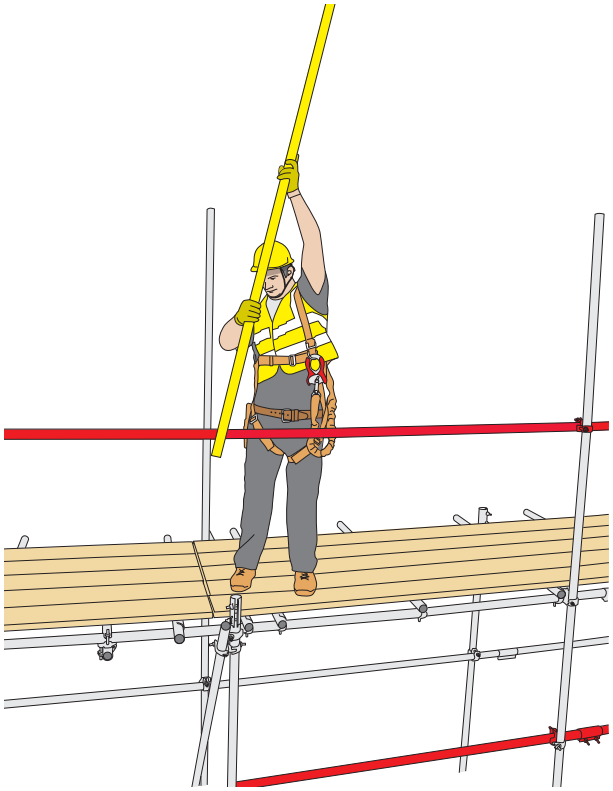


Figure 25: Illustration shows a scaffolder hemping a standard over a guardrail.

Scaffolding business owner received prison sentence following fatal fall

A scaffolding business owner received a 15 month prison sentence following a fall from height accident, where a scaffolder fell 14 metres to his death. He was found guilty of a breach of the Work at Height Regulations 2005 (amongst other breaches) for failing to properly plan, supervise and carry out work at height in a safe manner. The HSE investigation established that edge protection was missing and the scaffolder was not provided with any other means to prevent or protect against a fall, such as a safety harness. Fines to the business totalled £12,000 plus costs of £5,601 under the Health and Safety at Work etc. Act 1974 and Employers' Liability (Compulsory Insurance) Act 1969.

4.3.1 Scaffolders' step

This popular system utilises a proprietary step that is fixed to the main guardrail approximately 1m above the working platform. This enables the scaffolder to erect the guardrail protection on the lift above in advance or remove them from below during dismantling (*Figure 26*).

For some modular scaffolding systems, standard side brackets (hop-ups) can be used to create an internal temporary platform to install guardrails in the lift above, in a similar fashion to the proprietary scaffolders' step system (see *Figure 29*).

Scaffolders should fix transoms to the ledgers and place boards or decking in the lift above from the working platform to act as temporary guardrails to enhance the primary collective protection provided when using a Scaffolders' Step (see *Figure 27*).

Note that a guardrail will need to be fixed to the base lift to accommodate the step for the first lift (*Figure 28i*). A foot tie may also be required to secure the base lift with certain step designs – see manufacturers' instructions. For uneven ground the base lift may need to be boarded out to ensure some types of step are correctly supported at the base (*Figure 28ii*).

IMPORTANT
Scaffolders must be clipped on to a suitable anchor point, ideally to the back ledger, due to the risk of falling from the scaffold when using a scaffolders' step system.
Scaffolders must be clipped on as a secondary means of protection before climbing on the temporary platform and must not jump down onto the boarded platform due to the risk of board failure from impact loads.

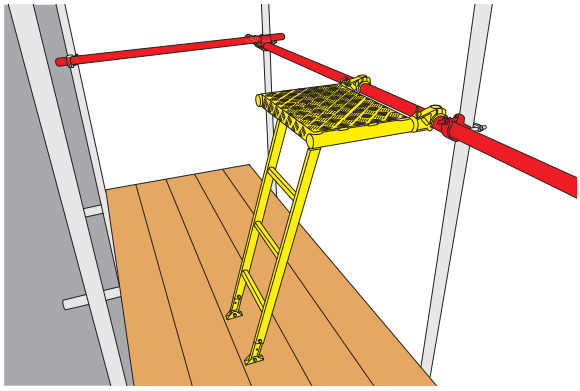


Figure 26: Example of a scaffolders' step used to install guardrails in advance.

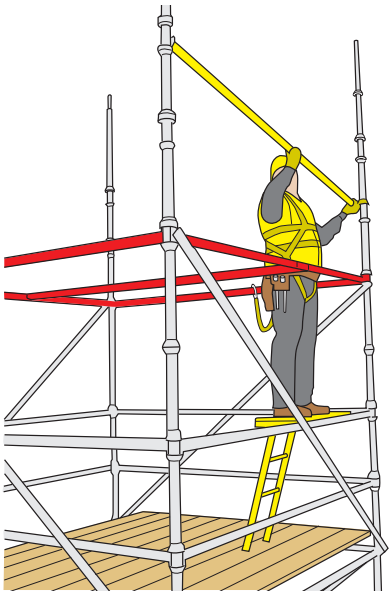
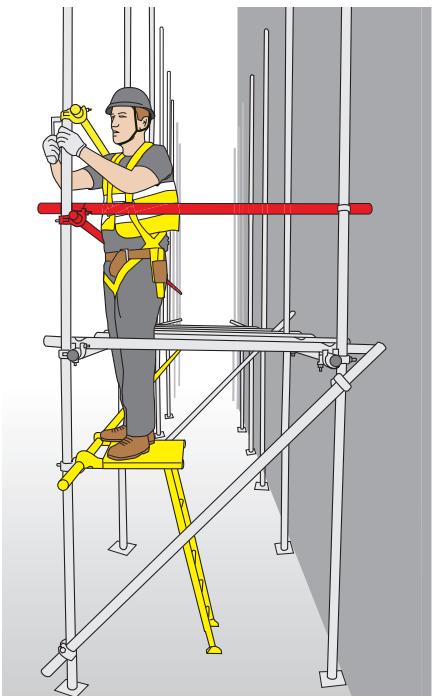


Figure 27: Scaffolder installing a guardrail in advance to the next lift from a scaffolders' step protected by the ledgers and transoms.



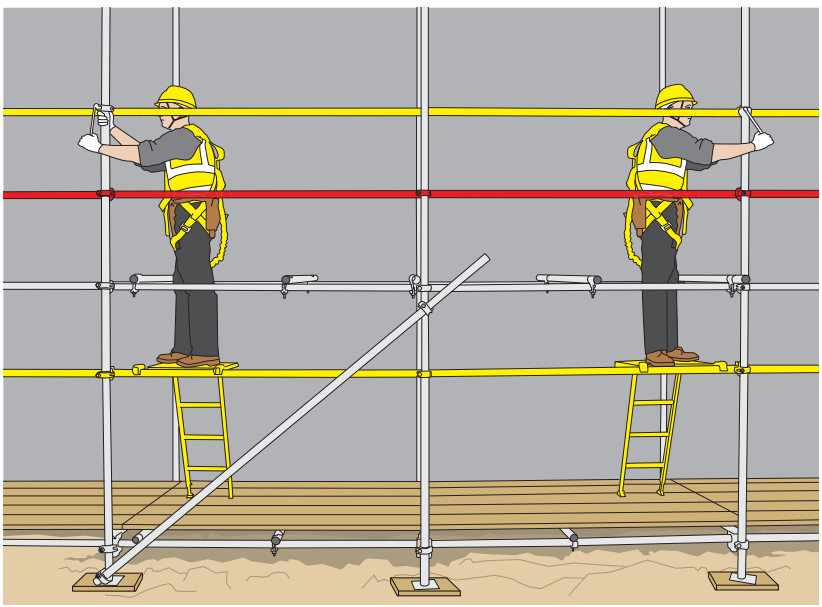


Figure 28: Shows the scaffolders' step being used with (i. Left) an additional guardrail to the base lift to support step and (ii. Above) boarded base lift to support the step on uneven ground.

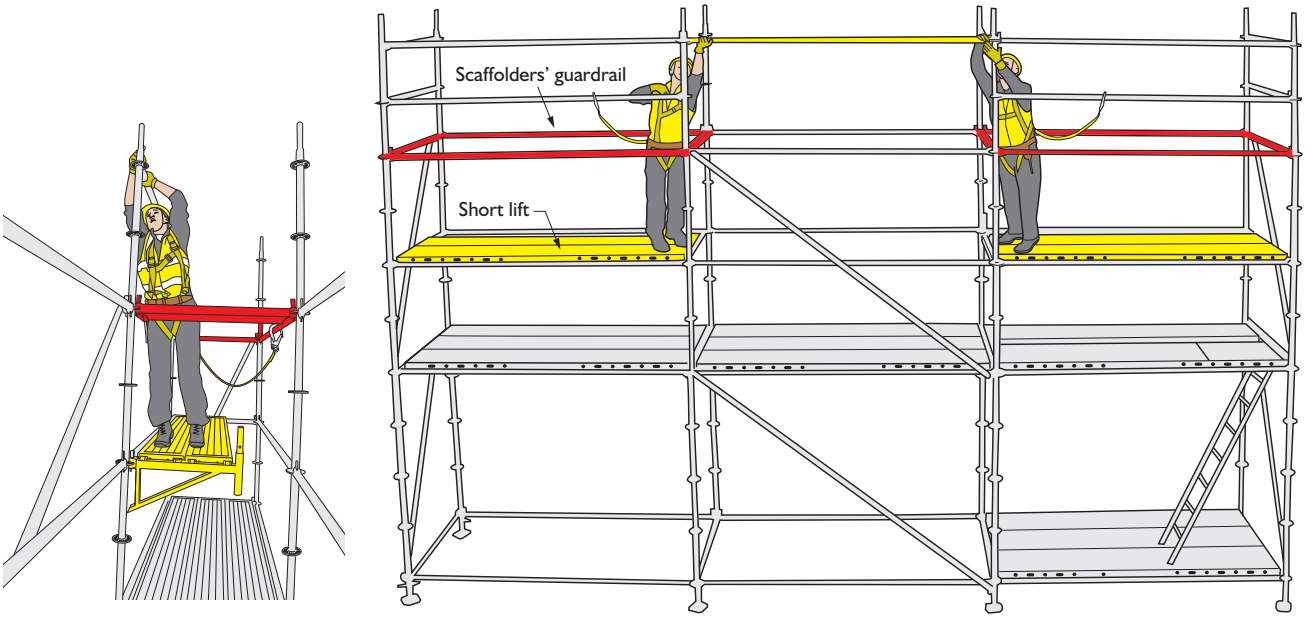


Figure 29: System scaffold side brackets used to create a scaffolders' step platform in alternate bays. The middle bays can be reached from adjacent bays to fix the guardrails.

4.3.2 Proprietary Advanced Guardrail Systems (AGS)

Several proprietary collective fall protection systems are available and have become known as 'Advanced Guardrail Systems' (AGS) (see *Figure 30*).

Advanced guardrail systems provide collective fall prevention for scaffolders traversing along a boarded lift and when erecting, altering or dismantling scaffolding. These temporary guardrails remain in place whilst the platform guardrails are installed or removed, allowing scaffolders to maintain guardrail edge protection on working platforms at all times.

The suitability of advanced guardrail systems needs to be considered as part of the risk assessment process when planning work at height and included in the method statement. These systems are best suited to straight uniform scaffold structures without complex elements (e.g. long straight facades with minimum returns, recesses or protrusions).

When using advanced guardrail systems scaffolders should ensure that all leading edges are protected where there exists a risk of falling (e.g. stop-ends, returns and inside faces).

Where an AGS is pushed up the outside of the structure, their operation can be impeded by protrusions from the scaffold or façade. Scaffolders may have to ensure that the transoms, ledgers, bracing etc. are correctly sized so that they do not have excessive overhang.

Where there exists a risk of a fall to the inside face of the scaffold, scaffolders may need to change the normal sequence of work to accommodate the AGS (e.g. locate the AGS above, before fixing transoms, hop-up brackets or tie assemblies (*Figure 31*).

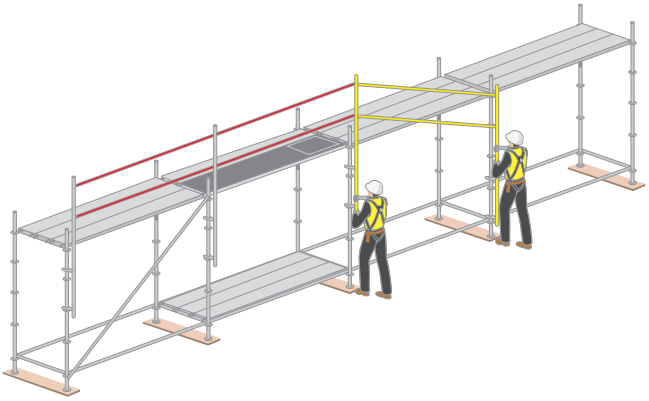


Figure 30: Example of an Advanced Guardrail System (AGS).

Figure 31: Shows the modified sequence of erection to allow an AGS to be used on the inside face before fixing transoms, ties or inside board brackets above.

Manufacturers of proprietary system scaffolding have developed an integrated AGS that form the permanent guardrails for the completed scaffold structure (*Figure 32*) And another manufacturer provides advanced guardrail tools that are bespoke to their particular product (*Figure 33*). Special arms are used to locate/remove the guardrail frame in the lift above.

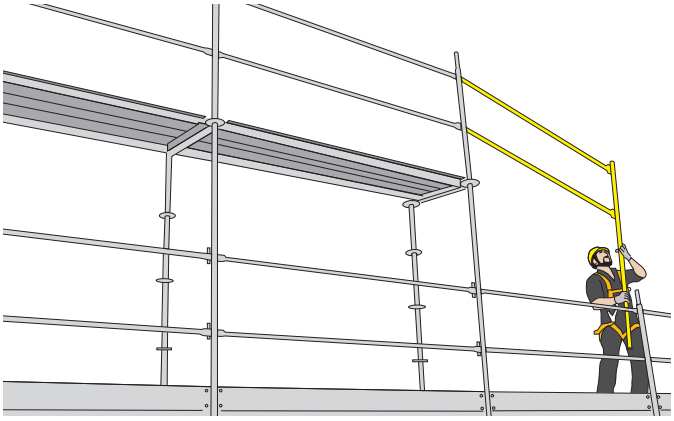


Figure 32: An example of an integrated advanced guardrail system for a proprietary scaffolding system.

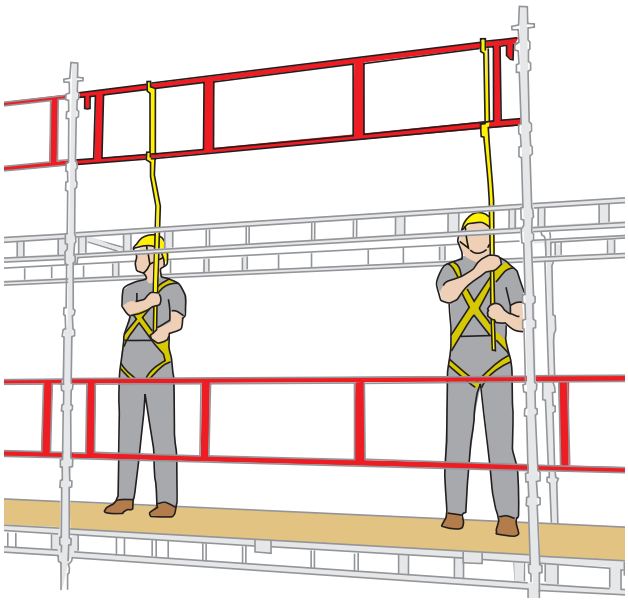


Figure 33: Example of a system scaffold specific tool for installing and removing guardrail frames in advance.

4.3.3 Short lift system

To use the short-lift system of work, the ledgers and transoms of the next lift are erected as normal to form a main lift (e.g. 2m above the current lift). Then a temporary intermediate 1m high short-lift is formed (also referred to as a dummy lift). Therefore, as the scaffolders access the next 1m level, the ledgers and transoms are already in place and act as guardrails to provide collective fall protection (*Figure 34*). Decking on the temporary short-lift can be raised to the next lift and any temporary transoms no longer required can be removed to provide clear access on all working lifts for other trades.

This system of working can be used on all scaffolds with conventional lift heights of up to 2.1m, however it is best suited to scaffolds designed without ledger bracing (e.g. modular system scaffolding or tube and fitting scaffolding using prefabricated transom units used in accordance with the manufacturer's instructions and TG20).

System decking also eliminates the need to install temporary intermediate transoms as board bearers.

Suitable methods of access and egress between the main lifts of the scaffold must be used (see Section 06 – Methods of access and egress).

IMPORTANT
Scaffolders must be clipped on to a suitable anchor point before climbing on and off the temporary platform and must not jump down onto the boarded/ decked platform due to the risk of board/deck failure from impact loads.

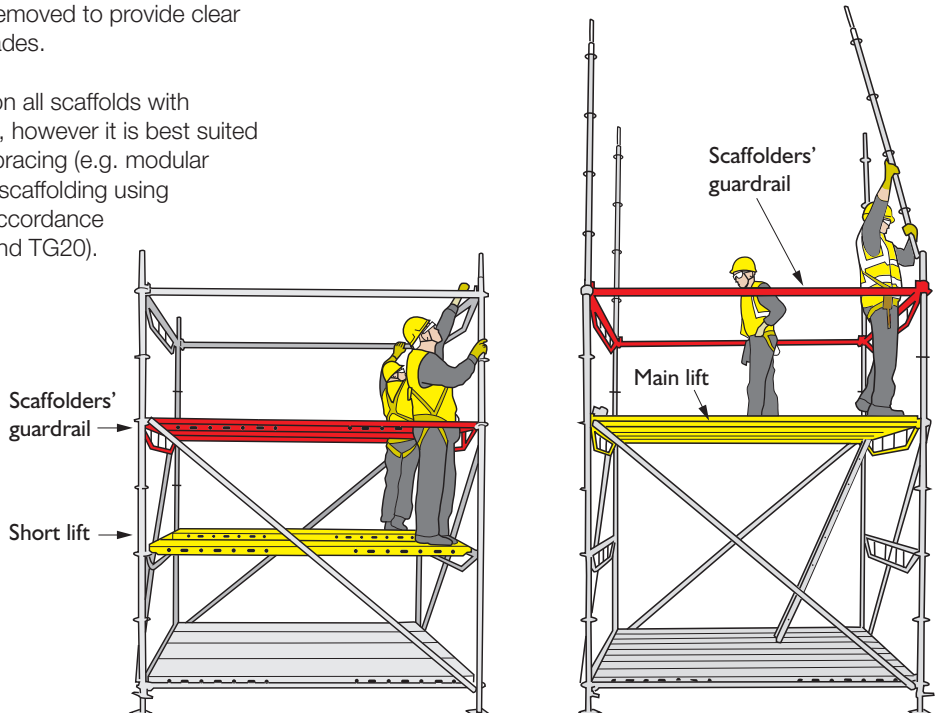


Figure 34: This sequence shows the short-lift system used to erect a system scaffold tower.

4.3.4 Tube and fitting frame type AGS

This tube and fitting frame type advanced guardrail system (AGS) functions similarly to proprietary advanced guardrail systems but is constructed using standard scaffolding components.

Step 1
Select tubes to suit the length of the scaffold elevation and bay sizes to be protected. The uprights are formed with 2.7 metre or 3 metre (9ft or 10ft) scaffold tubes, and a single tube is used to form the temporary guardrail. Aluminium tube can also be used to reduce the handling weight.

Step 2
Lay out the tubes on the ground to form a 'goal post' frame. Then fix the guardrail to the end of the upright tubes using right-angle couplers (EN74)

Step 3
Now fix a second right-angle coupler to each upright tube. Measure 1100mm down from the centre of the top coupler. Note that these couplers must be to the opposite side of the tube and fixed 'up-side-down' (see *Figure 35 inset*).

Step 4
Two scaffolders are required to lift the frame and fix to the ledger. Note by fixing the coupler 'up-side-down' it will help support the frame until it is secured (see *Figure 35 inset*). Also note that an additional guardrail is required for the base lift only for the vertical tube to act against.

Step 5
The couplers can now be secured to fix the advanced guardrail in place. Scaffolders can now access the platform and erect the next lift once the collective protection is in place.

Step 6
When the permanent guardrails have been installed, the advanced guardrail can be raised to the next level (*Figure 36(ii)*). This is more easily achieved by pulling back the outside board to access the coupler, from above (*Figure 36(i)*).

