The Work at Height Regulations 2005 (WAHR)

Part 5

Surfaces, Fall Protection & Schedules 2-5

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Schedules

- Schedule 1 Existing place of work (covered earlier)
- Schedule 2 Guard rails etc. (Collective fall prevention)
- Schedule 3 Working platforms
- Schedule 4 Collective safeguards for arresting falls
- Schedule 5 Personal protection systems
- Schedule 6 Ladders (covered latter)

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Also Schedule 7 Contents of a 7 day report of inspection which is to be used for working platforms (work equipment inc. cradles) in construction.

And

Schedule 8 Revocations.

Overview of this section

- "Suitable Surfaces" – EPOW & WPs
- Fall Protection
- Overview of schedule 2-5 including
  - important definitions (not included in regs)
  - new requirements for each class of work equipment
- Examples of equipment functionality

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EPOW – Existing Place of Work

WP – Working Platform

Suitable Surfaces

Schedules 1 & 3

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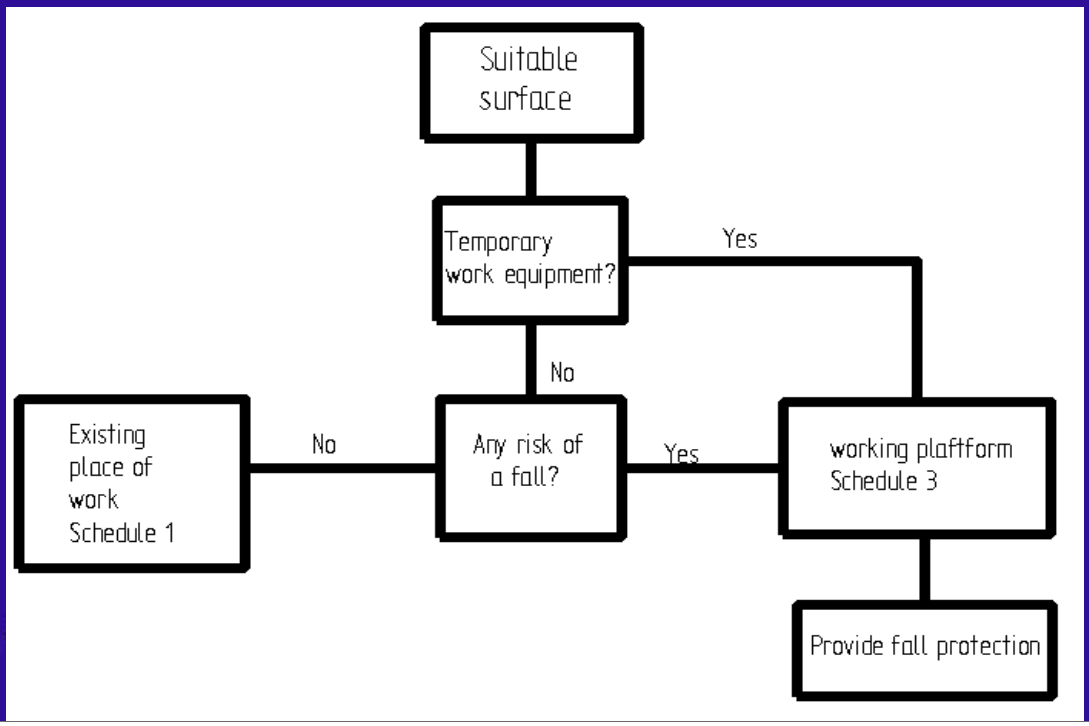
Surfaces – how to decide which Schedule



Where equipment fits into the overall picture

Existing Place of Work (EPOW) Reminder

Schedule 1 (This was covered in Part 2)

Definition: EPOW - reminder

Any :

- existing permanent place of work (inc access route) or
- any temporary place of work (inc access route) or working position,

excluding any actually provided by temporary work equipment

which does not require the use or addition of any temporary work equipment to prevent a fall from height occurring.

[i.e. a ‘safe’ working position - one from which there is no risk of falling]

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Sch 1 EPOW ?

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Sch 1 EPOW ?

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Sch 1 EPOW ?

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Working Platforms (WP)

Schedule 3

Definition – WP - reminder

A suitable surface from which to work but to which you have to add fall protection measures

Schedule 3 Working Platforms

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Defective working platforms

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Schedule 3 Requirements for Working Platforms

- Part 1 deals with requirements for all working platforms for all industry sectors
- Part 2 deals with specific requirements for scaffolding (covers construction and non construction use – entertainments industry)

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Part 1 Requirements for all working platforms

- Must be of suitable and sufficient strength and rigidity for which it is being used
- Prevented from inadvertent movement or slipping during work at height
- Must be of sufficient dimensions to allow safe work and passage
- Must not contain gaps through which material or objects could fall and cause injury
- Remains stable while being erected, dismantled, altered or modified

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Part 2 Additional requirements for scaffolds (New)

- Strength and stability calculations are required if not assembled in conformity with a recognised standard configuration
- Assembly, use and dismantling plan are required for complex scaffolding
- Warning signs when not available for use
- Assembled, dismantled or altered only under the supervision of a competent person

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SOME NEW TERMS APPEAR IN THE TEXT, THESE ARE EXPANDED UPON IN THE FOLLOWING TWO SLIDES

ALTERED ONLY UNDER THE SUPERVISION OF A COMPETENT PERSON – HOW FAR DOES THIS EXTEND?