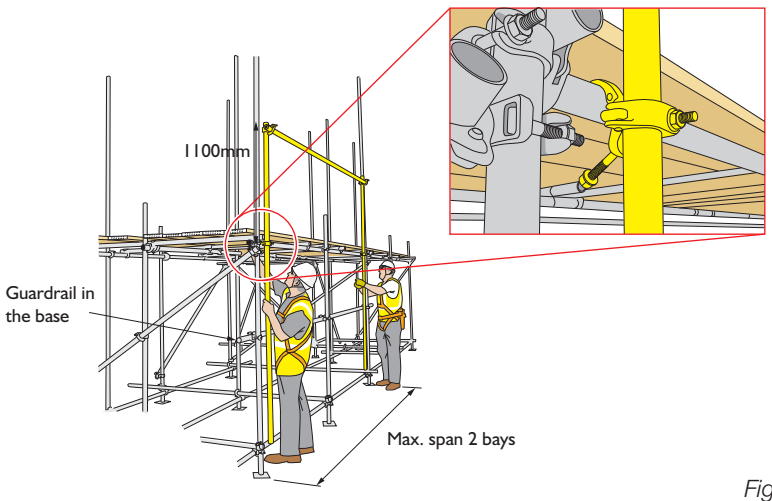


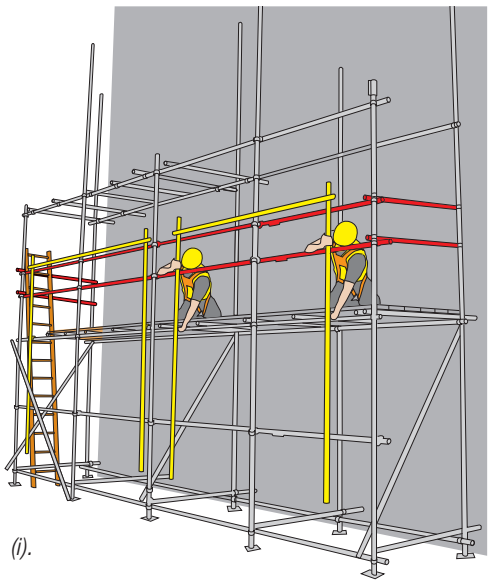
Figure 35: AGS frame constructed on the ground and fixed to the base lift.

For stop-end guardrails the advance guardrail can be fixed to standards using swivel couplers in parallel, otherwise scaffolders will need to clip on before encroaching within 1m of the leading edge.

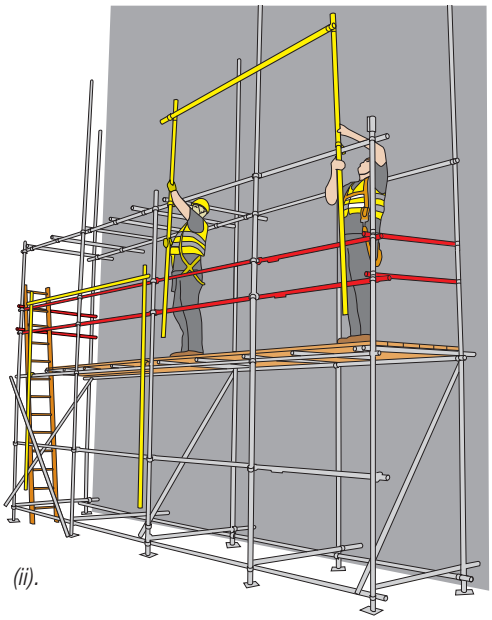
Where tie assemblies, transoms for inside boards, buttresses or other protrusions may obstruct the raising of the advanced guardrail, the build sequence will be critical, ensuring the advanced guardrail is raised prior to the transoms etc. being installed.

If the advanced guardrail is obstructed by the façade bracing, then fix the brace once the advanced guardrail has been raised.

This advanced guardrail system can also be used for dismantling and alterations that necessitate the removal of guardrail protection.



(i).



(ii).

Figure 36: AGS frame constructed on the ground and fixed to the base lift. (i). Releasing the guardrail from the ledger. (ii). Raising the guardrail to the next level.

4.3.5 Tube & Fitting Horizontal type AGS

This tube and fitting advanced guardrail system is best suited to independent tied scaffolding (façade scaffolds) and features the principle of pushing a tube out horizontally to form a temporary guardrail from within a scaffolders safe zone. The temporary guardrail fixes to the standards and can provide protection to both inside and outside faces of the scaffold.

To provide full collective protection it must be used in conjunction with an additional AGS method that can be fixed/removed from below for the first bay during erection and the last bay when dismantling. Again, additional precautions need to be taken at stop-ends or corner returns.

However, until the temporary guardrail is secured scaffolders must remain clipped on before leaving the established scaffolders' safe zone.

Step 1
Working from behind the guardrail protection, fix two right-angle couplers to the standards above the existing guardrail (*Figure 37 (i)*), ensuring to clip on before encroaching within 1m of an unprotected edge.

Step 2
Using another tube to form a temporary guardrail, place it loosely into the two fittings so the tube can still slide horizontally (*Figure 37 (ii)*).

Step 3
Push the tube out horizontally past the next standard (one bay max) and tighten the end coupler (*Figure 37 (iii)*).

Step 4
Now walk out to fix the temporary guardrail to the standard, clipping on until the guardrail is secured and if encroaching within 1m of the end (*Figure 37 (iv)*).

Step 5
The working platform guardrail(s) can now be completed and next lift constructed with the scaffolders' safe zone in place (*Figure 37 (v)*).

Step 6
The temporary guardrail can then be released and slid along horizontally to the next bay (*Figure 37 (vi)*). This sequence is repeated one bay at a time to provide the scaffolders' safe zone.

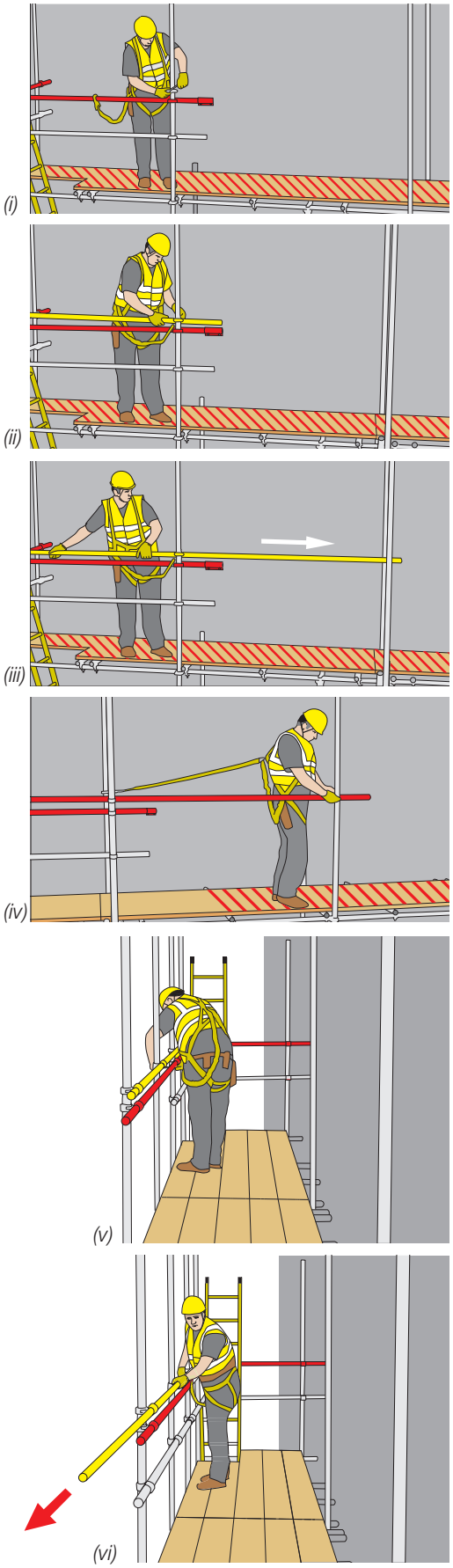


Figure 37: Shows a sequence of installing a tube and fitting advanced guardrail horizontally.

Personal Fall Protection

The working platforms and guardrails that form the **scaffolders' safe zone** do not completely eliminate the need for Personal Fall Protection Equipment (PFPE) for scaffolding operations.

Therefore, it is recommended that all scaffolding operatives involved with scaffolding operations should wear and use personal fall arrest equipment (harnesses etc.) when working at height, in accordance with the training and instruction received.

It is widely acknowledged that there is an inherent risk of a fall in all scaffolding operations, which cannot be completely eliminated. The use of PFPE that is designed to arrest a fall, does not prevent a fall occurring and therefore does not eliminate the risk of injury completely. However, it is important to recognise that PFPE may be the most suitable, or only, option in certain circumstances.

For most scaffolding operations PFPE is used to arrest a fall should it occur, to prevent the worker from hitting the ground (or other surface) or structure. The fall arrest equipment and anchorage points must be capable of withstanding the forces involved and minimising those forces to an acceptable level.

In some circumstances PFPE may be used for work positioning or work restraint. These systems of work are designed to prevent a scaffolder from falling from height by supporting them or by restricting movement to prevent them accessing a fall position at a leading edge. Where work positioning or restraint systems are chosen, then specialist equipment and training in its use is required.

Typically PFPE systems include equipment such as:

- Harnesses
- Lanyards
- Energy absorbers
- Line systems
- Inertia reels
- Connectors
- Anchorage points

All personal fall protection systems are classed as active protection that is only effective if used correctly (e.g. a fall arrest harness and lanyard system requires a suitably secure anchor point and a minimum clearance distance to arrest a fall), unlike collective protection (sometimes referred to as passive protection) that offers protection continuously.

When a personal fall arrest system is used, consideration must be given to reducing the distance a person is liable to fall and the consequences of the fall, particularly the ease of rescuing of a person suspended in a harness (see Section 5.17 – Rescue).

When choosing personal fall protection equipment, as part of a risk assessment to establish a safe system of work, employers must ensure that the equipment is suitable, having been designed and tested for the purpose that it is intended to be used. Always read the manufacturers' instructions carefully and if in any doubt seek advice from the supplier. It is important to note that some fall arrest equipment is only designed, tested and manufactured to meet the minimum British and European Standard and will only be safe to use within certain limitations. For example, a standard retracting inertia reel (designed and tested to BS EN 360) may only be used if attached above the scaffolder and traversing horizontally is limited to the maximum angle from the vertical, as specified by the manufacturer.

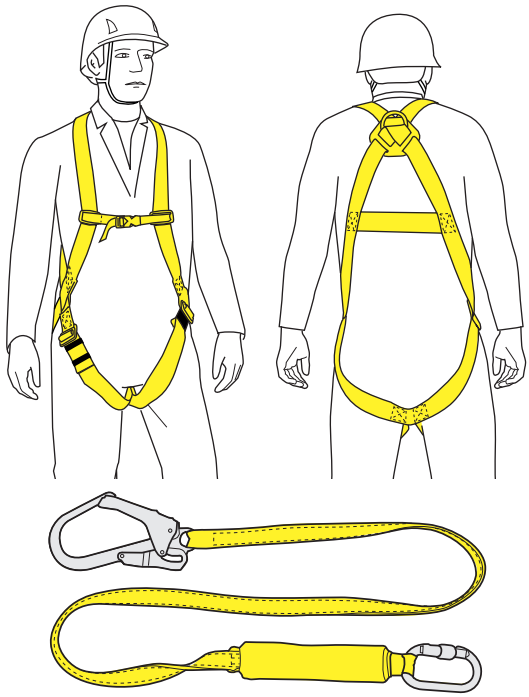


Figure 38: A minimum suggested personal fall protection equipment.

Figure 39: High specification personal fall protection equipment.

SECTION 05

Head Protection

The risk of a head injury is significant in any fall from height, this includes striking your head in an arrested fall and a swinging fall when using PFPE.

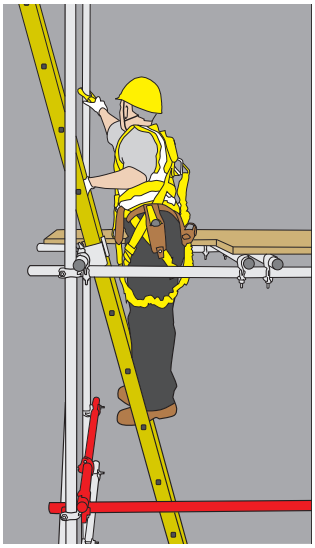
Industrial helmets for working at height and climbing helmets can offer scaffolders a greater level of protection, when working at height and in the event of a fall, compared to conventional construction safety helmets. Employers must carry out a risk assessment when choosing personal protective equipment (PPE) to ensure that the PPE is suitable for the application.

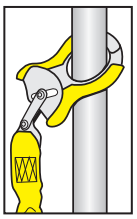
Safety helmets used for scaffolding operations must meet the appropriate British and European Standards. Industrial helmets designed for work at height must conform to BS EN 397. However, where climbing helmets designed for mountaineering to BS EN 12492 are used, the risk assessment must give special consideration to the risks associated with use in an industrial application (e.g. the risk from objects penetrating through the vents or strangulation from the chinstrap if entangled on scaffolding. Note that industrial helmets chin straps must release at a maximum of 250N force).

Figure 40: An industrial helmet for working at height.

5.1 PFPE in scaffolding operations

It has been established in the previous sections that collective fall protection should be considered before resorting to the use of personal fall protection equipment (safety harnesses). However, it is recognised that that there is an inherent risk of a fall within most scaffolding operations that cannot be completely eliminated. Planning for systems of work should prioritise collective protection methods and progressively creating a **scaffolders' safe zone**, where possible.





(i)

Figure 41: An example of a scaffolder clipping on from the ladder trap before accessing an unprotected platform. The scaffolder must remain attached until guardrails have been installed to form the scaffolders safe zone. Inset (i) showing a special anchor device for attaching to standards.

For most routine scaffolding operations, methods of work that use collective fall protection measures can be used to create the scaffolders' safe zone. Throughout this guidance situations have been highlighted where scaffolders must resort to using Personal Fall Protection Equipment, when working at height. Some of the Collective Fall Protection methods (see Section 4) also recommend the use of PFPE as a secondary means of protection (e.g. clipping on when using the scaffolders' step).

Typical scaffolding operations, where scaffolders are exposed to a risk of a fall and must remain clipped on using PFPE, as their primary means of protection, include:

- Before encroaching within 1 metre of a leading edge (*Figure 42*).
- Before raising or lowing platform boards/decking.
- Before reaching down below the height of a scaffolders' guardrail.
- Climbing or traversing on the scaffold structure (e.g. crabbing a beam or erecting a suspended scaffold).
- Before accessing a boarded lift without a guardrails in place to form a scaffolders' safe zone (e.g. clipping-on through the ladder trap before accessing an unprotected lift – see *Figure 41*).
- When traversing along an unprotected working platform (e.g. progressively creating a scaffolders' safe zone by installing guardrails and remaining continually clipped-on – see *Figure 43*). Note that guardrails should be progressively installed/removed one bay at a time to limit time and distance traversing exposed to a risk of a fall and reliance on PFPE.
- Remaining clipped-on whilst temporarily removing or adapting guardrail protection that forms the scaffolders' safe zone, until the guardrail protection is reinstated and secured.

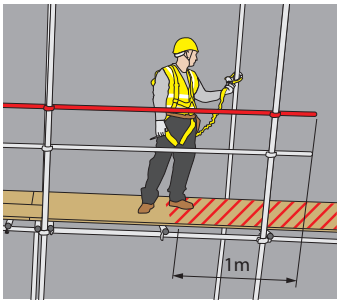


Figure 42: Shows a scaffolder clipping on before encroaching within 1 metre of a leading edge and being exposed to a risk of falling.

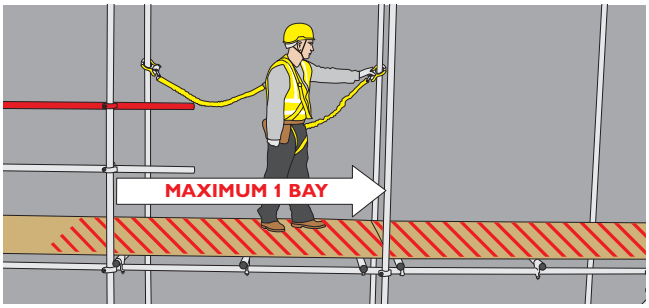


Figure 43: Scaffolder traversing on an unprotected platform remaining attached using a twin lanyard system of work with anchor devices for fixing to standards. The scaffolder should not traverse more than one bay before installing the guardrail that forms the scaffolders' safe zone.

5.2 Fall arrest harnesses and lanyards

Previous sections of this guidance have established that, in most scaffolding operations, the risk of a fall cannot be completely eliminated. Therefore the NASC strongly recommends that safety harnesses be:

i. Issued to ALL scaffolders*,

ii. Worn at all times when working at height; and,

iii. Used in accordance with this guidance note and the training and instruction received.

It is suggested that the following equipment should be issued to all scaffolders as part of a minimum personal fall protection system (*Figures 38* and *39*):

- Fall arrest harness complete with rear dorsal ring (BS EN 361) to offer maximum protection to the user;
- Fall arrest lanyard (BS EN 354) incorporating an energy absorber (BS EN 355) designed to reduce the forces imposed on the body in the event of a fall; (see *Figure 45* for max length. See also 5.3 Single Fall Arrest Lanyards).
- 55mm opening scaffold connector for one handed operation (BS EN 362) (see Section 5.5 – Anchor points, connectors and anchor devices – page 30).

*Excludes labourers and other non-scaffolding operatives, who are only permitted to access completed scaffolds.

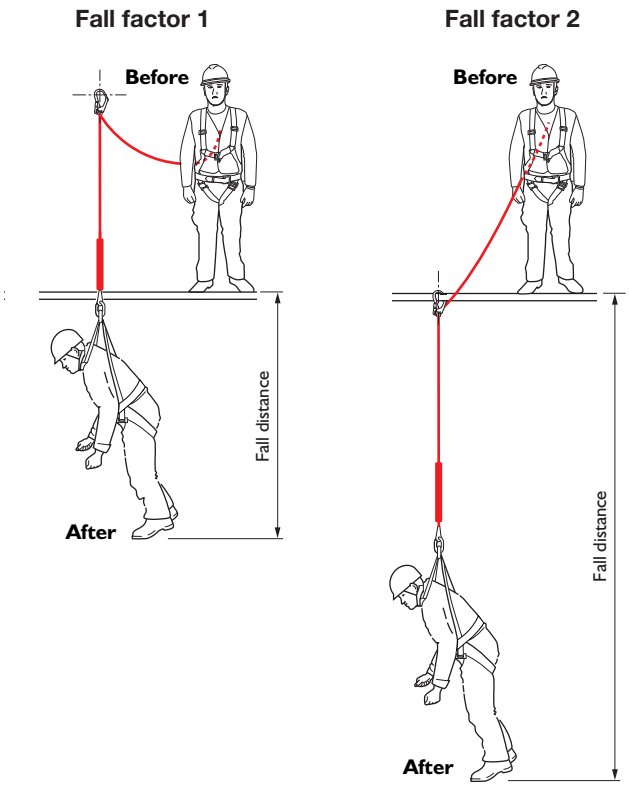


Figure 44: Fall factors.

Employers must consider all available PFPE technology when establishing a safe system of work, in order that the distance and consequences of any potential fall are minimised. A higher level of comfort and ease of use may be gained by selecting some of the alternative personal fall protection equipment and techniques highlighted in this section. Employers must assess the suitability of the personal fall protection equipment for the users. Safety harnesses are available with a range of adjustment, sizes and load rating to suit different body sizes and weights.

The Personal Protective Equipment at Work Regulations requires employers to ensure that PFPE is:

- properly assessed before use to make sure it is fit for purpose;
- maintained and stored properly;
- provided with instructions on how to use it safely;
- used correctly by employees.

When using personal fall protection equipment, it is important to position your anchor point as high as possible and to use as short a lanyard as possible, to minimise the potential fall distance. The shorter the fall distance, the lesser the forces generated from the fall. The ideal fall arrest system would utilise an anchor point and lanyard with virtually no fall distance at all, effectively creating a fall factor zero (*Figures 44 & 46*).

Fall Factor = Fall Distance ÷ Length of Lanyard

Figure 44 explains fall factors 1 and 2.

Risk of injury increases with greater fall distance, illustrated in *Figure 44* Fall factors (Fall Factor 2).

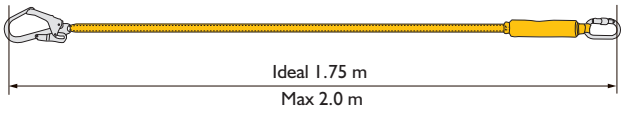


Figure 45: The maximum length of a fixed length lanyard.

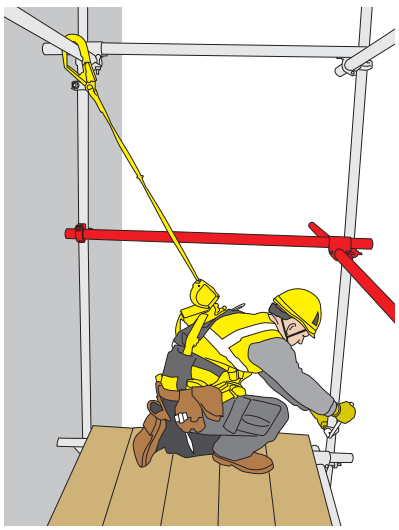


Figure 46: Shows a hybrid self-retracting fall arrest lanyard to minimise the potential fall distance and the consequences in a fall.

SECTION 05

5.3 Single fall arrest lanyards

Personal fall arrest systems that utilise a single fall arrest lanyard are only effective if continually attached whilst exposed to a risk of a fall. If the scaffolder has to change anchor positions to overcome an obstruction, they would be without fall protection, and exposed to an unacceptable risk (e.g. passing transoms when sliding a scaffold hook along a ledger). Scaffolders utilising a personal fall arrest system, with a single lanyard *(Figure 47*), are NOT permitted to traverse outside of guardrail protection, 'beyond the length of the lanyard' as they will be exposed to a risk of an unprotected fall. Scaffolders working within 1 metre of an unprotected edge (e.g. the end of a guardrail where there is a fall risk) must remain clipped on (see *Figure 15*), otherwise they must resort to an alternative system, such as double fall arrest lanyards where they can remain anchored.

Figure 47: Single fall arrest lanyard.

5.4 Double fall arrest lanyards

Certain scaffolding operations will require systems of work that use two energy absorbing lanyards or twin-tailed lanyards, commonly referred to as double lanyards (*Figures 48* and *49*). Scaffolders are typically required to use double lanyards when they have to access structures without a boarded platform or guardrail protection e.g. bridging using beams or temporary roofs erected in-situ.

The main benefit of using a double lanyard system of work is that it allows the scaffolder to remain clipped on continuously when exposed to the risk of a fall e.g. when crabbing along a beam, traversing at a leading edge or climbing a structure. In the planning process for scaffolding operations the need to climb the structure should only be considered as a last resort.

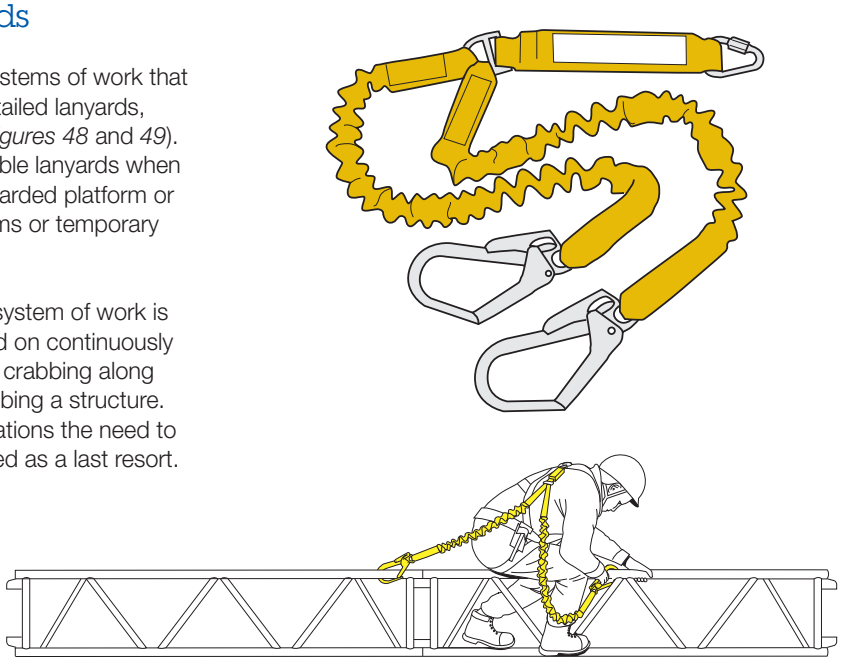


Figure 48: Twin-tail lanyard that shares a common energy absorber.

Figure 49: Double lanyard system using two separate fall arrest lanyards.

NOTE: A twin-tailed energy absorbing lanyard with a common energy absorber should ideally be used, because two separate lanyards and energy absorbers may be less effective and increase the loads transferred to the body in the event of a fall. Therefore, if two separate lanyards are used, they should not both remain connected to an anchor point other than for the momentary act of maintaining continuous connection.

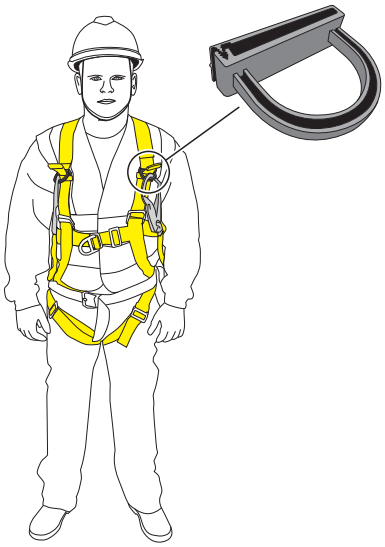
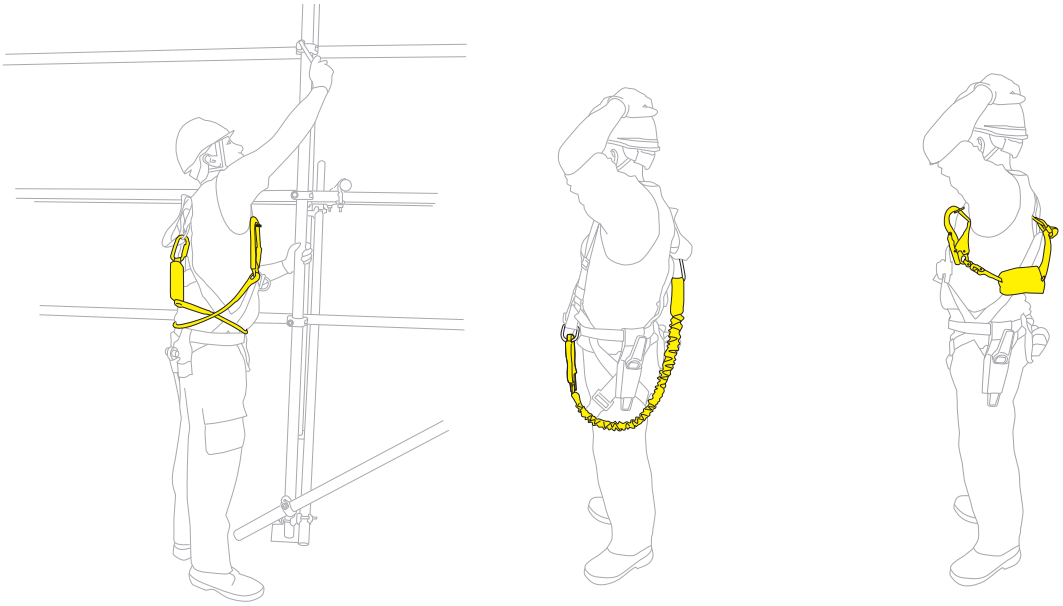


Figure 50: An example of a sacrificial lanyard parking point attached to harness for securing a lanyard when not in use.

IMPORTANT
When using only one of the twin-tail lanyards that shares a common energy absorber, scaffolders should NOT wrap the spare lanyard around their body or attach it back to the harness or tool belt, as this could reduce the effectiveness of the energy absorber and increase the load transferred into the body in the event of a fall. The spare lanyard, when not in use, should either be clipped onto the same anchor point, hang free or be clipped to a purpose designed sacrificial lanyard parking point on the harness (Figure 50).

A trailing lanyard when not in use can present a snagging, entanglement and tripping hazard to the scaffolder. When not working at height or using the lanyard it should be securely stowed away. Elasticated type lanyards and self-retracting type lanyards (incorporating a mini-inertia reel) will reduce the risk associated with a trailing lanyard (*Figure 51*).



(i). A conventional fixed-length lanyard wrapped around the body and secured when not in use.

(ii). A contracted elasticated type lanyard reduced risk from a trailing lanyard when stowed.

(iii). A hybrid self-retracting lanyard with minimum trailing lanyard when stowed.

Figure 51: Typical options for stowing and securing a single lanyard when not in use, to reduce the risk from a trailing lanyard.

SECTION 05

5.5 Anchor points, connectors and anchor devices

PFPE is totally reliant on being attached to a suitable anchorage. To ensure the safe performance of the system, the likely loads that would be transferred into the anchorage and the ability of an anchor point and any supporting structure to resist those forces, must be established.

Very high loads can be transferred into an anchorage when a fall is arrested (6kN or more). Manufacturers and suppliers of personal fall arrest equipment should provide information on potential anchor loads.

Anchor points must be suitable for the potential loads imposed in an arrested fall. Employers must consider the availability and suitability of anchor points when designing a system of work. Temporary works designs must consider the suitability of structures to be used as anchors for personal fall protection equipment as part of the designer's risk assessment (see Section 2.9 – Temporary works design). Scaffolding structures that require bespoke design and routinely rely upon the use of personal fall protection equipment for erection, altering and dismantle require special consideration by engineers for the availability and security of anchor points.

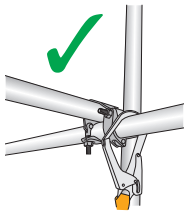
If scaffolders are unsure about the reliability of a proposed anchor point, they should stop work and refer to their employer. Employers should seek advice from a competent engineer regarding the suitability of anchorages for PFPE.

5.6 Anchorage to Tube & Fitting Scaffolds

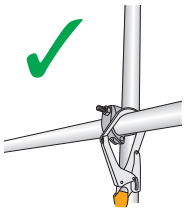
Scaffolds must be erected in accordance with the relevant British and European Standards (e.g. BS EN 12811) and Technical Guidance (e.g. NASC TG20) so that they are adequately stable. Where ties and stability measures (e.g. buttressing, kentledge, guys and anchors etc.) are required they should be installed and removed as work progresses to ensure optimum stability against overturning or collapse of the structure. This includes the use of any temporary (dummy) stability measures required solely for erecting, altering and dismantling purposes. It has been established by the NASC, through independent testing, that steel tube and fitting TG20 compliant scaffolding can provide a safe anchor point for a scaffolder wearing a full body harness and attached by a lanyard with an energy absorber (see Suitable scaffold anchor points *Figure 52* and Unsuitable anchor points *Figure 53*). Where alternative scaffolding materials are used, such as, aluminium or glass reinforced plastic (GRP), the users must contact the supplier to ensure anchorage to the structure is appropriate.

5.6.1 Suitable scaffold anchor points:

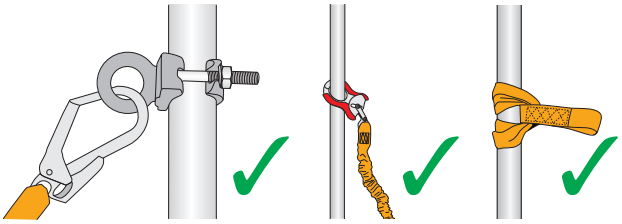
- Ledgers and transoms supported with load bearing couplers
- Standards, but only when using a suitable anchor device designed for the purpose (*see Section 5.7*) and no joints between the lift and the attachment point
- Guardrails supported with load-bearing couplers (guardrails within a scaffold structure)
- Plan braces (horizontal) supported on right-angle couplers



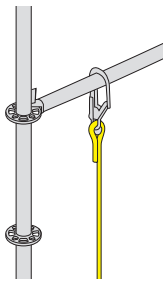
Ledger on right angle couplers



Guardrail on right angle couplers



Proprietary anchor devices for standards



As per system scaffold manufacturer's instructions

Figure 52: Examples of suitable anchor points and devices.

5.6.2 Unsuitable scaffold anchor points:

- Ledgers or guardrails supported with putlog clips (single couplers)
- Ledgers or guardrails within a bay where it has a joint
- Standards unless a suitable anchor device is used designed for the purpose
- Standards with a joint between the lift and the attachment point
- Puncheons
- Transoms at foot level or below
- Putlog transoms or bridle tubes
- Underslung tubes below ledgers on non load-bearing couplers
- Reveal or prop tie assemblies
- Vertical braces (e.g. façade or ledger braces) or other diagonal tubes (e.g. spurs or rakers)
- Other tube open ended or not supported either side of the attachment position e.g. protruding end of a transom, needle or dropper
- Standalone edge protection, unless designed to be used as a suitable anchor point for the purpose.

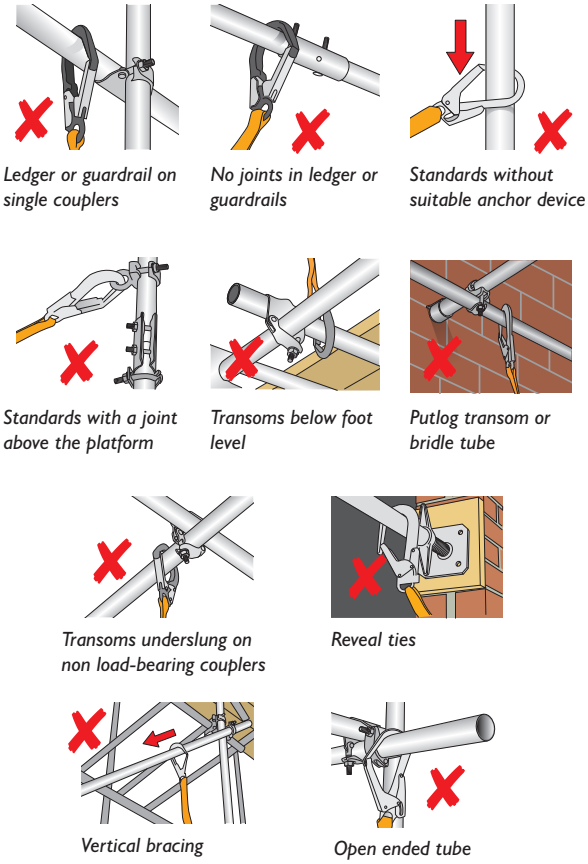


Figure 53: Examples of unsuitable anchor points.

5.7 Anchoring to scaffolding standards

Proprietary anchor devices for anchoring to scaffolding are available that enable scaffolders to attach their lanyard to vertical standards (*Figure 54*). This means that scaffolders can take advantage of a higher anchor position in preference to attaching to the ledger below their feet.

Karabiners that are designed especially for attaching to scaffold standards make an effective and efficient anchor device. Webbing slings specifically designed to wrap around standards to create an effective anchor device. Another design includes special couplers that can be pre-assembled on standards before they are erected as part of a planned system of work.

These devices provide scaffolders with alternative and convenient anchor positions as they access an unprotected lift. Always refer to the manufacturers' instructions to ensure safe use.

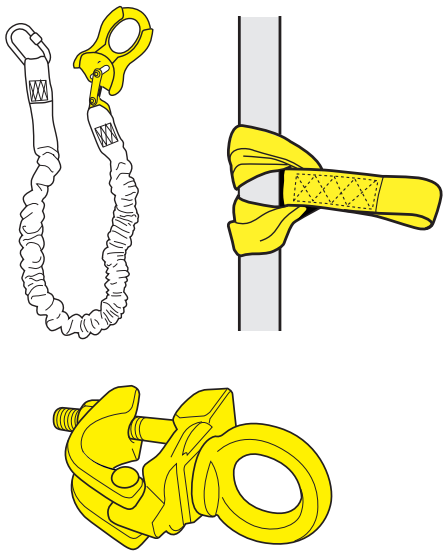


Figure 54: Anchor devices These pictures illustrate the use of connectors specifically developed for use as anchor devices to scaffold standards.

5.8 Anchorage to proprietary scaffolding systems

The NASC recommends that you follow the scaffolding system manufacturers' instructions as to the suitable anchor points for personal fall protection equipment. The requirements of manufacturers to consider fall prevention and protection for their products, is outlined in Section 7.2 Proprietary system scaffolding (page 44).

SECTION 05

5.9 Guidelines for anchorage on other structures

Alternative anchor points that may need to be used for scaffolding operations should always be checked to ensure they are suitable and sufficient and where necessary approval must be sought from the client or owner. If an alternative anchor point is required (e.g. steel beam) then an assessment may need to be made by a competent engineer. All permanently installed anchorage points or systems must have a current inspection and test certificate available for inspection, in accordance with the relevant British and European Standard.

Other possible anchorage points could include, for example:

- Beams;
- Girders;
- Any other structural steelwork;
- Wire systems; and,
- Permanently installed anchorage points

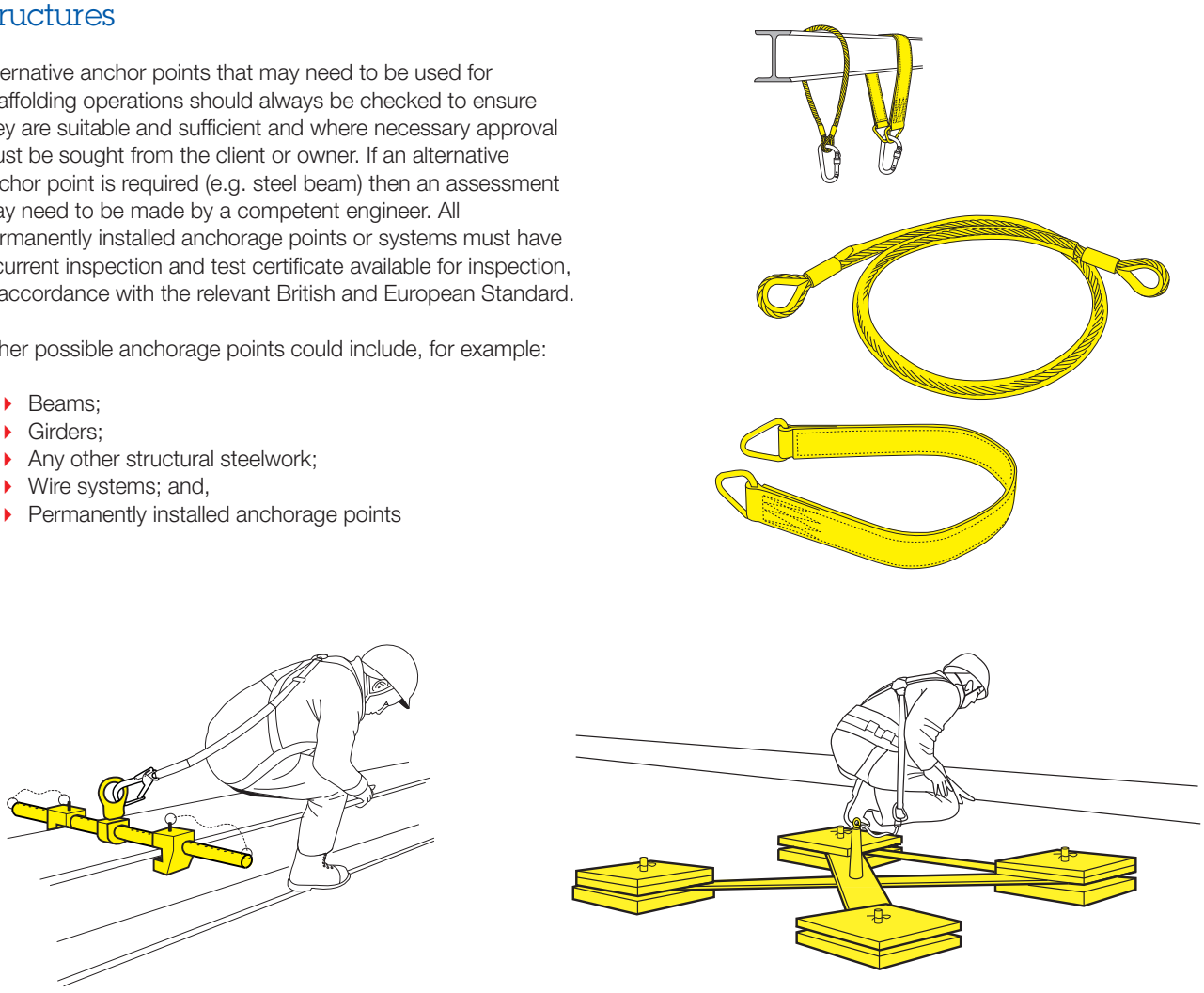


Figure 55: A selection of special connectors and anchor devices.

5.10 Anchorage to lightweight mobile access towers (MATs)

Generally, personal fall protection equipment should not be used during the erection, altering or dismantling lightweight mobile access towers (MATs), as they do not provide a suitably stable or secure anchorage. The Health and Safety Executive (HSE) supports a system of work for the erection, use and dismantling of MATs that minimises the risk of a fall. The NASC recommends that scaffolders required to erect, alter or dismantle MATs should be trained in accordance with the Construction Industry Scaffolders Record Scheme (CISRS) or similar.

5.11 Inertia reels

Retractable line fall arrest devices are commonly known as inertia reels, lines or blocks. A steel cable or material webbing line extracts and retracts automatically and, should a fall occur, a braking mechanism stops the line paying out to arrest a fall, similar to the operation of a car seat belt.

Inertia reels are available in various lengths, sizes of block and critically weights, as they are required to be manually handled. Care must be taken when considering a system of work using inertia reels, as they must be suitable for the scaffolding operation and be used in accordance with the manufacturer's instructions. All retractable line fall arrest devices must be manufactured and tested in accordance with BS EN 360.

Most inertia reels are designed for an anchor point above the scaffolder to limit the distance a person can fall to a minimum. This is due to the fact that many inertia reels have no or little energy absorption capability should a fall occur. Generally, inertia reels should only be used in a broadly vertical plane with minimal horizontal movement, thus minimising the pendulum effect should a fall occur (e.g. Slung scaffold *Figure 57*). The working area and horizontal traversing is restricted because the angle of the line from vertical can be no greater than that specified by the manufacturer, to reduce the risk of injury from the pendulum effect or swing fall risk as it is also known (*Figure 56*).