Anywhere where the results of the alteration would have an impact on the safety of the structure or the persons working on it

Part 2 Definitions (not in Regs)

- Scaffolding

  A temporary construction which provides a safe place of work including access and egress

- Strength and stability calculations

  Detailed documented process which demonstrates that a scaffold has sufficient load bearing capacity and positional fixity

- A note of calculations

  A summary of conclusions and working drawings from a set of strength and stability calculations

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Part 2 Definitions cont

- Generally recognised standard configuration
  Arrangement of scaffold components which has been shown either by strength and stability calculations or by custom and practice to be fit for purpose and intended use
- Complexity of the scaffold
  Degree of divergence from a generally recognised standard configuration
- Standard plan
  Generic sequence of operations

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GENERALLY RECOGNISED STANDARD CONFIGURATION

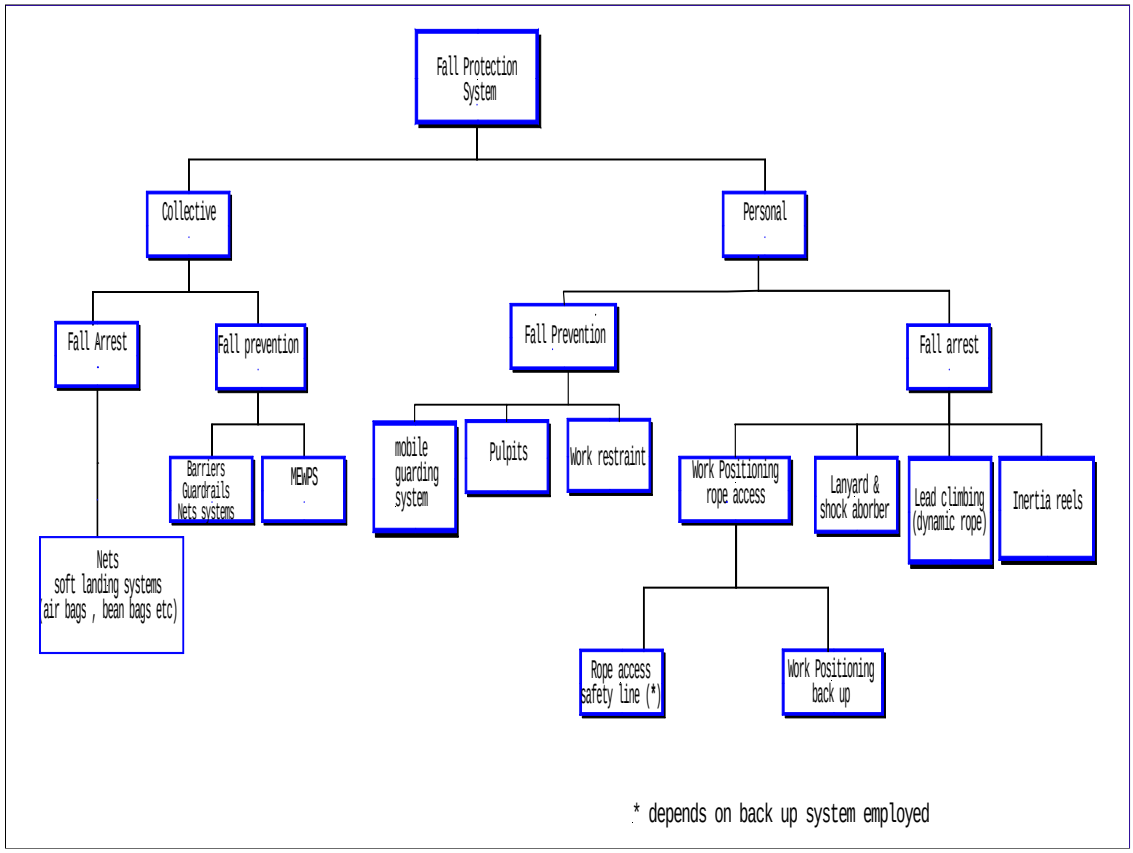
BS5973, EN12811 and NASC documents are acceptable as generally recognised standard configurations.

STANDARD PLAN

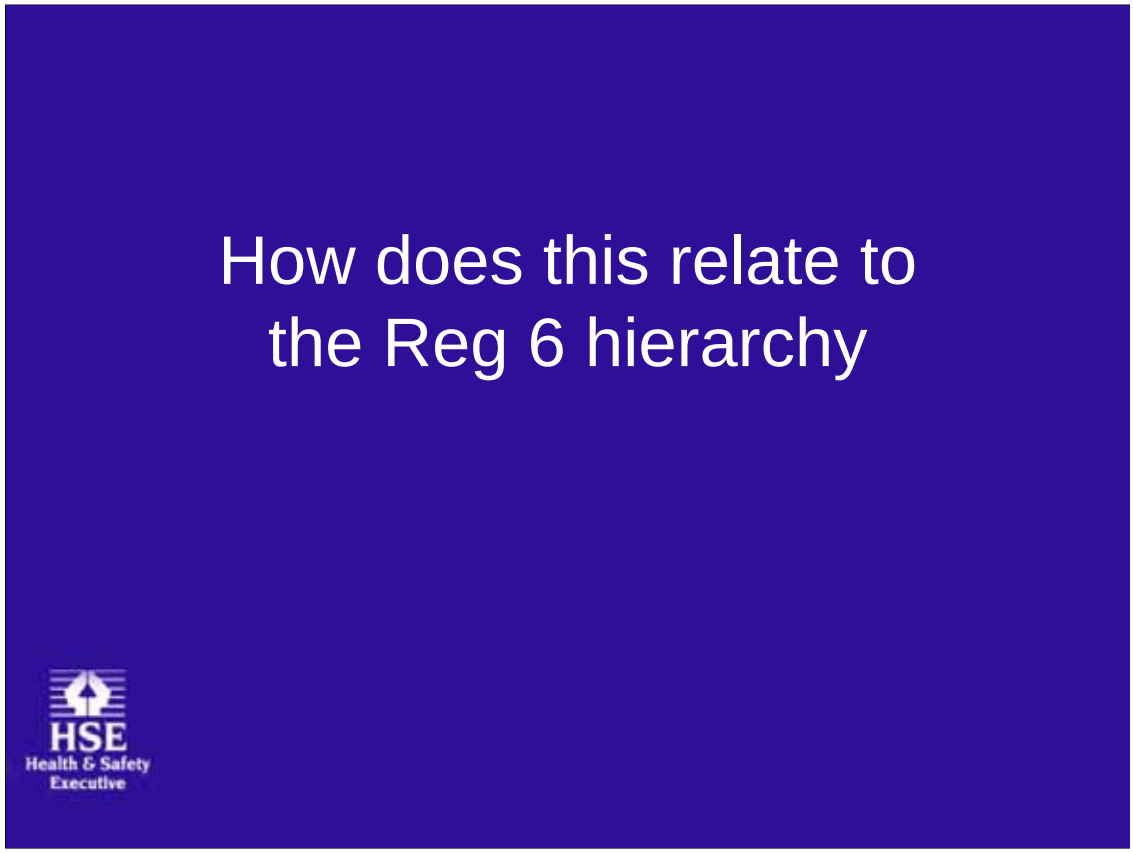
Requires the **USE** to be considered so the client needs to be involved at the planning stage re loading etc