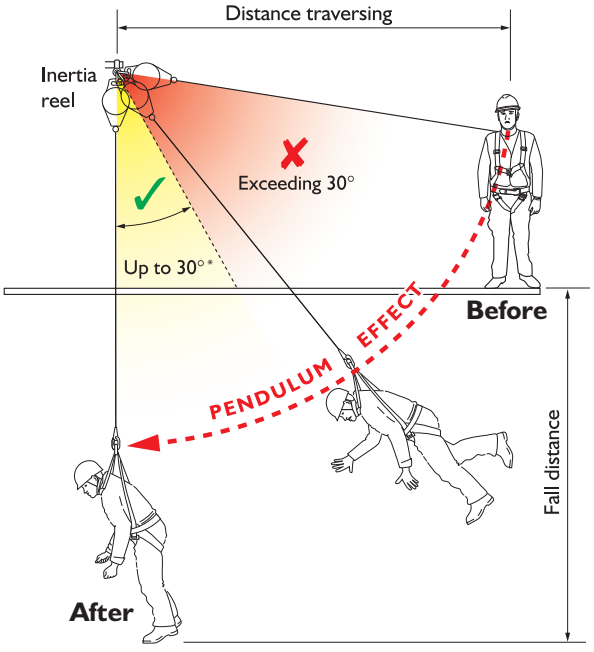


Figure 56: The pendulum effect. This illustration shows the dangers of the pendulum effect also referred to as the swing fall risk. The faller will swing like a pendulum, at risk of striking the structure or the ground.

IMPORTANT
Do not exceed the manufacturer's recommended maximum angle from the vertical.

Where an inertia reel manufacturer allows horizontal use, employers must design a system of work that minimises the swing fall risk. The risk of the line being run against a sharp edge and failing also needs to be considered.

Inertia reels are ideally suited for drop-lift or slung scaffold structures, where a suitable anchor point can be erected above, and scaffolders are able to erect, alter and dismantle lift(s) below whilst remaining attached. When specifying inertia reels, consideration must be made for rescue and recovery should a fall occur. Where necessary, retrievable inertia reels should be specified that allow colleagues to winch the casualty up or down to safety by deploying an integral handle or similar device (see Section 5.17– Rescue). Where steel inertia lines are specified then webbing connection strops should be used. This will assist the user with self-connection to the line and enable a rescuer to release the primary fall arrest equipment by cutting the webbing strop, if necessary, in the event of a fall (*Figure 57*).

Where the inertia reel is mounted out of reach of the work area (usually above), a tag line can be fitted to the end of the spooling line. This usually allows attachment connection to be spooled out of the reel, and allowed to retract under control, without need to climb up to the reel. The tag line should be coiled and stored ready for refitting when the worker disconnects from the line. Note that the tag line is a lightweight, non load-bearing line.

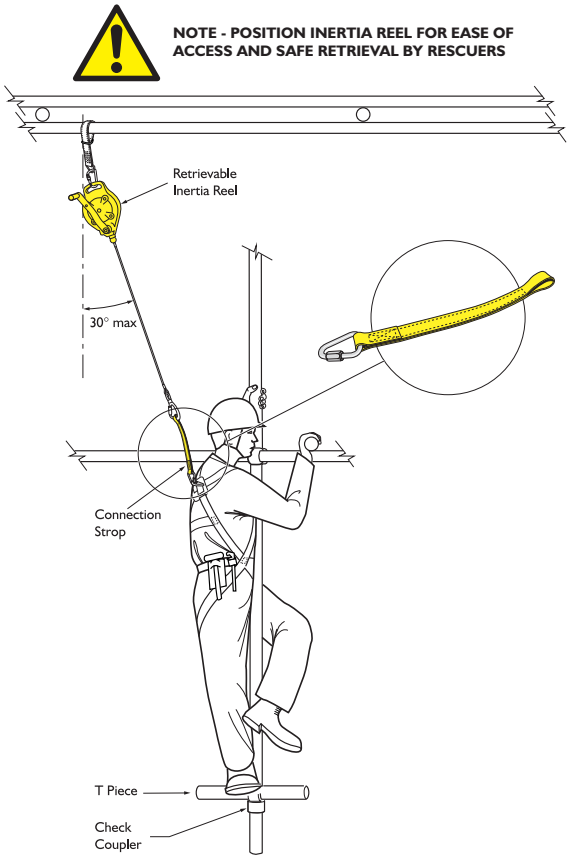


Figure 57: A slung scaffold being erected by a scaffolder utilising an inertia reel as part of the personal fall protection system (inset) Webbing connection strop for use with lines. They provide ease of connection by the scaffolder and emergency release in rescue when using steel lines.

SECTION 05

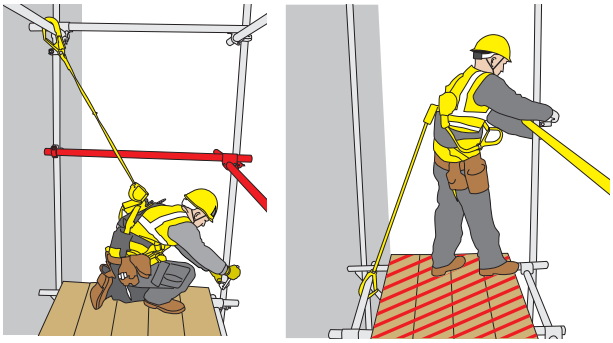
5.12 Hybrid self-retracting lanyards

Several manufacturers now offer self-retracting fall arrest lanyards that incorporate a mini inertia reel and energy absorber capability. A number of these special devices have been designed and tested so that they can be attached to an anchor point below foot level (e.g. in a fall factor 2 scenario), similar to a fixed length fall arrest lanyard.

These self-retracting lanyards can be used as single or double (twin) lanyard systems where conventional fall arrest lanyards would be used. Therefore they are suitable for many routine scaffolding applications and can also be used for some tasks where an inertia line would be deployed (e.g. small cantilever structures such as a protection fan).

By using these devices, fall distances can be reduced, trailing lanyard hazards minimised and greater flexibility is given to the scaffolder.

For the use of specific makes and models of self-retracting lanyard systems, always check the manufacturers' instructions.



(i). Anchored above *(ii). Below foot level*

(iii). As a double lanyard

Figure 58: Examples of a hybrid self–retracting lanyard system in various scaffolding applications.

5.13 Horizontal line systems

Horizontal line systems can enable scaffolders to traverse a lift or other structure whilst maintaining fall protection. Scaffolders should never erect or use improvised lines with equipment that is not designed or suitable for the purpose. Employers must consult the manufacturers' instructions or seek engineering advice to ensure the system chosen is suitable.

Scaffolders MUST be trained in the installation and use of the temporary horizontal line system used. The three major factors that need to be considered when selecting a suitable horizontal line system are:

I. Clearance distance
The amount of deflection in the line and the clearance required below the attachment position (e.g. some systems at 20 metres in length can deflect more than 6 metres, where others have a deflection of less than 2 metres). Therefore, if a system is used that has a maximum deflection of 6 metres with a 1.75 metre lanyard to attach to the line, it would only be an effective personal fall arrest system at the 10 metre (5th lift) level or above. The line adopts a 'V' shape as it deflects between supports when arresting a fall. The user travels to the centre of the 'V' causing a swing fall risk. This risk is greater for multiple user systems. If using an inertia reel with a horizontal line system, users need to be aware of the risk from inertia reels continuing to pay out after a fall has occurred due to deflection and elasticity in the line causing the faller to rebound. This is known as the racketing effect and may affect clearance distances required.

II. Anchor Loads
The supporting structure for anchoring the ends of the line system needs to be designed and calculated. Guardrails/edge protection on scaffolds are unlikely to provide the required loading requirements and should not be used as attachment points for horizontal line systems. With some systems, end loads into the anchor points need to be calculated allowing 24kN (approximately 2.4 tonnes of force). If attached to scaffold components (e.g. the standards) the forces generated in a fall could significantly deform the structure and may affect its stability or the security of the anchorage. Consideration needs to be given to the suitability and design of anchor positions for line systems, in accordance with the potential end loading, specified in the manufacturers' instructions.

III. Capacity
The maximum number of persons that can be attached to the system at any one time. Line systems are available that offer protection to only one or two scaffolders at a time (i.e. if a system is only suitable for one person and two scaffolders require protection, then two separate systems would be required). In addition, for a horizontal line positioned close to an open edge, deflection of the line during a fall is likely to drag the persons in the vicinity off the platform. For these reasons the design and use of horizontal line systems needs to be restricted to use where this is unlikely to occur. Where necessary rescue procedures need to cater for more than one person suspended.

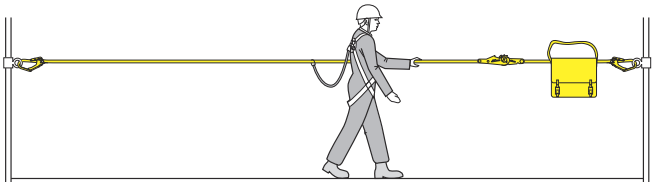


Figure 59: An example of a proprietary line system.

5.14 Inspection and maintenance of personal fall protection equipment

Fall arrest equipment made from rope or webbing materials is particularly vulnerable to damage and wear and tear during normal use by scaffolders. Therefore all scaffolding contractors must ensure adequate arrangements are made for the storage and inspection of all fall protection equipment, so that it is maintained fit for use.

The Health and Safety Executive (HSE) and the NASC recommend three levels of inspection for all personal fall protection equipment, as a minimum requirement as described in Health and Safety Executive (HSE) booklet INDG 367 and NASC Safety Guidance Note 16 (SG16):

I. Pre-use checks

This level of inspection should be carried out by the user for both harnesses and lanyards at the beginning of each shift and are a means of checking that there are no visible or surface defects with the equipment. Pre-use checks should be tactile and visual. The whole lanyard and harness should be subject to the check, by passing it slowly through the hands (e.g. to detect softening or hardening of fibres or ingress of contaminants). A visual check should be undertaken in good light and will normally take just a few minutes.

Any defects or concerns identified during the pre-use check should be raised with the employer before the equipment is used. A suitably competent person, having received appropriate training, must carry out a detailed inspection to either satisfy themselves that the equipment is safe to use or remove from use and destroy the equipment depending upon the defect and concern raised.

There should be additional harnesses and lanyards available to use as replacements in the event that defective equipment has been taken out of use.

II. Detailed inspections

These are more formal in-depth inspections looking at the equipment for underlying defects or problems that may not be identified during the pre-use checks.

For frequently used equipment, particularly those used in arduous conditions such as scaffolding, the NASC recommend that a formally recorded detailed inspection is undertaken at least every three months.

III. Interim inspections

These are also in-depth inspections and may be carried out when necessary between detailed inspections. The need for interim inspections and their frequency should be identified through risk assessment. Examples of situations where interim inspections may be appropriate include:

- Arduous work environments involving paints, chemicals or grit blasting operations.
- Very hot environments or the risk of contact with hot materials or surfaces (e.g. foundries, steel works, welding, burning, cutting with abrasive wheels etc.).
- Acidic or alkaline environments (note that some fabrics offer low resistance to acids or alkalis).

Ancillary equipment (e.g. connection strops and anchor devices etc.) must also be subject to a suitable inspection regime. Specialist personal fall protection equipment (e.g. inertia reels) must be inspected before use and subject to servicing and maintenance in accordance with the manufacturers' recommendations.

You must record the results of all detailed inspections for each piece of equipment. If defects are identified they must be recorded. Records of inspections should be kept until the equipment is destroyed. If any defects or concerns are identified as a result of a pre-use check or detailed inspection then the equipment must be withdrawn from use and destroyed. Any lanyard and harness that has been used to arrest a fall should never be re-used and the equipment removed from use and destroyed.

Where equipment is removed from use and destroyed, this should be recorded in the inspection register.

5.15 Personal fall protection equipment manufacturers' instructions

Under the Personal Protective Equipment Regulations and British/European Standards on personal protective equipment (PPE), product information must be supplied by the manufacturer. This information should be read and understood by the scaffolders before using the equipment.

5.16 Climbing scaffold structures

The routine climbing of scaffolding structures should be avoided wherever practicable and scaffolders should establish a scaffolders safe zone when possible and use safe means of access and egress. However, in some cases climbing is a necessary element of the scaffolding erection, altering and dismantling process. Examples of typical scaffolding operations that may necessitate some climbing activity include:

- Beam work
- Suspended scaffolds
- Cantilevered scaffolds
- Temporary roofs
- Staging and events structures
- Falsework structures
- Other complex structures without working platforms

IMPORTANT
When working outside of a scaffolders safe zone or before encroaching within 1m of a leading edge, the scaffolder must be clipped on and maintain 100% anchorage with personal fall protection equipment that minimises the distance and consequences of a potential fall.

SECTION 05

5.17 Rescue

A rescue and recovery plan must be an integral part of any system of work involving personal fall protection equipment. This section outlines the considerations that need to be made for rescue planning should an arrested fall occur and a scaffolder(s) becomes suspended by their personal fall protection equipment.

There are health risks associated with any person suspended in a fall arrest harness, therefore an adequate plan must be in place for every scaffolding operation, where fall arrest equipment is used, to ensure a speedy rescue. **However, rescue plans must not rely solely upon the emergency services to recover a person suspended by personal fall protection equipment** (*Figure 60*).

The rescue techniques and equipment selected will depend upon the type and complexity of the scaffolding structure.

Any rescue plan must consider the potential danger in which rescuers may have to place themselves, to carry out a rescue. Therefore, when selecting rescue equipment, priority should be given to equipment and techniques that would minimise the risk of further accidents and injuries to the rescuers.

Rescue equipment that may be used remotely from a working platform or scaffolders' safe zone ought to be considered first. For example, if a personal fall protection system using inertia reels is selected for a slung scaffold, then a retrievable type inertia reel should be specified. Retrievable inertia reels (manufactured to BS EN 1496) incorporate a winch mechanism that enables colleagues to recover a suspended scaffolder should a fall occur (*Figure 61*).

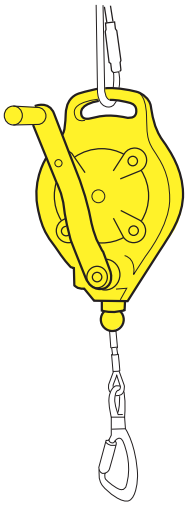


Figure 61: Retrievable type inertia reel.

The NASC has produced a separate Safety Guidance note (SG19) to help scaffolding contractors in conjunction with their clients to prepare a rescue plan as part of the risk assessment process for each job. Details of the rescue plan should be incorporated into the risk assessment and method statement (RAMS). Safety Guidance 19 – A guide to formulating a rescue plan (SG19) includes a range of standard rescue plans that can be adopted for many routine scaffolding operations.

Figure 60: Recovery from height by emergency services. Shows the emergency services using a MEWP to recover an accident casualty from height.

5.18 Assisted rescue (without specialist rescue equipment)

In many cases where a scaffolder suffers an arrested fall, they may be able to recover themselves, or their colleagues could assist in a rescue, without the use of specialist rescue equipment. It is feasible for a scaffolder to pull themselves into the scaffolding structure at a lower lift, or back onto the structure for example, depending upon the fall distance, providing they are not seriously injured or unconscious. If complete self-recovery is not possible, merely supporting themselves on a ledger or other part of the structure until rescued will significantly reduce the risks from the effects of suspension in a safety harness. Employers may also consider supplying special supports, available from PFPE suppliers, which are attached to or integrated during manufacture into the harness. These supports enable the scaffolder, in the event of an arrested fall, to release the straps and adjust them over their feet. Their body weight can then be supported by their feet until rescued, thereby reducing the risks from suspension fainting (otherwise known as Syncope).

A rescue plan could include: the use of site access equipment, such as, a Mobile Elevating Work Platform (MEWP), mobile access tower (MAT) or a crane with a personnel basket that could facilitate a rescue (see SG19).

5.19 Specialist rescue equipment

Rescue kits are available that can be deployed quickly by trained operators to facilitate a remote rescue using specialist equipment, without exposing the rescuers to unnecessary risk. These remote rescue kits enable rescuers to attach the equipment to the harness of the suspended scaffolder, release their primary fall protection equipment and either raise them to a safe platform or lower them to the base (*Figure 62*).

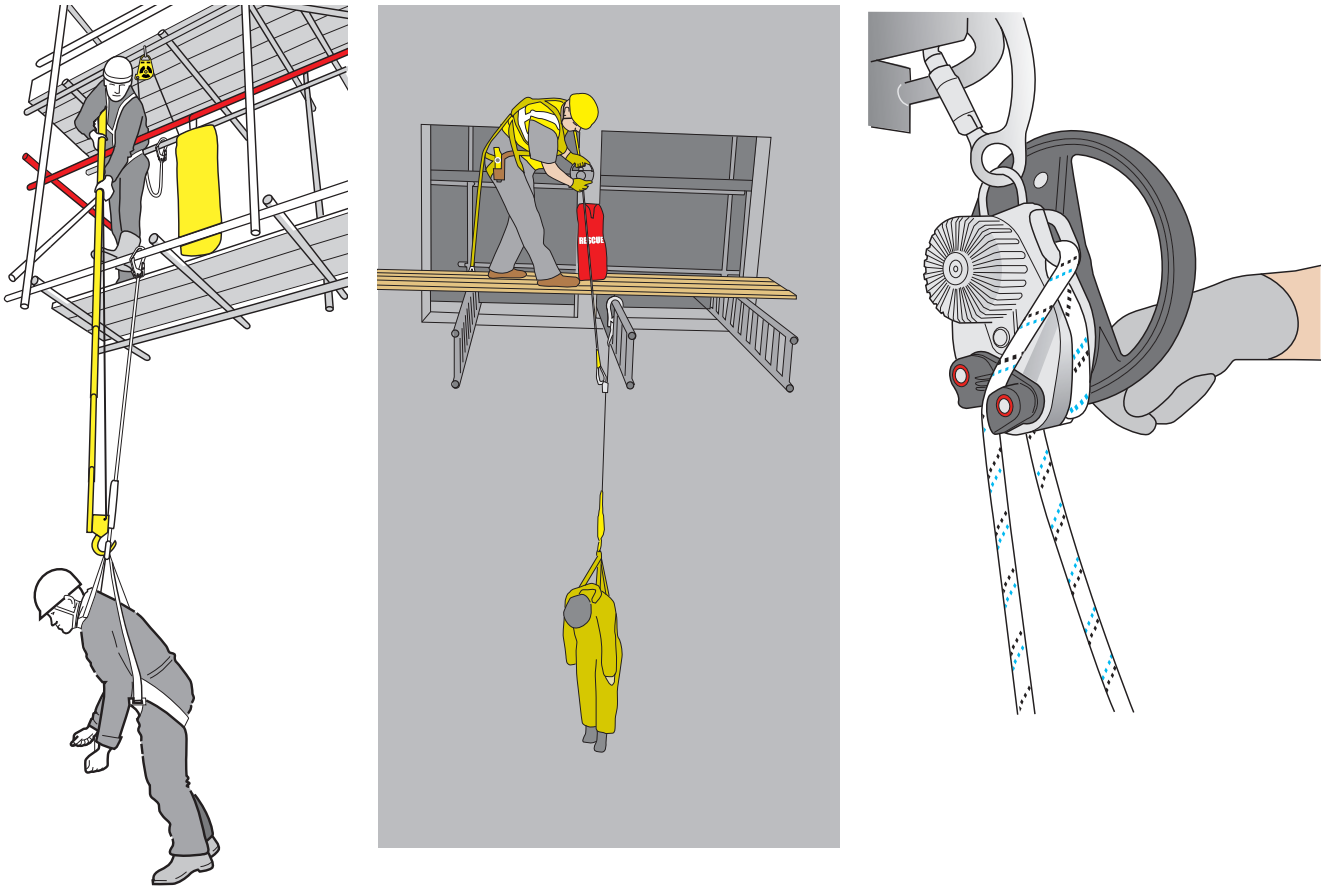


Figure 62: Examples of remote rescue equipment for scaffolding applications.

When choosing a rescue kit ensure that it is suitable for the scaffolding application. This includes for example:

- is there sufficient rope length to lower a person to the ground from the highest position if necessary?
- does the device allow casualties to be raised or lowered?
- is the device a descender only type, which may not be suitable for certain situations such as work over water or very high level work where a large quantity of rope would be required?
- is the rescue equipment readily available at all times when working at height?
- are there sufficient numbers of trained personnel available at all times during work at height that can use the equipment?
- are there suitable anchor points for attaching the chosen rescue equipment that are unquestionably reliable in an emergency?

Equipment and techniques can be used that requires a rescuer to descend (or abseil) down to the suspended scaffolder, attach the casualty to the rescuer and then release the scaffolder's primary fall arrest device (e.g. lanyard). The rescuer may then either raise or lower the casualty to safety (depending upon the equipment used). This type of equipment and technique places a rescuer at greater risk and should only be considered as a last resort (*Figure 63*).

Specialist rescue equipment must be subject to maintenance and an inspection regime to ensure that it is in good order whenever it is required to be used. Maintenance and inspection of rescue equipment should be in accordance with the manufacturers' instructions. Note that an inertia reel or other device that incorporates a winch to raise or lower a person is, by definition, lifting equipment under the Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) and requires thorough examination at six-monthly intervals. The only exception to this is dedicated rescue equipment that remains sealed, dry, undamaged and unused (i.e. bagged or crated). An extended thorough examination interval may be agreed by a competent person.