Fall Protection

Schedules 2, 4 & 5



Where equipment fits into the overall picture

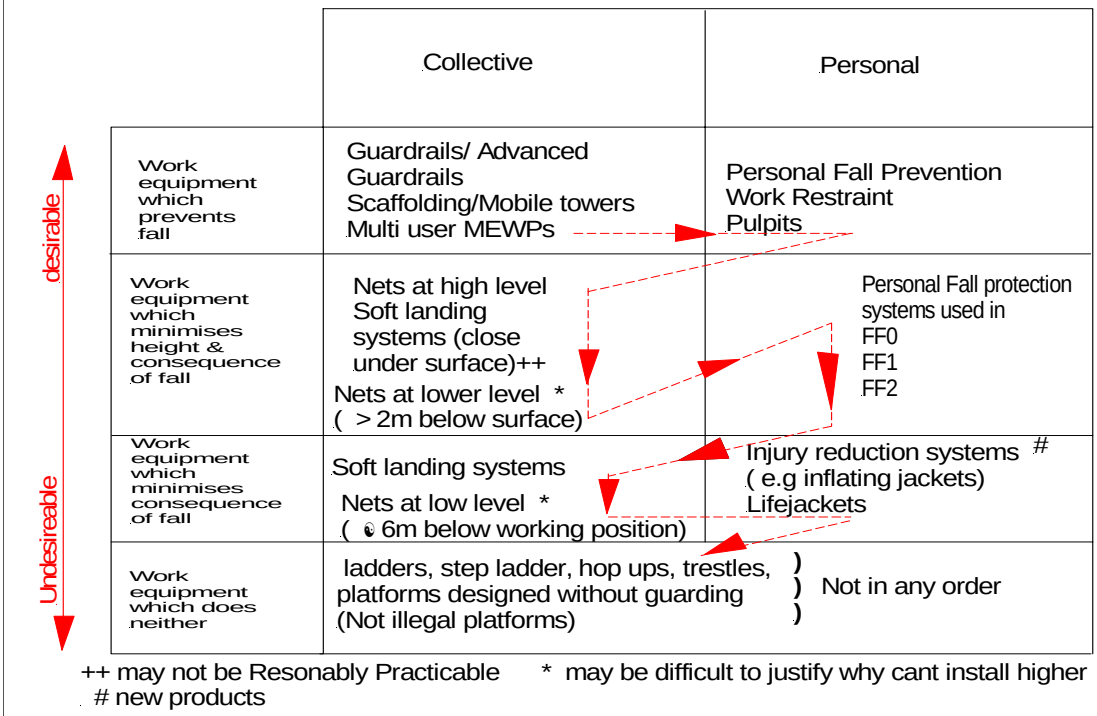


Where equipment fits into the overall picture

	Collective Reg 7 (1) (a)	Personal Reg 7 (1) (a)
Work equipment which prevents fall Reg 6(4)(b)		
Work equipment which minimises height & consequence of fall Reg 6(5)(a)(i)		
Work equipment which minimises consequence of fall Reg 6(5)(a)(ii)		
Work equipment which does neither Reg 6 (5)(b)		

Where equipment fits into the overall picture

Selection of work equipment



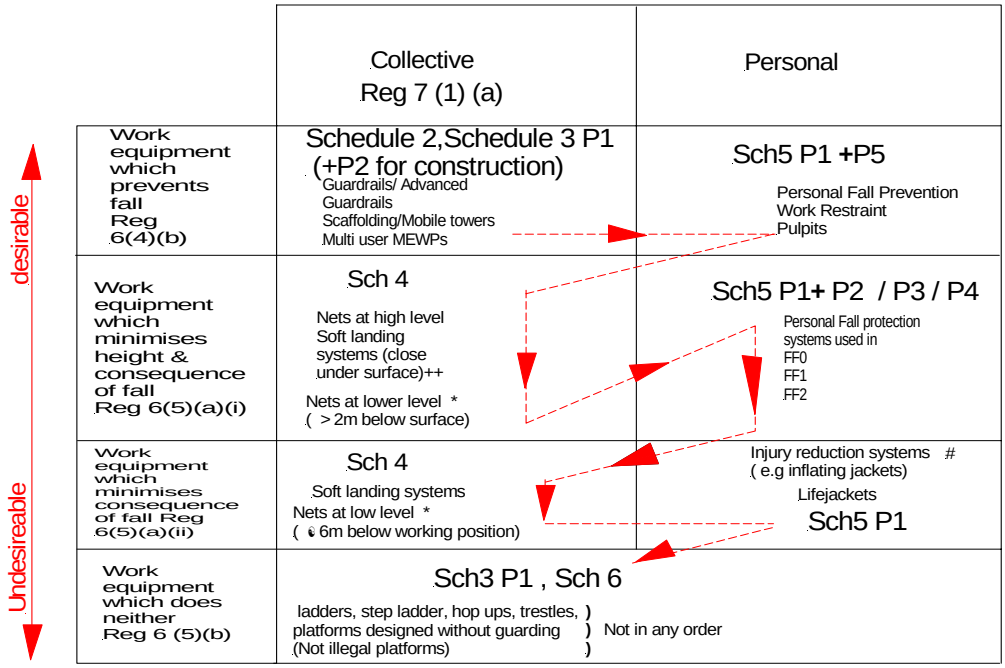
++ may not be Resonably Practicable * may be difficult to justify why cant install higher

new products

	Collective Reg 7 (1) (a)	Personal Reg 7 (1) (a)
Work equipment which prevents fall Reg 6(4)(b)	Schedule 2,Schedule 3 P1 (+P2 for construction)	Sch5 P1 +P5
Work equipment which minimises height & consequence of fall Reg 6(5)(a)(i)	Sch 4	Sch5 P1+ P2 / P3 / P4
Work equipment which minimises consequence of fall Reg 6(5)(a)(ii)	Sch 4	Sch5 P1
Work equipment which does neither Reg 6 (5)(b)	Sch3 P1 , Sch 6	

Where equipment fits into the overall picture

Selection of work equipment links to Reg 6 hierarchy & Schedules



++ may not be Resonably Practicable * may be difficult to justify why cant install higher

new products

Collective Fall Prevention

Schedules 2 (Guardrails etc)

Schedule 2

- Covers requirements for guard rails, toe boards, and similar collective means of prevention (barriers,nets, tensioned lines, frames etc) whether for permanent structures or work equipment for all industry sectors
- The objective is to **prevent** the fall of persons or materials
- Includes some prescriptive standards for construction activities

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This schedule covers collective safeguard for **PREVENTING FALLS**

Schedule 4 covers collective safeguards for **MITIGATING FALLS**

Schedule 2 -collective fall prevention

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Schedule 2 cont.

- Prevention measures should be of suitable and sufficient dimension, strength and rigidity and should be placed and secured so as to prevent a fall of persons or materials
- Structures to which means of protection are attached should be of sufficient strength and be suitable for the purpose

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Schedule 2 cont

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- Openings in means of protection are allowed at a point of access to a ladder or stairway where an opening is necessary
- Means of protection can be removed only for the time necessary to perform a particular task, providing compensatory safety measures are in place e.g. work restraint, fall arrest

A scaffolding in construction can have an opening in guard rails to allow a ladders or stairway access.

However internal ladders and enclosed tower stairways are preferable

Can remove means of protection eg at a mezzanine to load goods but need other safety measures eg self adjusting barrier, work restraint or fall arrest. Same applied to any goods opening in a scaffold or need to remove internal guard rail on a scaffold to facilitate work. Should use additional safety measures.

Schedule 2 application to non construction

- Guard rail heights & strengths should be suitable and sufficient to prevent a fall
- Want them at least 950 mm if reasonably practicable
- Alternatively comply with either :
  - the Building Regs
  - any relevant EN standard (e.g EN 13374 [55mm])
  - SMSR (EHSR) 'designed and constructed to avoid falls'
- If less than 950 mm must justify as being suitable and sufficient via risk assessment

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Toe boards, intermediate guard rails, barriers and other means of protection should also be suitable and sufficient to prevent a fall

Schedule 2 application to construction

- Guard rails at least 950 mm
- Intermediate guard rail should be positioned so that there is no gap exceeding 470 mm
- Toe boards should be suitable and sufficient
- Access - The preferred option should be an enclosed tower staircases or internal ladders in scaffolds in construction activities

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WHAT ABOUT CONSTRUCTION GUARDRAILS WHICH ARE AT 910mm BEFORE 4 APRIL 2005?

910mm OK until the end of the project.

WHAT ABOUT CONSTRUCTION WORK AT EXISTING PLACES OF WORK?

Can be 910 if the guard rails were existing fixed guard rails before the regs came into force.

Do not require existing fixed guard rails on e.g. a gas holder to be extended to 950 mm during any construction work unless risk assessment considers otherwise.

TOE BOARD HEIGHTS

No prescriptive requirement for toe board height in the WAHR (must be suitable and sufficient). CHSW specified 150 mm for Toe boards. This had caused problems with MEWPS which are normally 100 mm.

Collective Fall Arrest

Schedule 4 (Nets etc)

REMINDER COLLECTIVE SAFEGUARDS

An assembly of components or equipment which provides fall protection for all persons at a working position. Collective safeguards include nets, airbags, bean bags

TRAINING

Should have people trained in the use including rescue procedures eg from nets.

Trained **AVAILABLE PERSONS** does not mean net installers (contractors) but on site people

SHOULD ARREST A FALL SAFELY

Nets, airbags, and bean bags should be placed as close to the user to restrict fall height. Max fall height 2 metres. Anything more than this needs justification via a risk assessment.

CLEARANCE ZONE

Nets etc need a clearance zone so that a person does not hit an obstruction as a net deflects/distorts

SAFEGUARD DOES NOT CAUSE INJURY

Eg falling person does not fall onto a scaffold pole next to an airbag.

Schedule 4 Collective FA safeguards used to minimise Height & Consequences (injury)

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Schedule 4 Collective FA safeguards used to minimise Consequences (injury)

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Schedule 4 Collective FA – securely attached /stable

No

No

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Schedule 4 Collective FA safeguards

should not cause injury + clear zone

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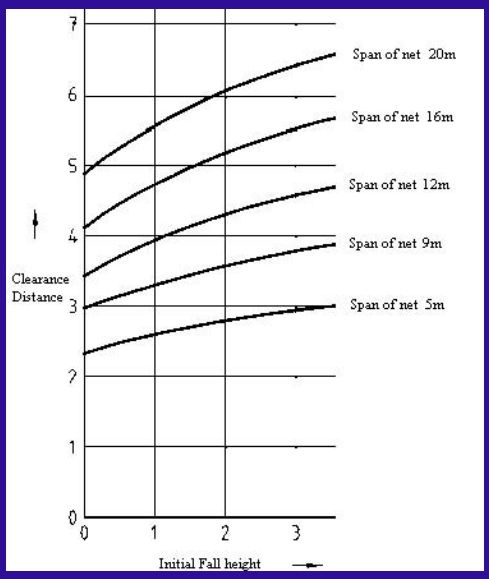

Schedule 4 Collective FA safeguards no injury

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Personal Fall Protection

Schedule 5

Schedule 5 Requirements for personal fall protection systems

- Part1 covers requirements for **all** personal fall protection systems e.g.
  - Personal fall prevention
  - Work restraint
  - Work positioning
  - Rope access
  - Fall arrest
  - Rescue systems

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Personal fall prevention system