5.20 Rescue training

Employers must ensure when specifying specialist rescue equipment as part of a rescue plan, that an adequate number of scaffolders have been suitably trained in its use, including any refresher training and exercises necessary.

Rescue must be an integral part of all scaffolder training and instruction in accordance with this NASC guide.

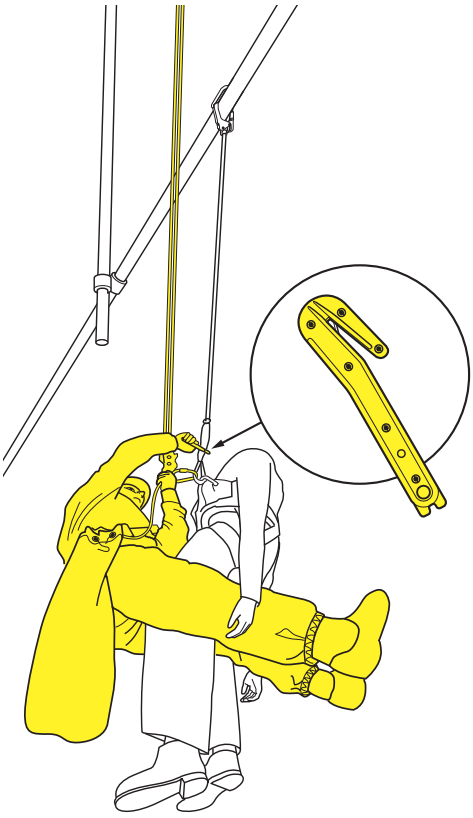


Figure 63: Fully assisted rescue situation. The rescuer has attached the casualty to themself and is cutting the lanyard webbing using a special cutting device that reduces the risk of accidentally cutting the rescue equipment.

Methods of access and egress

Safe access for use by scaffolders should be included as early as possible in the erection process and removed as late as possible during dismantling, removing the need for scaffolders to climb the scaffold structure.

It is recommended that wherever practicable, scaffolding should incorporate ladder access, ladder bays or stairways for the purpose of erecting, altering and dismantling scaffolding. A system of working should be adopted, where possible, that enables the scaffolders to work progressively away from and back towards their means of access and egress (i.e. ladder access or staircase) when erecting, altering or dismantling the next lift (*Figure 64*).

During the planning phase, clients and contractors who specify access and egress to and from scaffolding, should consider the hierarchy of access in NASC Technical Guidance 20 (TG20) Operational Guide (Section 8, *Figure 8.1*) and Safety Guidance 25 (SG25) Access and egress from scaffolds via ladders and stair towers etc. (*Figures 65-68*).

For special scaffold structures that do not normally include a method of access (e.g. falsework, shoring, loading bays etc.), consideration must be given in the planning process for the use of ladders etc. to avoid climbing the structure wherever possible (*Figure 69*).

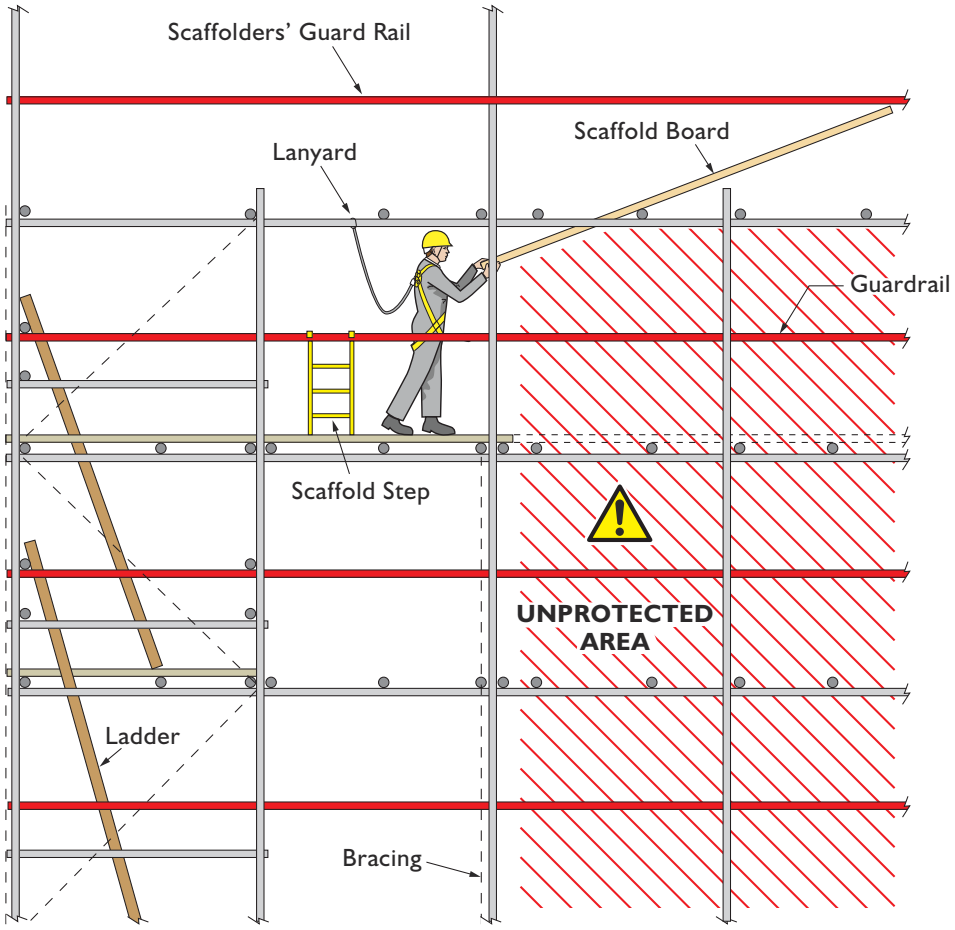


Figure 64: A Scaffolder raising platform boards to the next lift above working progressively backwards towards the ladder access.

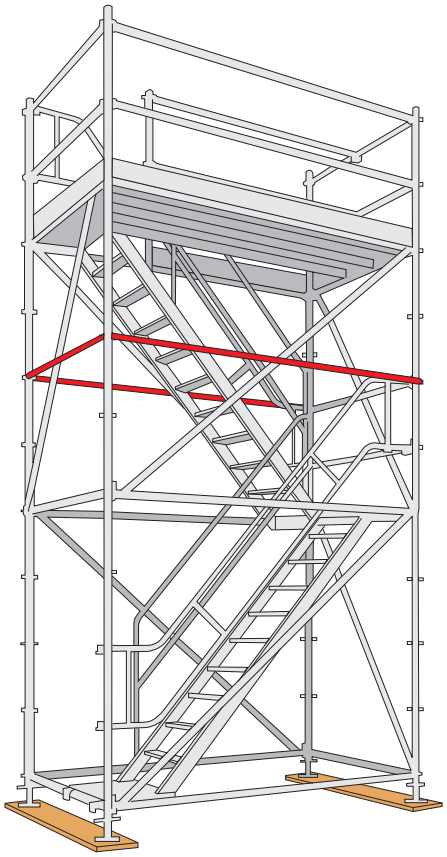


Figure 65: Typical proprietary system scaffold stairway

Fatal fall from scaffolding ladder access opening

Example of a self-closing ladder safety gate.

An incident occurred whilst working on the roof of a two-storey terraced house that was accessed using a ladder and a scaffold that had been erected by an unqualified scaffolder. Slates were being raised up to the roof using an electric hoist when a roofer fell through a gap adjacent to the hoist, falling six metres to the ground and tragically dying almost immediately.

Following an investigation by the Health and Safety Executive (HSE), it was found that the scaffolder, whilst not fully qualified to do so, had erected the scaffold leaving a 1.17m gap in the edge protection at the ladder access point and failed to fit a scaffold gate. This did not comply with industry standards or legal requirements for safe work at height. Furthermore, the roofer, who was in charge of work on site, allowed work to continue despite this unsafe environment. He also failed to appoint a qualified scaffolder and lacked the adequate health and safety training required to manage the site.

The HSE Inspector said of the incident:

"The tragedy of this incident was that it was totally avoidable. Preventative measures were inexpensive and required little time or effort. Reducing the size of the opening in the guard rails and installing a self-closing scaffold gate would have stopped this man from falling to his death. A scaffold gate costs around £40 and only takes a few minutes to install.

Those involved in scaffolding and roof work on smaller sites need to be aware of the potentially devastating consequences of failing to put basic safeguards in place."

After pleading guilty to breaching the Health and Safety at Work etc Act 1974, the roofer was fined £5,000 and ordered to pay costs of £6,318. The scaffolder also pleaded guilty to breaching the Health and Safety at Work etc Act 1974, fined £5,000 and ordered to pay costs of £6,318.

Source: HSE

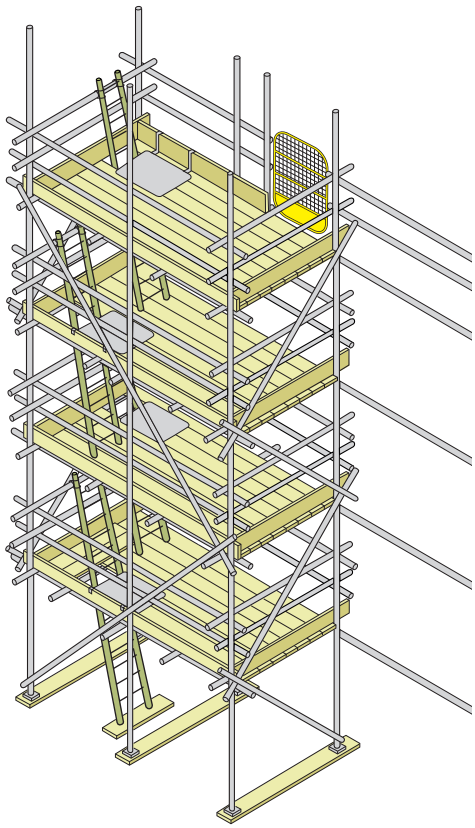


Figure 66: Ladder access bays with single-lift ladders.

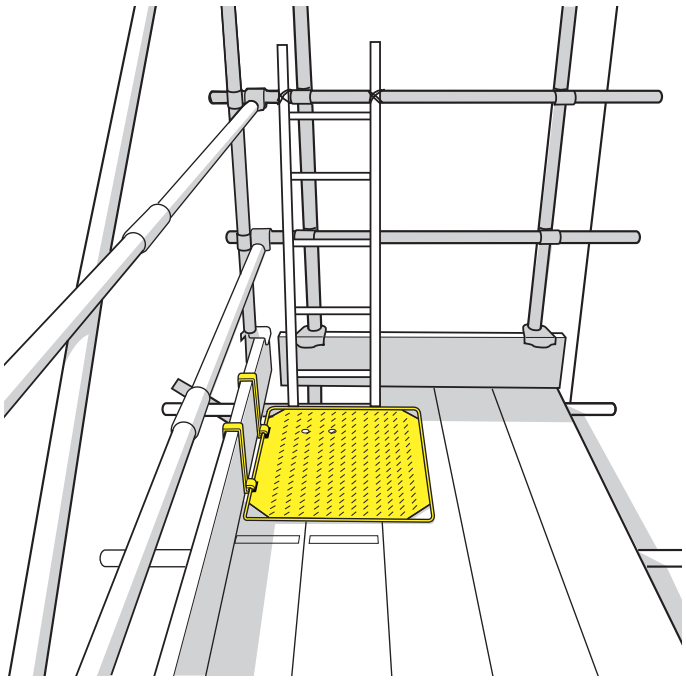


Figure 67: Internal ladder access with a protected ladder trap an example of good practice.

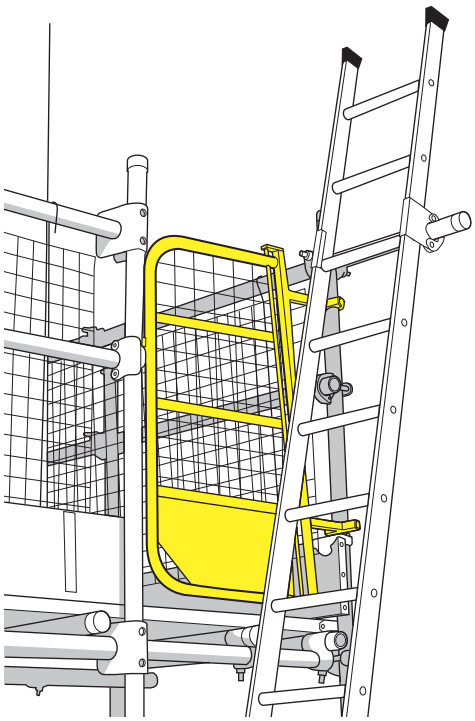


Figure 68: External ladder access using a safety gate as an example of good practice.

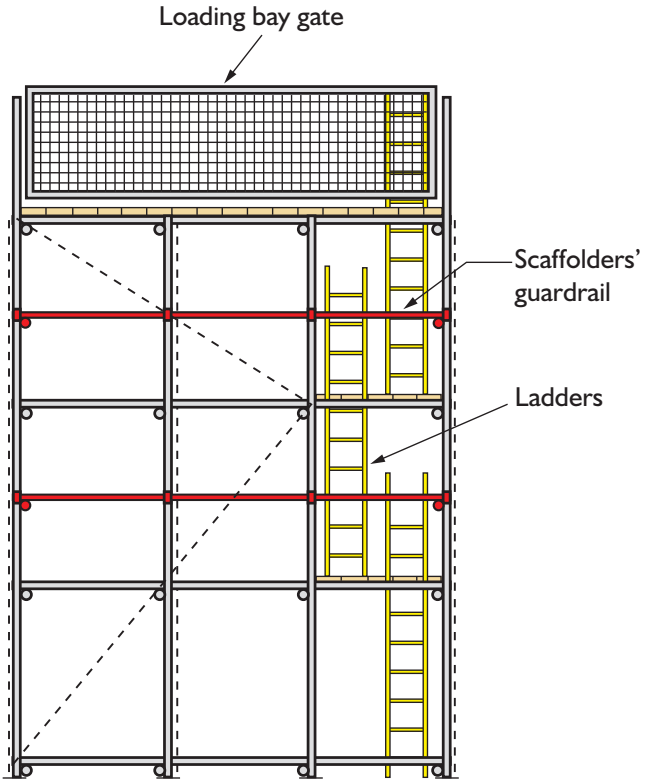


Figure 69: A standalone loading tower with ladder access installed for use by the scaffolders only. Following completion of the loading tower it is highly recommended that the ladders are removed or secured preventing access by others until required for alterations or dismantling.

Other scaffolding applications

The purpose of this section is to feature examples of good practice and specific guidance for various common scaffolding operations. In keeping with the general theme of this guidance it does not extend to all scaffolding operations; however, the methods and principles highlighted may be adopted as good practice.

7.1 Scaffolding from a Mobile Elevating Work Platform

Mobile Elevating Work Platforms (MEWPs) are also commonly referred to as 'cherry pickers', 'booms' or 'scissor-lifts'. MEWPs are available in all shapes and sizes and have often been considered to be a competitor to the scaffolding industry. In recent years, the availability and cost of hiring MEWPs as a safeguard against falls for some of the more hazardous scaffolding operations is now a viable option (*Figure 70*). It is important to recognise that MEWPs are only suitable for certain scaffolding applications and cannot be considered as a practical option for the majority of routine scaffolding operations. MEWPs can offer collective fall protection for some applications where scaffolders would typically rely upon personal fall protection equipment whilst climbing and working from the scaffold structure without a scaffolders' safe zone.

Where MEWPs are selected for erecting, altering and dismantling scaffolding, employers must have a safe system of work for their intended use. Care should be taken to select the most suitable type and specification of MEWP for the operation.

The use of a MEWP may not be suitable where there is restricted access, work near or over water or at very high levels.

Only Scaffolders who are authorised and trained (e.g. International Powered Access Federation (IPAF) powered access licence (PAL) or equivalent) should operate MEWPs. Planning for the use of MEWPs must consider the interfaces with the workplace environment and particular consideration for emergencies and recovery from height.

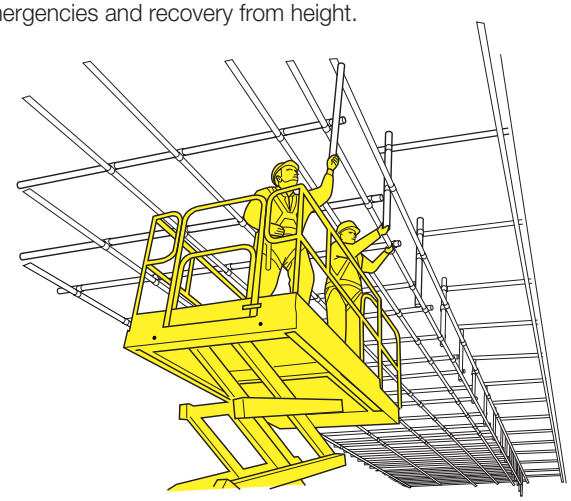


Figure 70: Scaffolders using a MEWP to erect a suspended scaffold.

IMPORTANT
The powered access industry recommends that work restraint lanyards are used to prevent the operator being exposed to a risk of falling from the platform when using certain types of MEWP (e.g. boom type). However, it is recommended by the NASC that scaffolders who regularly use MEWPs should consider using an adjustable fall arrest lanyard that may also be used for work restraint (*Figure 71*). Always check with the MEWP supplier to ensure only specified attachment points are used.

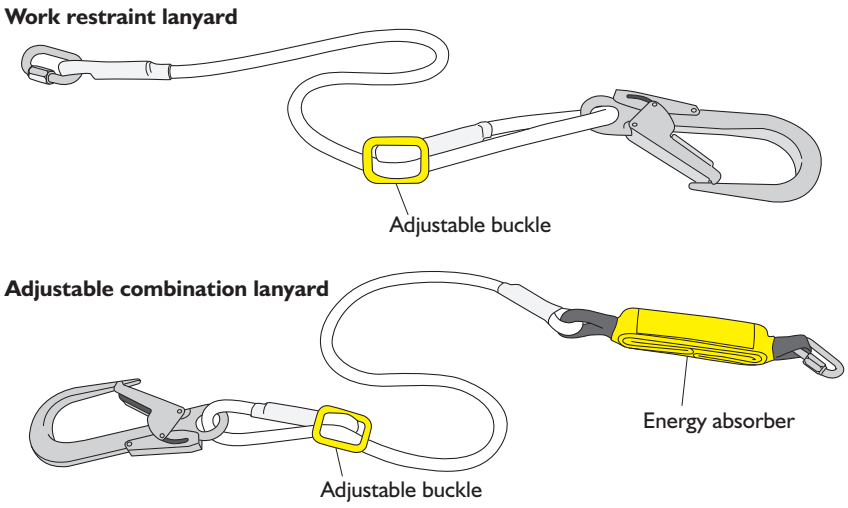


Figure 71: Illustration showing i. a work restraint only that must not be used in fall arrest, and ii. a combination lanyard that can be used in fall restraint and arrest when required.

SECTION 07

7.2 Proprietary system scaffolding

Manufacturers and suppliers of proprietary system scaffolding have legal duties to carry out appropriate research and testing of their products and to provide information and instructions. They must ensure the equipment can be used safely, meets the provisions of the Work at Height Regulations and any other statutory requirements or industry guidance, regarding fall protection.

In addition to the minimum requirements of any British or European manufacturing standards, manufacturers should undertake a product risk assessment. The purpose of a product risk assessment in this case is to ensure that safe erection, altering, use and dismantling processes are specified. Scaffolding contractors who use system scaffolding must ensure that it is erected, altered and dismantled in accordance with the manufacturers' instructions for safe use. Particular attention should be given to the use of suitable anchor positions for personal fall arrest equipment when applying the principles of this NASC guidance *(Figure 72*).

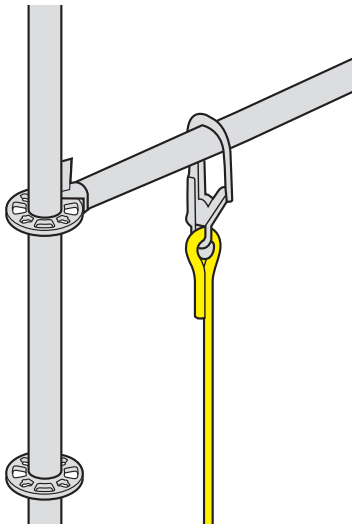


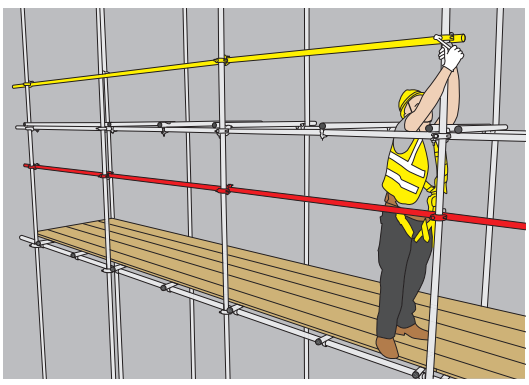
Figure 72: An example of an anchor point for a proprietary scaffolding system as per the manufacturers' instructions.