- A personal fall protection system not using a body holding device (harness) connected to an anchor, by which a person is prevented from reaching zones where the risk of a fall exists
- Examples

  Valley gutter frame walker

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Examples of a personal fall prevention system

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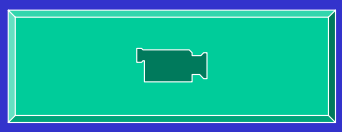
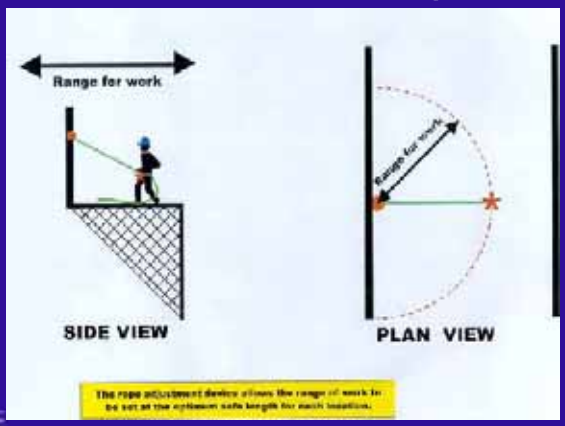
All other equipment uses a harness



Questions

Reminder : work restraint system – can't fall



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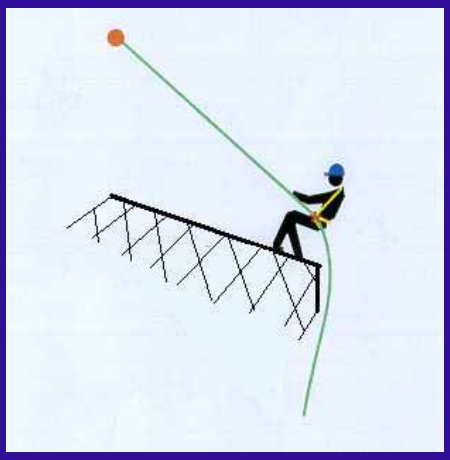
Not fall arrest

Can be adjustable but must be used properly hence the need for robust training (competence) and supervision.

Reminder:
work positioning system –equipment provides support to user



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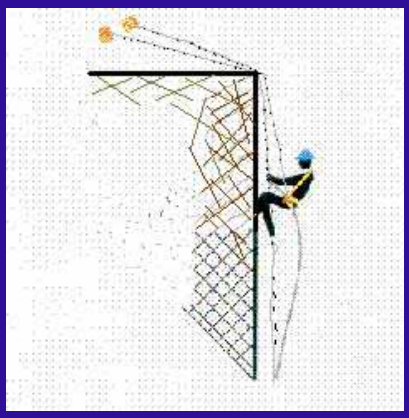
Reminder:
rope access system -
work positioning using static ropes



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Can be used for work positioning

Reminder :
fall arrest system – can fall

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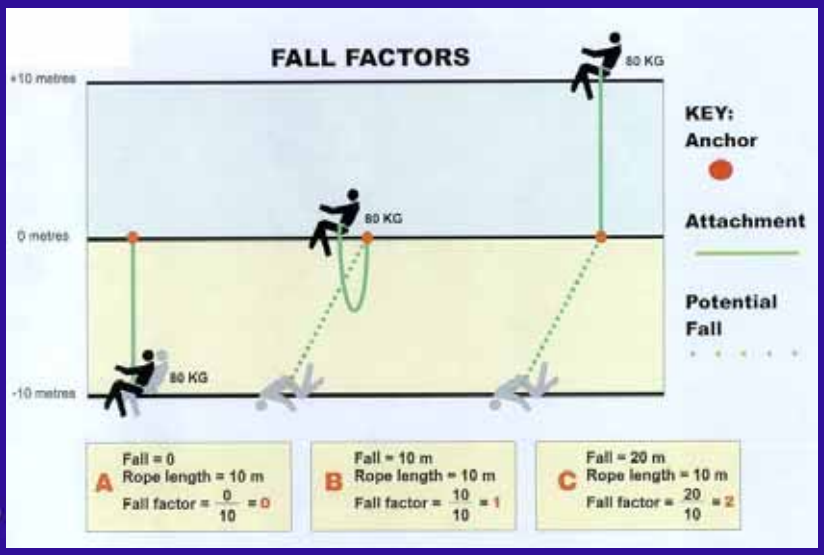
Reminder