Temporary works designers must also consider fall prevention and protection measures as part of the design risk assessment when specifying system scaffolding products.
Scaffolders must receive all necessary information, instruction, training and supervision in the safe erection, altering and dismantling of the proprietary system scaffolding used, in accordance with the manufacturers' instructions, bespoke designs and ideally have received training in accordance with the CISRS System Scaffold Product Training Scheme (SSPTS).

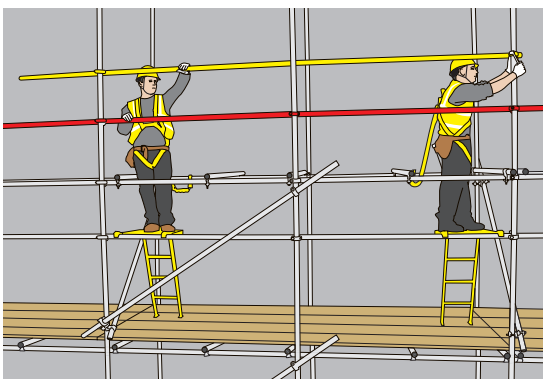
7.3 Shorter lift heights (Bricklayers' lifts)

Progressive scaffolds for brickwork are normally erected using 1.35-1.5 metre lift heights. Many of the established collective fall protection systems do not easily accommodate these smaller lift heights. In such cases the scaffolders' step or small proprietary standings may be used to enable scaffolders to install guardrails in advance to the next lift or remove them during dismantling. The intermediate guardrail can often be fixed simply from the lift below as they are typically only 1.75-2 metres above the lift (see *Figure 73*).

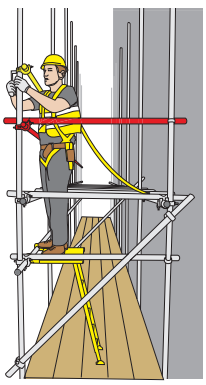
(iv)



(i)

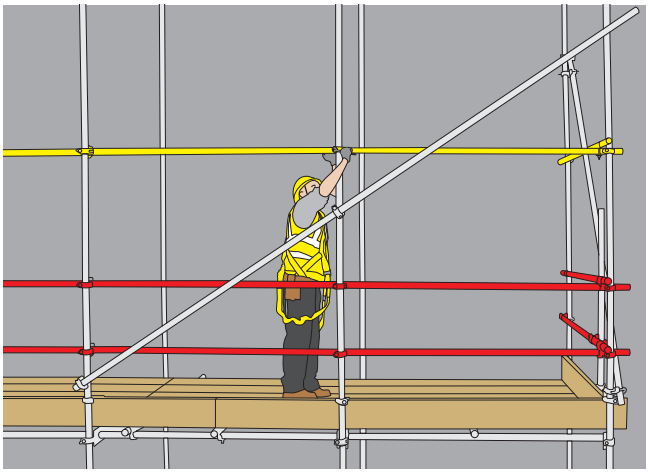


(ii)

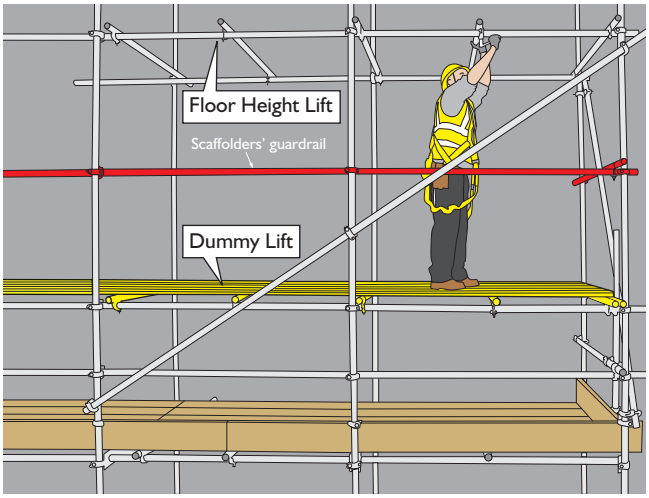


(iii)

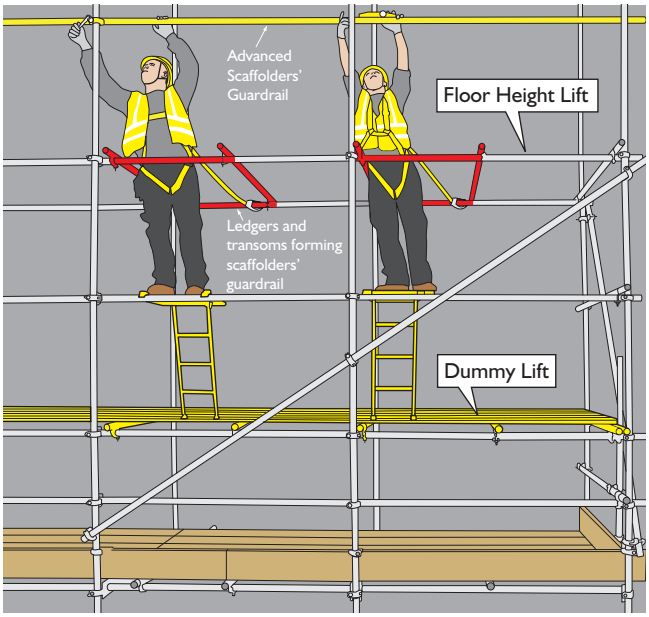
Figure 73: Example of a sequence of work used to erect guardrails in advance for shorter lift heights. (i) Shows the intermediate guardrail installed from the lift below, (ii) a scaffolders' step used to install the main guardrail and (iii) showing the stop-end guardrail. (iv) A 600mm proprietary staging platform being used as an alternative step-up.



(i) Guardrail installed in advance to provide a safe zone for the dummy lift.



(ii) Dummy lift installed to enable fixing of the floor height lift.



*(iii) Scaffolders' steps used to install the guardrails in advance on the main lift to form the **scaffolders' safe zone**.*

Figure 74: A sequence of work for floor height lifts using a combination of methods to create the scaffolders' safe zone.

7.4 Tall lifts (floor height lifts, pavement lifts and gantries)

Scaffolding with taller lift heights such as the erection of pedestrian base lifts (up to 2.7 metres) or floor height lifts (up to 3 metres) are often difficult to provide collective fall protection for, as most of the common systems of work are designed for a standard 2 metre lift height only.

Scaffolders may have to use a combination of systems to achieve full collective protection for taller lifts. For example, using the 'short lift method' (Section 4.3.3., page 22) to erect a temporary lift (or dummy lift) at approximately 1 metre and then resorting to other collective protection methods to install guardrails on the working platform (see *Figure 74*). The temporary lift can then be dismantled to allow unimpeded access on the working lift during use of the scaffolding, but should be reinstated for any alterations and dismantling. Note that temporary guardrails should be left in place where possible for dismantling.

Alternatively, floor height lifts can be constructed by splitting the lift height into a conventional 2 metre lift and a shorter lift which can remain in place throughout the works.

A MEWP or mobile access tower are other examples for employers to consider for erecting/dismantling tall base lifts providing the ground conditions are suitable, as an alternative to installing a dummy lift.

Where scaffolders' steps are used to install taller lifts (as opposed to fixing guardrails in advance) guardrails should be installed to prevent falls from the step and scaffolders must remain clipped-on (see *Figure 75*).

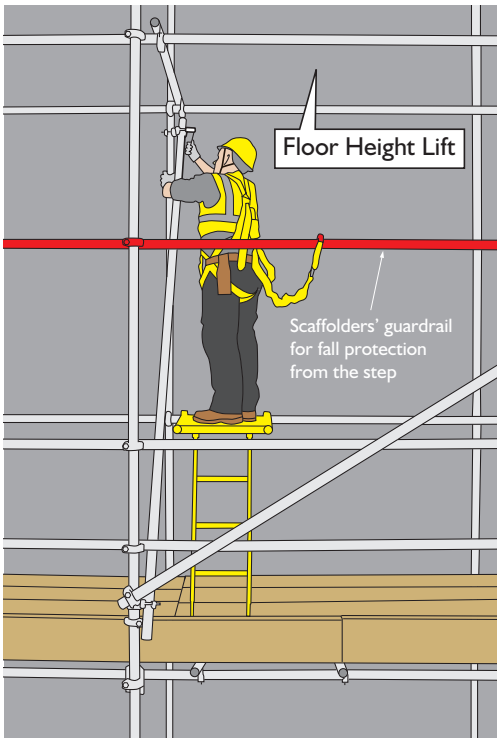


Figure 75: Tall Lifts – Scaffolder using a scaffolders' step to form a floor height lift

7.5 Birdcage access scaffolding

The basic principles of this guidance can be applied to birdcage access scaffolding. The main risk of a fall is associated with raising and lowering boards over a large surface area. Scaffolders should plan the erection and dismantling by systematically working away from and back towards the access position.

Birdcage scaffolding normally consists of one working platform and scaffolders have two options when erecting the intermediate lifts:

i. Fully board the whole area
– this means that all bays will require transoms and all of the boards will have to be raised systematically. Scaffolders must remain clipped on when encroaching less than 1 metre from the leading edge. Only the perimeter or outer elevations of birdcage (if exposed) will require guardrails.

ii. Partially boarded
– this means constructing scaffolders' safe zones in runs for the erection of the birdcage scaffold (*Figure 76*) . Internal falls must be protected with guardrails.

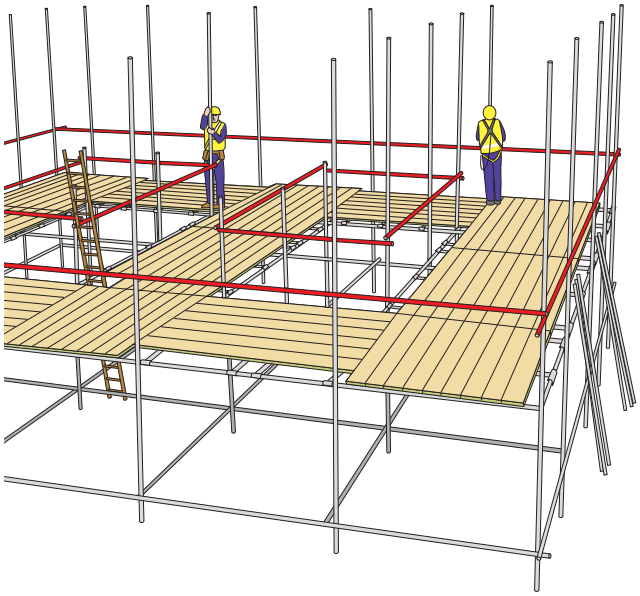


Figure 76: Example of a birdcage scaffolding system of work. Shows the scaffolders' safe zone used in runs for the erection of birdcage scaffolding. All bays can be reached to fix ledgers, transoms and braces without the requirement to fully board the entire structure.

7.6 Loading bays

Loading bays (also known as loading towers) can be constructed as standalone structures or attached to access scaffolds for the loading and storage of materials and equipment. The basic principles and methods of protection featured in this guidance can be utilised for the erection, alteration and dismantling of loading bays.

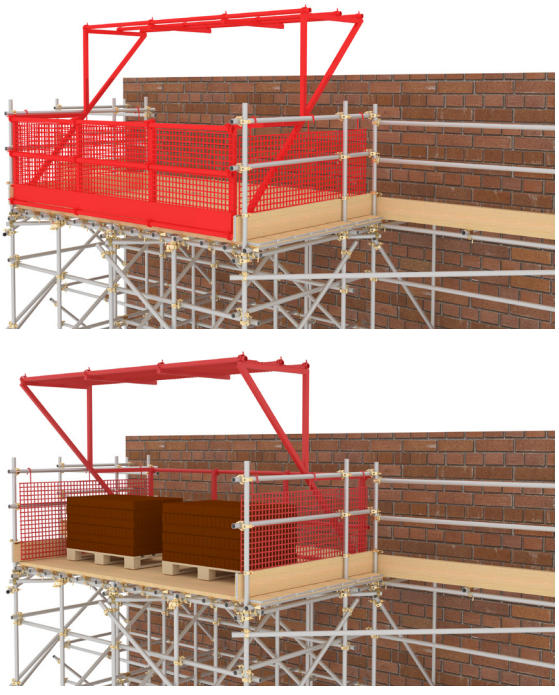


Figure 77: Example of a loading bay gate to maintain collective fall protection for the scaffold users when the loading bay gate is open.

A key feature for loading bay platforms, and good practice, is to use a loading bay gate system that allows the passage of bulk goods using mechanical handling equipment (e.g. forklift truck) whilst maintaining collective fall protection (*Figure 77*). It is recommended, before installing and removing loading bay gates, that scaffolders should fix a temporary guardrail to maintain the scaffolders' safe zone (see *Figure 78*). Also see Section 6 – Methods of access and egress (page 39) for advice on providing safe access for constructing standalone loading bays.

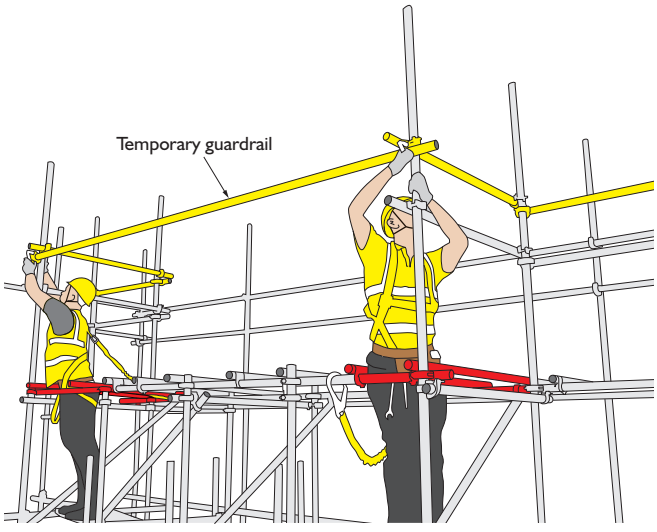


Figure 78: Temporary guardrail to maintain a scaffolders' safe zone for loading bay gate installation and removal. The temporary guardrail is removed once the gate is installed.

7.7 Chimney-stack scaffolding and roof saddles

Scaffolding operations for accessing chimneys and constructing scaffolding on pitched roofs present challenges for scaffolding contractors to establish suitable protection against falls from height, due to the variety of roof types, chimney positions and intended use of the scaffolding. This section provides some basic principles to be considered by employers when completing a risk assessment and preparing a method statement for the erection, alteration and dismantling of chimney-stack scaffolding. Standard configurations and guidance for typical chimney-stack scaffolding can be found in the NASC Technical Guidance TG20 Operational Guide (Chapter 16).

To access a chimney-stack positioned at the ridge, mid-pitch or eaves, an access scaffold (independent or tower scaffolding) should be erected at the eaves to provide safe access and fall protection for scaffolders when erecting and dismantling the roof saddle etc. The access scaffold should be securely tied and be long enough to cover the working area of the scaffolders accessing the roof. A working platform complete with guardrails should be erected within a 500mm vertical distance from the eaves level to provide collective edge protection for the scaffolders working on the roof (*Figure 79*).

Ideally the perimeter of the roof should be protected with access scaffolding and/or guardrails to provide suitable edge protection when chimney access is combined with other construction or maintenance activities, it is recognised that this may not be a practical solution just for chimney work. When erecting or dismantling the roof saddle and walkway access, scaffolders will typically rely upon personal fall protection equipment (safety harnesses) attached to the scaffolding structure, as their primary means of fall protection. Therefore the roof saddle and walkway structures should be constructed/removed progressively from the access scaffold to ensure a suitable anchor point is provided. To maintain continual attachment scaffolders would use a double lanyard system (see Section 5.4 – Personal fall protection equipment and *Figures 48 & 49*). Continual attachment is particularly important when working over the ridge or near the verge of the roof, as the opposing eaves or gable verges are not typically protected by an access scaffold and are without edge protection.

For accessing a chimney-stack at a gable end, an access scaffold is provided at the verge to the same height as the working platform of the roof saddle. However, no collective edge protection is provided at the eaves so scaffolders should remain attached to the scaffold structure using their personal fall protection equipment.

In addition to the edge protection and personal fall protection systems featured above, the frame of the roof saddle (e.g. ledgers and transoms attached to raking tubes and the access scaffold) may provide a foot-hold for scaffolders working from the roof surface, otherwise a suitable roof ladder may be required. Where a high standard of edge protection and/or personal fall protection equipment is used, it may be possible for scaffolders to work directly from the roof if the pitch is shallow, not fragile and the surface provides a particularly good foot-hold.

Figure 79: Example of a roof saddle sequence of work with eaves edge protection and continual attachment maintained using a double lanyard system of work.

SECTION 07

7.8 Working from beams

This section features examples of good practice for constructing scaffolding structures using prefabricated beams. These structures include:

- Bridged sections to create openings or to span across obstructions within an independent tied scaffold or birdcage type structure.
- Gantry structures over pavements or roadways
- Large or heavy-duty loading bays.
- Temporary roofs erected in situation at height.
- Cantilevered structures using beams such as truss-outs scaffolds and heavy-duty protection fans.

It is generally necessary for scaffolders to climb on the beams (commonly referred to as crabbing) to fix the chord ties, braces, purlins, transoms etc. to form the structure and therefore they are reliant on their personal fall protection equipment (safety harnesses). A double lanyard system of work is required to maintain continual fall protection when crabbing beam sections.

NASC Technical Guidance TG20 Operational Guide provides standard configurations and guidance (Chapter 9) for two- and three-bay bridge spans, which must be constructed in accordance with the TG20 compliance sheet and associated guidance.

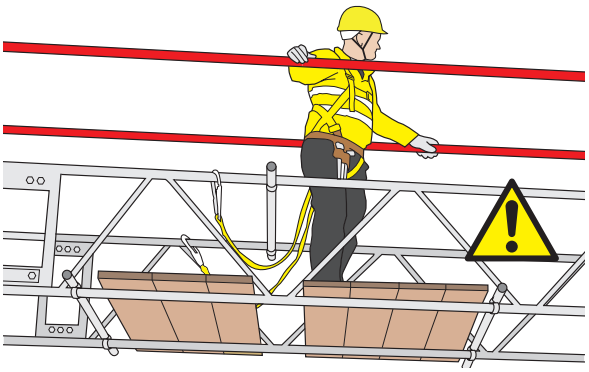
For constructing a TG20 compliant two-bay or three-bay bridge, it is possible to progressively place short scaffold boards temporarily onto the bottom chord of the beams between the vertical rungs/lattice bracing, to provide a better footing for scaffolders to stand on and remove the need to climb on the beams themselves, whilst traversing (*Figure 80*).

IMPORTANT

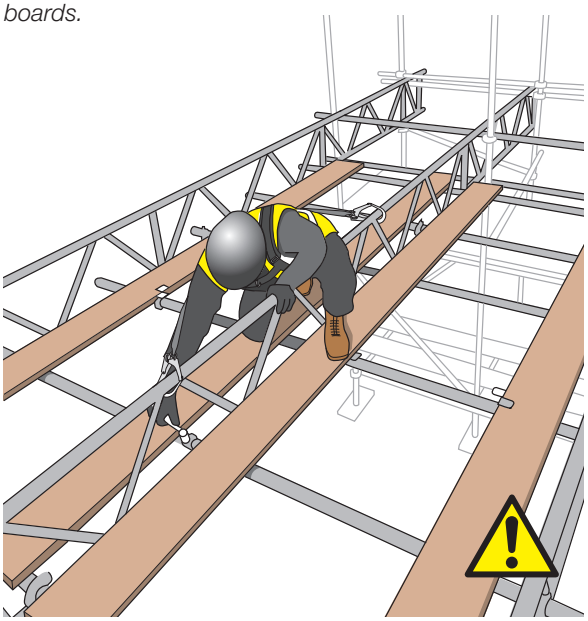
When working with beams using temporary boarding for an improved footing, care must be taken to ensure boards are correctly supported by observing the target span and the minimum and maximum overhangs.

Temporary boarding on beams does not provide a complete working platform, individual boards may need to be removed to fix members to the beams and short boards need to be secured. Therefore it is recommended that scaffolders remain continually attached to an anchor point until a scaffolders' safe zone has been created.

Where temporary boards are left in place for dismantling or planned adaptions, they must be secured and considered in the design, so allowance can be made for increased loading.



(i) bridging with beams using short transverse temporary boards.



(ii) lacing and bracing beams using longitudinal boards.

(iii) boarding out of gantry beams.

Figure 80: Examples of temporary boards used with beam work.

Depending upon the bridge span, guardrails can also be installed above the bridging beams at the same time as the beams are fixed, thus providing a degree of collective protection during the erection process. Deep section beams will also provide a degree of side protection for the scaffolders when working from a boarded bottom chord. However very deep beams they may also impede the ability to crab the beam and alternative boarded platforms may be required for the construction of the beamed structure (*Figure 80*).