Fall factor = Fall distance / Lanyard length



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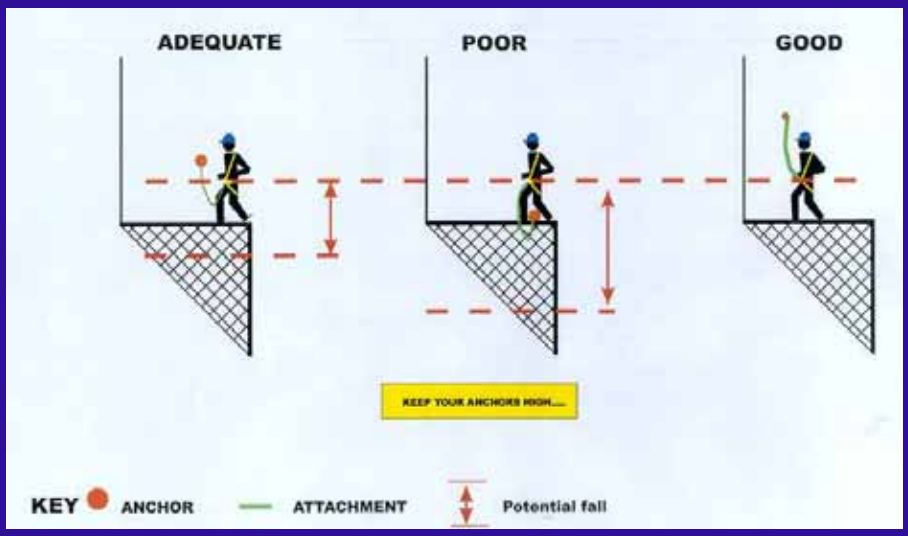
A = good, C= bad. More shock on the body and equipment the higher the fall therefore more likelihood of injury or equipment failure.

Reminder:
Limiting the fall factor



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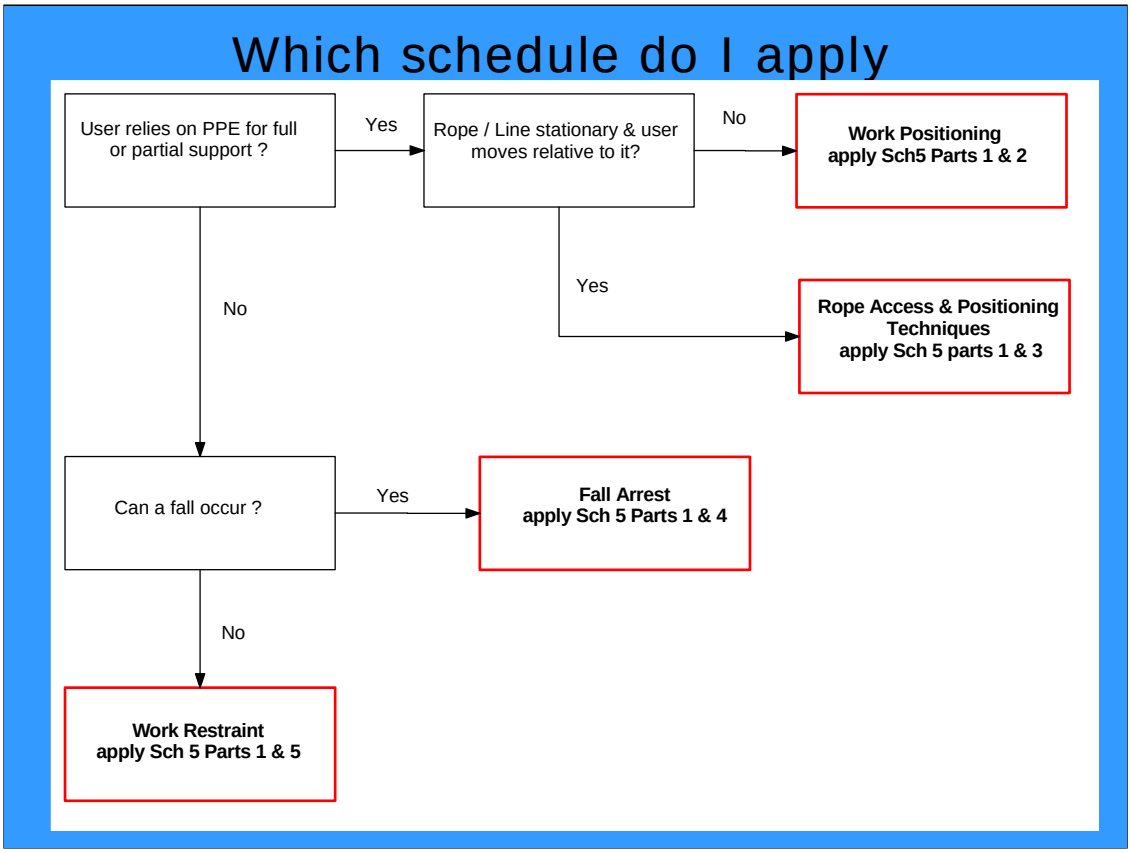
FF = 1 FF=2 F=0

Keep your anchor high


Which schedule do I apply
User relies on PPE for full or partial support ?
Yes
Rope / Line stationary & user moves relative to it?
No
Work Positioning
apply Sch5 Parts 1 & 2
Yes
Rope Access & Positioning Techniques
apply Sch 5 parts 1 & 3
No
Can a fall occur ?
Yes
Fall Arrest
apply Sch 5 Parts 1 & 4
No
Work Restraint
apply Sch 5 Parts 1 & 5

Sched. 5 Part 1 Req'ments for all personal fall protection systems

- A personal fall protection system can be used only if justified by a risk assessment and the use of other safer work equipment is not reasonably practicable
- User and available persons have been trained

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REMINDER

Personal protection measure means **An assembly of components or equipment to protect the individual whilst working at height (including gaining access and egress from the working position**

Includes work restraint, work positioning, rope access, fall arrest and rescue

TRAINING

Should have people trained in the use including rescue procedures eg from deployed fall arrest lanyards.