Gantries constructed with beams to bridge a span between support scaffolds should apply similar principles to other beam work. The beams should be fixed from a **scaffolders' safe zone** within the supporting scaffolds (*Figure 81*). Temporary platforms should be formed by placing scaffold boards or stagings on the bottom chords (ensuring target spans are maintained). Scaffolders should maintain continual attachment ideally with a double lanyard system when crabbing beams or traversing on the temporary platforms. Perimeter guardrails should be established as soon as practicable during the erection process.

Truss-out scaffolds and protection fans constructed using beams should follow the guidance below on cantilevered scaffolding section 7.9 below.

For temporary roofs constructed with beams refer to section 7.10 temporary roofs below.

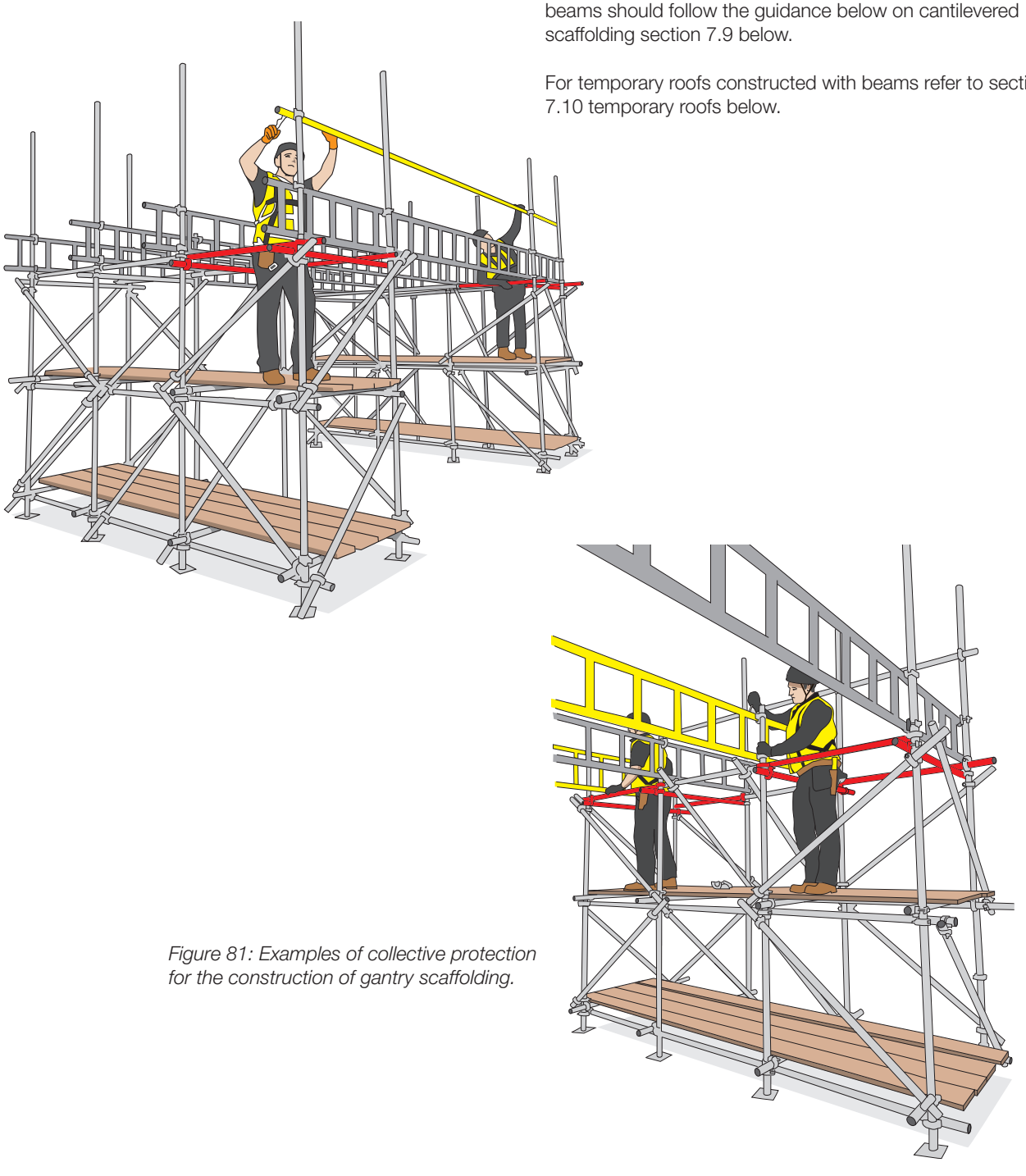


Figure 81: Examples of collective protection for the construction of gantry scaffolding.

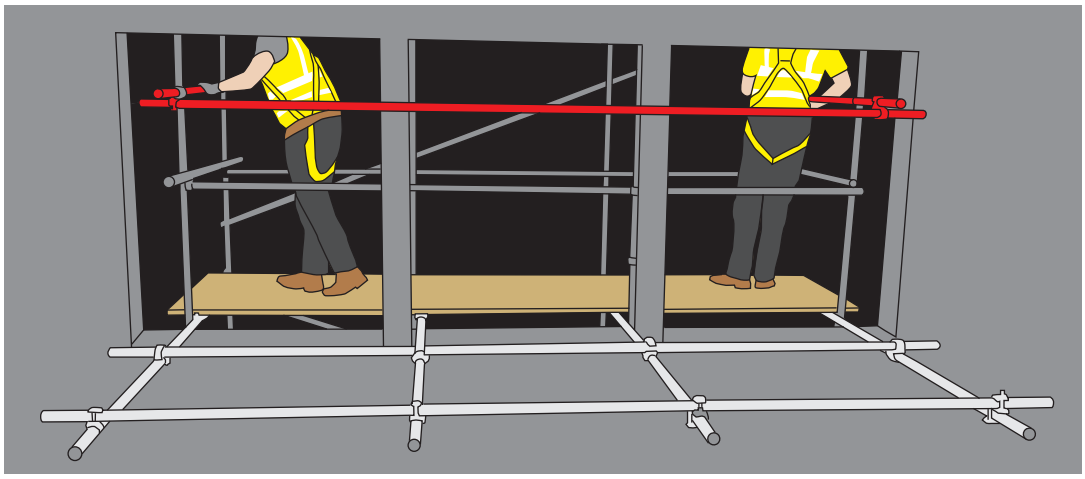
SECTION 07

7.9 Cantilevered structures

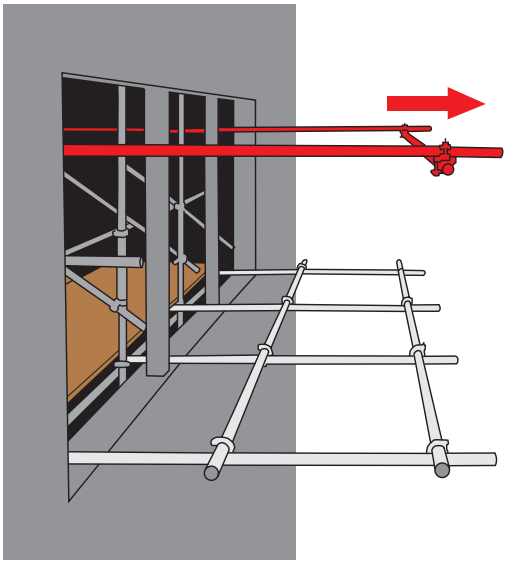
The construction of protection fans and other cantilevered structures requires scaffolders to fix the needles (extended transoms) or beams from the main scaffold (back or horse scaffold) and typically relies on the use of personal fall protection equipment (safety harnesses) solely for completing the structure. Inertia reels are often used for this purpose (see *Figure 82*). In some cantilevered scaffolding applications (e.g. tubular truss-out scaffolding) it may be possible to push out the cantilever from the protection of the main scaffold and also a guardrail assembly, in advance, to provide a temporary guardrail and form a scaffolders' safe zone (*Figure 83*).

Ensure safe access to retrieveable inertia reel. Comply with manufacturers' recommended maximum angle. See 5.11 Inertia reels p33.

Figure 82: Falling object protection fan erected using a retrievable inertia reel.



(i). Temporary guardrail formed from the back scaffold (horse or support scaffold) within a scaffolders' safe zone.



(ii) Guardrail pushed out horizontally from the back scaffold to protect the truss-out.

(iii) Needles (extended transoms) are boarded out to create a scaffolders' safe zone to complete the truss-out scaffold.

Figure 83: An example of a temporary guardrail assembly used to provide a scaffolders' safe zone during the erection of a truss-out cantilevered scaffold.

7.10 Temporary roofs

This section identifies examples of good industry practice for preventing or protecting against falls from height in scaffolding operations involving the erection, alteration and dismantling of scaffolding temporary roofs. The purpose of temporary roofs is normally to provide weather protection for the refurbishment or maintenance of an existing building (see *Figure 85*).

All temporary roofs and supporting structures must be designed and planning for temporary roofs must consider specific measures for preventing or protecting against falls from height. For further information about the design of temporary roofs refer to NASC technical guidance TG9 *A guide to the design and construction of temporary roofs and buildings.*

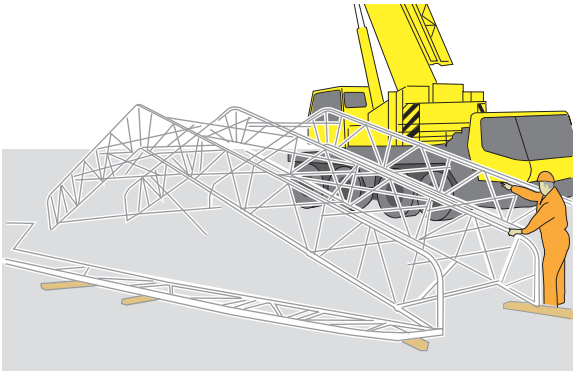
Temporary roofs have similar hazards associated with the construction of permanent roof structures and coverings. However, the nature and structure of temporary roofs often does not facilitate the same methods of work and safety precautions. For example, MEWP access is not normally a practical option for constructing the temporary structure which is normally erected over another existing building. Also, temporary roof structures may not support the anchor loads required for fall arrest netting and there is often insufficient clearance in the void between the permanent roof and temporary structure.

7.10.1 Proprietary roof systems

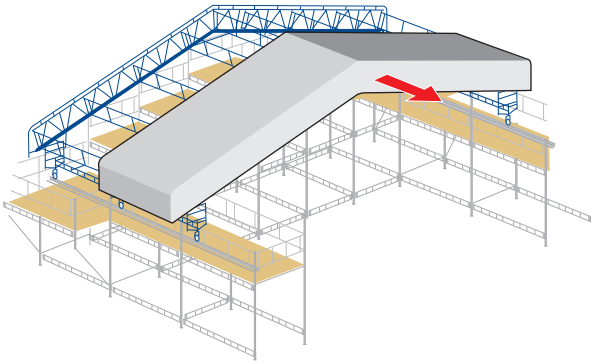
There are several proprietary temporary roof systems that have introduced innovative and safer methods for assembling and erecting temporary roofs that avoid or reduce the amount of work at height by scaffolders, particularly the need for climbing the structure (see *Figure 84*).

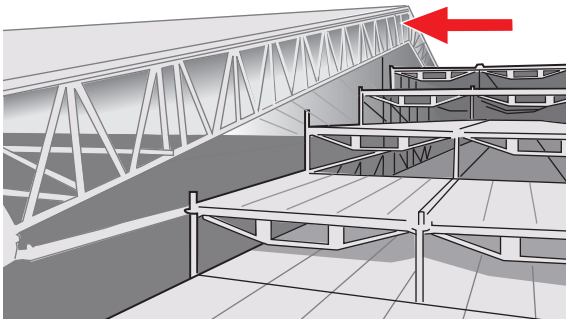
Boss jailed for scaffolder's fatal fall

The boss of a scaffolding firm has been jailed after a Scaffolder fell 10 metres to his death on a refurbishment project.
The Crown Court heard that the 36-year-old experienced scaffolder, in the process of dismantling a temporary roof, was removing corrugated iron roofing sheets when he slipped and fell into the basement below, suffering 'catastrophic' brain injuries. He was not wearing fall protection equipment and no risk assessment had been carried out by the employer.
The company had ignored a previous warning from the Health and Safety Executive when one of their scaffolding gangs, which included the injured party, was spotted working unsafely at height. In the sentencing hearing the HSE stated that the director had failed to exercise his duty of care and as a result an employee died while working for him. He had intentionally breached, or flagrantly ignored, the law.
The Director pleaded guilty to failing to ensure the health, safety and welfare of employees and was sentenced to 8 months imprisonment. *Source: HSE*

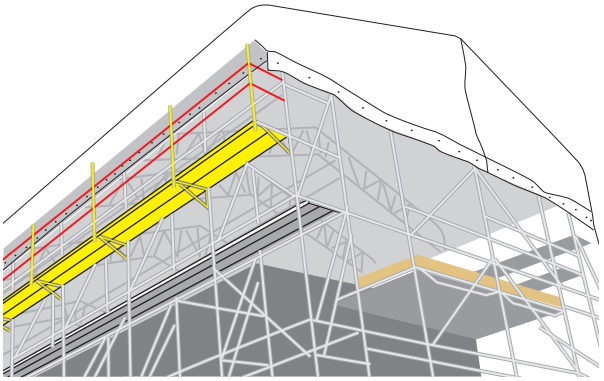


(i.) Modular roof section assembled on the ground and craned into position avoiding the need for scaffolders to crab the beams.





(ii.) Wide gable-end bay scaffolding bay is provided for erecting roof sections from a scaffolders' safe zone. Modular sections are rolled out on special rail and caster systems, to avoid the need for scaffolders to crab the beams.



(iii.) Temporary eaves walkways constructed with guardrail protection to allow sheeting operations to be completed from a ***scaffolders' safe zone****.*

Figure 84: Examples of proprietary temporary roof systems using innovative methods of erection.

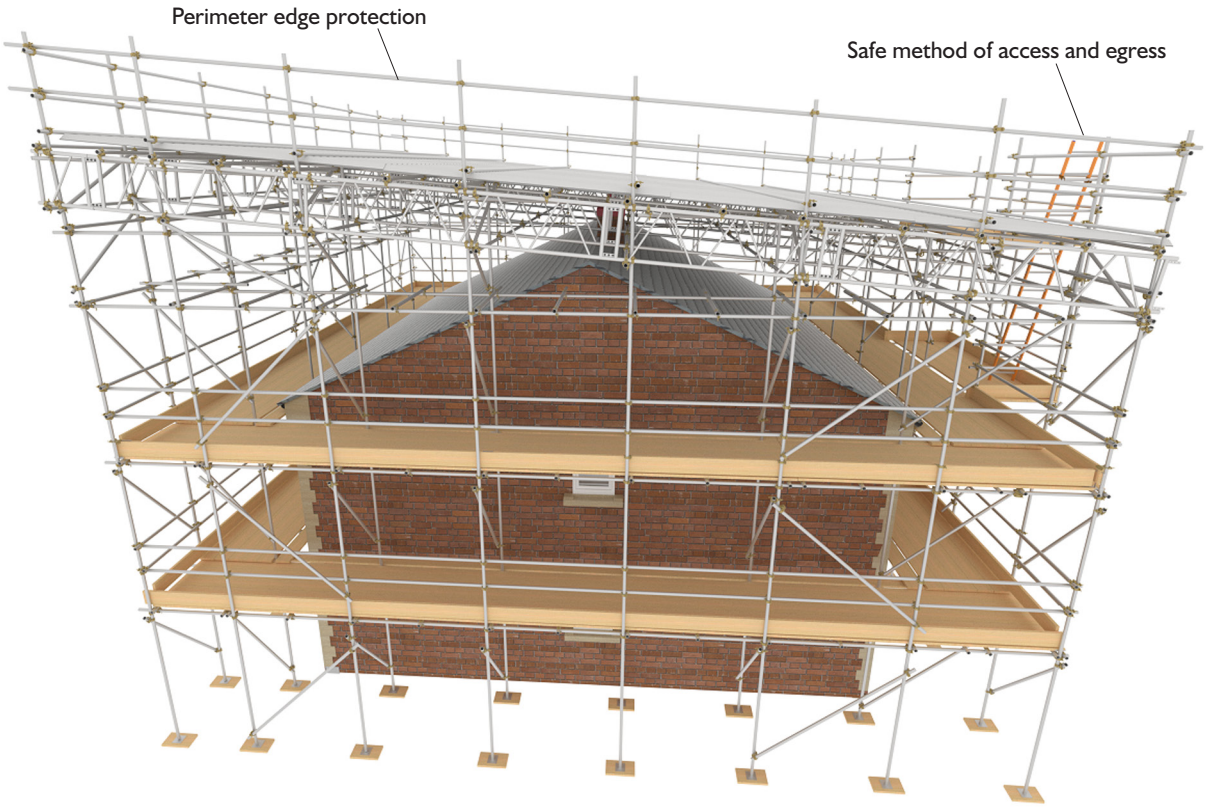


Figure 85: A traditional temporary roof incorporating edge protection and safe access and egress.

7.10.2 Traditional temporary roofs

The term 'traditional temporary roofs' refers to scaffolding roofs constructed from steel or aluminium scaffolding beams to form trusses which are typically supported by scaffolding, the building or other structures. The beams are laced and braced laterally with tubes and fittings for strength and stability. The roof coverings are normally corrugated steel or aluminium sheeting supported by purlin tubes and secured with overlaid tubes and special sheeting couplers (CI Couplers). In some cases flexible plastic sheeting is used for the roof coverings.

Employers must consider the significant risks associated with the provision of traditional temporary roofs and the specific control measures to prevent or protect against falls from height in their planning processes. The NASC recommends 5 key principles for fall protection when erecting, altering and dismantling traditional temporary roofs in situation (in-situ):

I. Temporary roof design
Designers must consider the sequences of work and fall protection measures as part of the design risk assessment. Fall protection measures including anchor points must be considered in the design calculations and featured on the drawings for the scaffolders.

II. Use of Scaffolders' safe zones
Beams should be fixed to the support scaffolding from a scaffolders' safe zone, wherever possible, otherwise scaffolders should remain clipped on.

III. Safe Climbing
To enable the fixing of lacing, bracing, purlins and edge protection, scaffolders would be required to climb the structure by traversing along the beam known as 'crabbing' (*see Figure 86*). During such operations scaffolders are required to maintain continual attachment (e.g. double lanyards and suitable anchorages) .

Suitable anchor points within a temporary roof structure may include:

- Beam chords
- Lacing tubes (top or bottom chord ties)
- Overlaid tubes
- Plan braces
- Guardrails

All beams and tubes must be fixed with suitable load-bearing couplers (e.g. EN74 right-angle or swivel couplers). When specifying fall arrest lanyard systems, employers must consider the risk of a lanyard running along a sharp edge and failing in the event of fall, such as the edge of a corrugated iron sheet. PFPE manufacturers can supply lanyard systems that are specified as edge tested.

Consider temporary/fixed boarding to assist with the lacing and bracing of the beams. Depending upon the depth of the beam, scaffold boards or stagings can be used to provide a platform or improved foothold when traversing along a beam. Boards must be correctly supported and where necessary secured to prevent accidental movement (see *Figure 80* Temporary chord boarding, page 48).

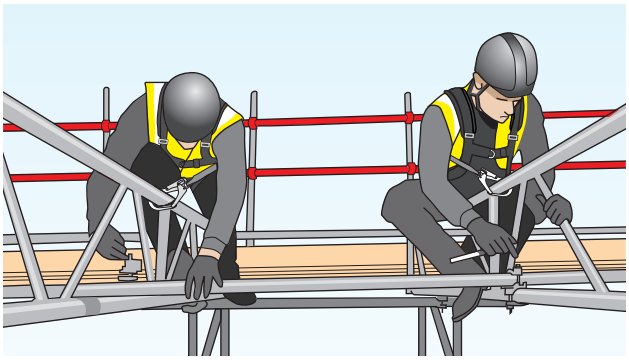


Figure 86: Scaffolders crabbing beams to fix a chord tie maintaining continual attachment.

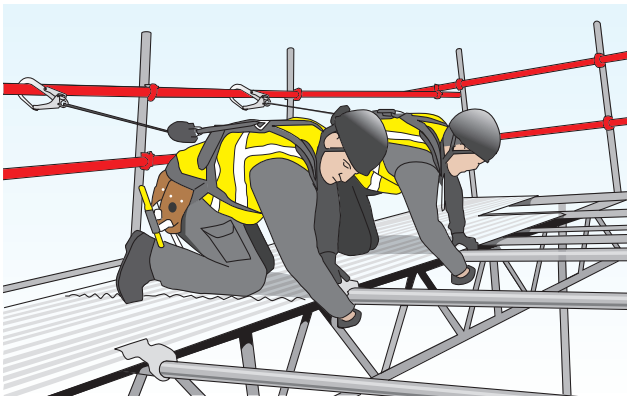


Figure 87: Scaffolders maintaining continuous attachment whilst fixing sheeting to a temporary roof

Consider temporary/fixed boarding to assist with the lacing and bracing of the beams. Depending upon the depth of the beam, scaffold boards or stagings can be used to provide a platform or improved foothold when traversing along a beam. Boards must be correctly supported and where necessary secured to prevent accidental movement.

IV. Safe access and egress

Means of safe access and egress to the roof surface. The position of the access point should be carefully considered to allow scaffolders to work progressively away from and back towards the means of access when erecting and dismantling. An access tower or cantilevered platform can be used to provide access to the roof surface (*see Figure 88*). The platform may be designed to be left in place throughout the works or could be removed after erection and reinstated for alterations or dismantling. An access platform will also aid the passing and handling of materials.

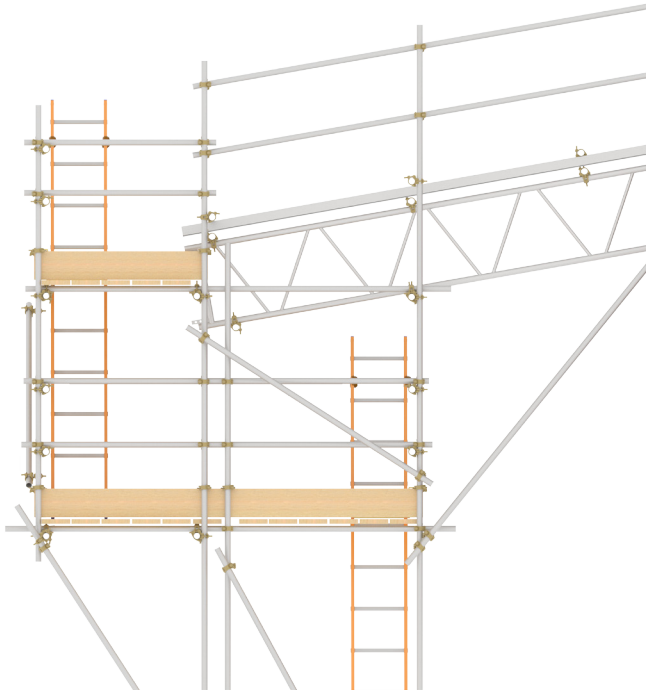


Figure 88: An example of safe access to the roof surface via a cantilevered eaves platform.

V. Perimeter edge protection.

The installation of perimeter guardrails during the construction of the roof structure will enable scaffolders to be protected at the roof edge and provide an alternative anchor point for PFPE (*see Figure 89*). The perimeter guardrails will also provide fall protection if maintenance or alterations to the roof is required during the period of use (e.g. sealing of leaks or snow management). The inclusion of a toe board may be considered to protect against the risk of falling objects.

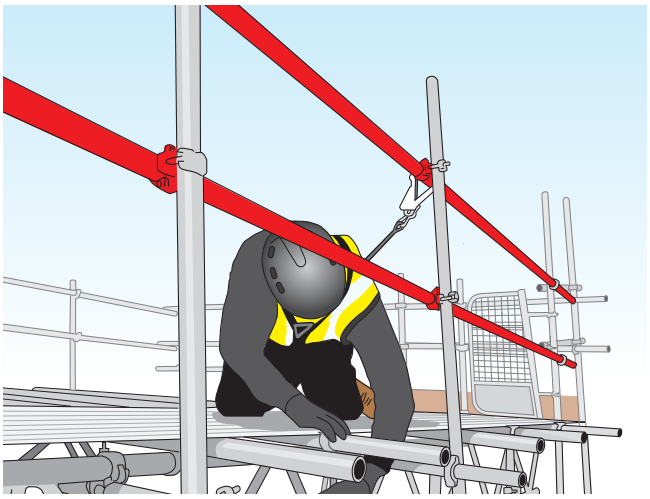


Figure 89: Shows perimeter edge protection to a traditional temporary roof.

SECTION 07

7.11 Sheeting and cladding operations

Cladding of scaffolding structures in netting, sheeting and rigid cladding is a routine scaffolding operation undertaken by both scaffolders and third-party contractors. The purpose of adding cladding to scaffolding structures varies from weather protection, debris containment or noise reduction through to advertising or decorative hoardings to disguise construction operations. However, in most cases, the risk of falling associated with such cladding operations remains the same.

The fixing of sheeting and netting to the outer face of a façade scaffold from within the protection of a working platform is a relatively low risk operation as the handling and fixing of the sheeting is undertaken from behind guardrails (*Figure 90*). However, on scaffolds where operatives are required to climb or access parts of the structure where they are exposed to a risk of falling additional control measures must be provided.

In recent years the application of shrink wrap sheeting to provide weather protection and environmental containment for scaffolding, temporary roofs or temporary buildings has increased in popularity. Encapsulating a structure with this material requires the operatives to position the sheeting and apply heat insitu. Robust and effective planning of this work should consider safe systems of work that fully apply the work at height hierarchy. If PFPE is required, as the work cannot be undertaken from a fully protected working platform, those installing and maintaining the sheeting will need appropriate training about the anchor points, use of PFPE and emergency arrangements.

When applying the hierarchy of controls from the Work at Height Regulations and the principles of this guidance note, planning for sheeting and cladding operations must consider collective protection before resorting to personal protection. When specifying the type of sheeting or cladding, employers should give due consideration to systems that use collective protection before resorting to methods that rely upon personal fall protection. Therefore the following preventative and protective measures should be taken:

- Employers should provide working platforms and guardrails equivalent to a scaffolders' safe zone and safe access and egress.
- Operatives must wear personal fall protection equipment (PFPE) during sheeting and cladding operations at height, unless safe access and complete working platforms with double guardrails and toeboards are provided.
- Before operatives encroach within 1 metre of a leading edge they must clip on.
- When reaching below a scaffolders' guardrail or climbing above the height of the main guardrail operative must be clipped on.
- Where operatives are required to reach out over guardrails to handle or fix sheeting or cladding, they should remain clipped on.
- If operatives need to climb the structure, then they should remain continually attached (see Section 5.16 – Climbing scaffold structures).
- If installation of sheeting and cladding to the outer faces of the scaffolding requires the use of work positioning equipment (rope access) then the operatives should be trained and supervised in accordance with the International Rope Access Trade Association (IRATA) Training, Assessment and Certification Scheme (TACS).
- The installation of additional frames to the outer faces of scaffolding and anchorage for work positioning for fixing advertising or decorative cladding must designed by a competent engineer.

Figure 90: Showing good practice for fall protection during sheeting operations from a fully protected working platform. Source: Rhino

7.12 Hoist towers and debris chutes

Hoist towers and debris chutes, commonly erected from traditional tube and fitting scaffolding materials, require particular consideration. Scaffold boards are often over-spanned because the bay must be kept clear of obstructions that would be created by transoms to support standard scaffold boards. Proprietary stagings or battens should be used that are capable of spanning the bay without the need for board bearers (*Figure 91*).

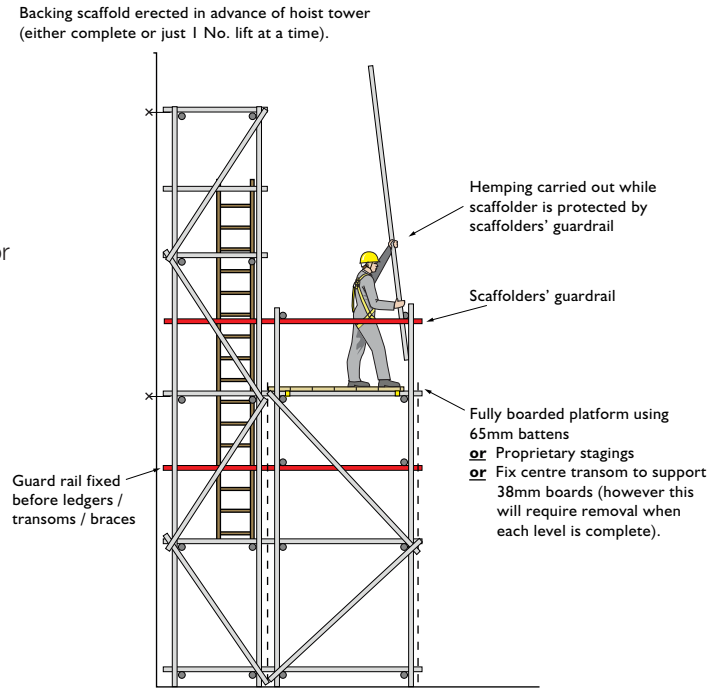


Figure 91: Debris chute or hoist tower construction.

7.13 Temporary edge protection
(see also 2.8 Fragile Surfaces)

Examples of good planning to avoid work at height include the prefixing of guardrails to steelwork prior to installation at height (see *Figure 2*, page 3). Where possible all temporary edge protection should be installed and removed from a MEWP to provide collective protection (*Figure 92*). For further information on the use of MEWP's in scaffolding see Section 7.1 – Scaffolding from a MEWP (page 41). For further guidance on temporary edge protection, reference should be made to NASC Safety Guidance Note 27 (SG27) *Guidance on temporary edge protection on open steelwork, roofs and slab edges etc.* and Technical Guidance Note 1 (TG1) *Temporary edge protection*.

Collective fall arrest safety net fan systems provide useful solutions for congested or restricted sites where MEWP access is not possible (*Figure 93*). Scaffolders can access the leading edge of the floor to erect temporary edge protection.

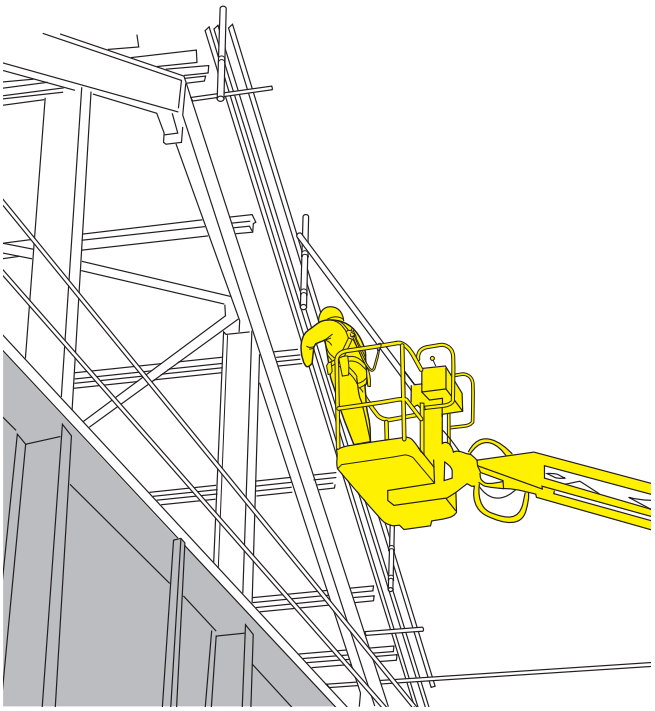


Figure 92: Scaffolder erecting roof edge protection from a MEWP.

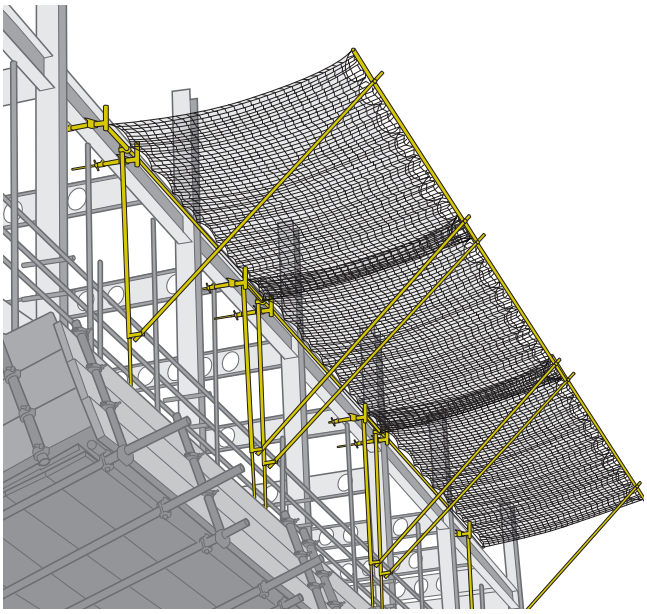


Figure 93: Safety net fan system provides protection for erecting temporary edge protection.

Another common challenge facing scaffolding contractors is the safe erection of temporary handrails for the installation of permanent stairways in construction. Again good planning between clients and their subcontractors has seen pre-cast concrete staircases manufactured to accommodate handrail posts that can be installed on the ground prior to them being craned into place, thereby eliminating or minimising the need for scaffolders to work at height.

Erecting edge protection to existing roofs can be particularly problematic for scaffolding contractors to provide safe systems of work, especially if MEWP access is not possible or there is an absence of suitable anchor points for using personal fall protection equipment. In such cases, scaffolders may need to rely upon mobile anchor devices, work restraint systems or work positioning equipment (for further guidance reference should be made to BS 8437 Code of practice for selection, use and maintenance of personal fall protection systems and equipment for use in the workplace).

Consideration must be given to the risk associated with fragile surfaces. See also Section 2.8 Fragile Surfaces.

Where existing permanently-installed fall protection systems are available for roof access then these should be utilised, where possible (*Figure 94*). Employers should seek advice from the occupiers or others responsible for the property, and must ensure they are used in accordance with the manufacturers' instructions, including checking maintenance and inspections records before use.

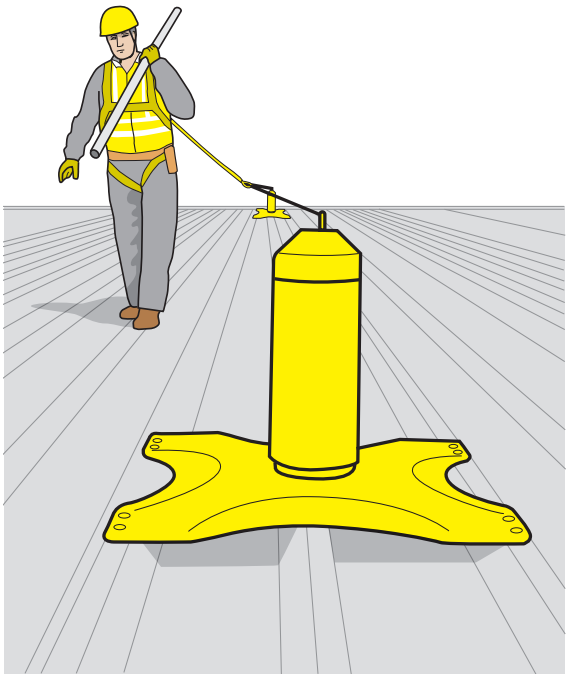


Figure 94: Scaffolder utilising an installed fall protection system for roof access.

7.14 Falsework, formwork and other temporary structures

The main focus of this guidance is aimed towards access scaffolding, however the basic principles of this guidance can be applied, where scaffolders construct other similar temporary structures in scaffolding or proprietary systems (e.g. falsework, formwork, stages, seating, bridging etc.). Collective fall protection methods (e.g. the scaffolders' safe zone), anchor points for attaching personal fall protection equipment and methods of access and egress must be considered by designers and employers at planning stage (*Figure 95*).

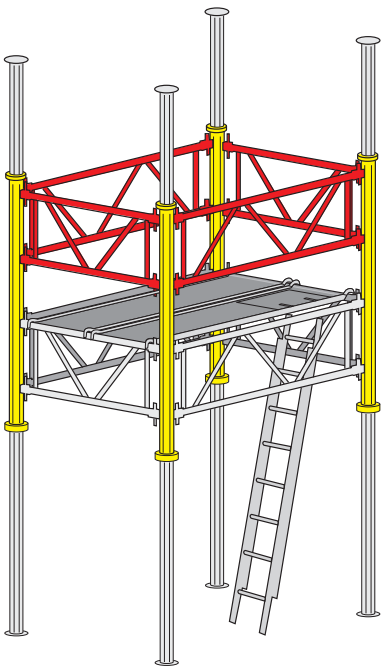


Figure 95: Fully decked and guardrailed working platform to form a scaffolders' safe zone with safe access and egress, used for the erection, alteration and dismantling of a formwork system.

Relevant Health and Safety Law

- The Health and Safety at Work etc. Act 1974.
- The Management of Health and Safety at Work Regulations 1999.
- The Work at Height Regulations 2005 (as amended).
- The Construction (Design and Management) Regulations 2015.
- The Lifting Operations and Lifting Equipment Regulations 1998.
- The Workplace (Health, Safety and Welfare) Regulations 1992.
- The Provision and Use of Work Equipment Regulations 1998.
- The Personal Protective Equipment at Work Regulations 1992.
- The Personal Protective Equipment at Work (Amendment) Regulations 2022.
- The Health and Safety (Safety signs and signals) Regulations 1996.
- The Manual Handling Operations Regulations 1992 (as amended).

SECTION 08

British and European Standards

- BS1496: 2017 Personal fall protection equipment – Rescue lifting devices.
- BS 2482: 2009 Specification for timber scaffold boards.
- BS 5975: 2019 Code of practice for temporary works procedures and the permissible stress design of falsework.
- BS 7883:2019 Personal fall protection equipment. Anchor systems. System design, installation and inspection. Code of practice.
- BS 8437: 2005 + A1:2012 Code of practice for selection, use and maintenance of personal fall protection systems and equipment for use in the workplace.
- BS 8454:2006 Code of practice for the delivery of training and education for work at height and rescue.
- BS 8610:2017 Personal fall protection equipment. Anchor systems. Specification.
- BS EN 12810-1: 2003 Facade scaffolds made of prefabricated components. Product specifications.
- BS EN 12811-1: 2003 Scaffolds. Performance requirements and general design.
- BS EN 13374:2013 + A1:2018 Temporary edge protection systems. Product specification. Test methods.
- BS EN 354: 2010 Personal fall protection equipment. Lanyards.
- BS EN 355: 2002 Personal protective equipment against falls from a height. Energy absorbers.
- BS EN 360: 2002* Personal protective equipment against falls from height. Retractable type fall arresters.
- BS EN 361: 2002* Personal protective equipment against falls from a height. Full body harnesses.
- BS EN 362: 2004 Personal protective equipment against falls from a height. Connectors.
- BS EN 364: 1993 Personal protective equipment against falls from a height. Test methods.
- BS EN 365: 2004 Personal protective equipment against falls from a height. General requirements for instructions for use and for marking.
- BS EN 39: 2001* Loose steel tubes for tube and coupler scaffolds.
- BS EN 74-1: 2005 Couplers, spigot pins and baseplates for use in falsework and scaffolds.
- BS EN 397:2012+A1:2012 Industrial safety helmets.
- BS EN 795: 2012* Personal fall protection equipment. Anchor devices.

* Publication under review at the time of printing.

References and further reading

National Access and Scaffolding Confederation (NASC)
4th Floor, 12 Bridewell Place, London EC4V 6AP
enquiries@nasc.org.uk www.nasc.org.uk
Tel: 020 7822 7400

- SG4:You User guide to SG4 Preventing falls in scaffolding.
- SG7 Risk assessments and method statements.
- SG16 Management of fall protection equipment.
- SG19 A guide to formulating a rescue plan.
- SG25 Access and egress from scaffolds.
- SG27 Guidance on temporary edge protection on open steelwork, roofs and slab edges etc.
- SG29 Internal edge protection on scaffold platforms.
- TG1 Temporary edge protection.
- TG9 Guide to the design and construction of temporary roofs and buildings.
- TG20 Operational guide – A comprehensive guide to good practice for tube and fittings scaffolding.

HSE Books
www.books.hse.gov.uk email:hseorders@tso.co.uk Tel: 0333 202 5070
All HSE free and priced publications can be downloaded free via the HSE website www.hse.gov.uk

- HSG150 Health and safety in construction (currently under review – see HSE website).
- HSG33 Health and safety in roof work.
- L153 Managing health and safety in construction.
- INDG 367 Inspecting fall arrest equipment made from webbing or rope.
- GEIS6 The selection, management and use of mobile elevating work platforms.
- Research Report 116 Falls from height – Prevention and risk control effectiveness.
- Research Report 708 Evidence-based review of the current guidance on first aid measure for suspension trauma.

Prefabricated Access Suppliers and Manufacturers Association (PASMA)
PO Box 26969, Glasgow G3 9DR
info@pasma.co.uk www.pasma.co.uk Tel: 0345 230 4041

- Operators' Code of Practice.

International Powered Access Federation (IPAF)
Moss End Business Village, Crooklands, Cumbria LA7 7NU
info@ipaf.org www.ipaf.org Tel: 015395 66700

- Code of Practice.

Acknowledgements

The NASC would like to acknowledge the following members in the preparation of this guidance:

Alan Harris	Pro-Fix Access Limited (Chair)
Peter Booth	Benchmark Scaffolding
Adrian Rooney	Midland Scaffolding Services Limited
Simon Hughes	Simian Risk Management Limited (Technical Author)
Kate Thomson	Thomson Scaffolding Limited
Health and Safety Executive (Co-opted member)	

We extend our thanks to all other organisations and their employees who have provided information and assisted in the production of this guidance.

NASC

National Access & Scaffolding Confederation

NASC
4th Floor
12 Bridewell Place
London
EC4V 6AP

020 7822 7400

enquiries@nasc.org.uk

NASC scaffolding

www.nasc.org.uk

ISBN 978-0-9934076-6-6

Whilst every effort has been made to provide reliable and accurate information, we would welcome any corrections to information provided by the Writer which may not be entirely accurate, therefore and for this reason, the NASC or indeed the Writer, cannot accept responsibility for any misinformation posted