Sched. 5 Part 1 Req'ments for all personal fall protection systems

- Individual System requirements: Must
  - Be of suitable and sufficient strength,
  - Fit the user
  - Be designed to minimise injury in the event of a fall
  - Prevent uncontrolled / unplanned movement of user
- Where System designed to use anchor is securely attached to the required number of anchors (I.e. at least 1 anchor)

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Sched. 5 Part 1

- Fit the user
- Be designed to minimise injury in the event of a fall
- Prevent uncontrolled / unplanned movement of user

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Schedule 5 Requirements for personal fall protection systems

- Which additional schedule depend on the actual functionality of the equipment – (the way it is being used) :
  - Part 2 additional requirements for work positioning systems
  - Part 3 additional requirements for rope access and positioning techniques
  - Part 4 additional requirements for fall arrest systems
  - Part 5 requirements for work restraint systems

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Functionality ?

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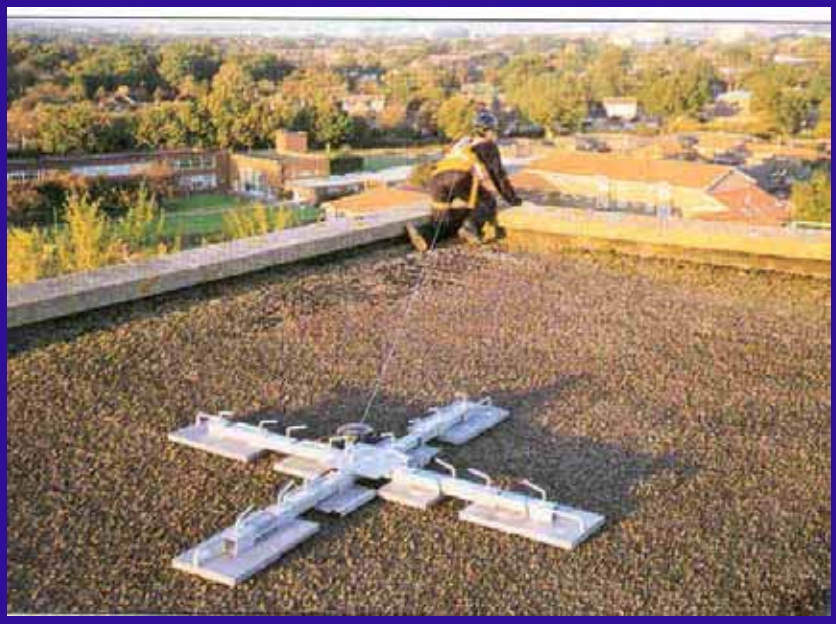
Functionality ?



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Functionality ?

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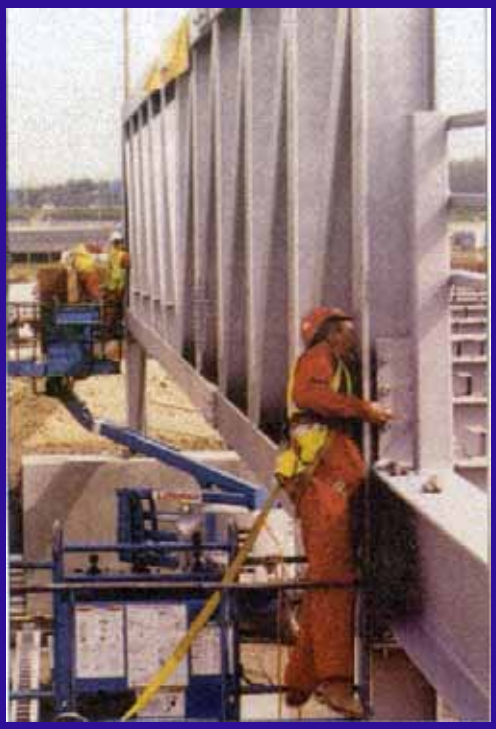
Functionality ?



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Functionality ?

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Functionality : Aboroculture

secured foot lock technique

Prussiking technique

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Ropes :Fundamental principle

- If the rope moves with the user
  - Functionality is likely to be work positioning (eg bosun chair or arboriculture prussiking on a single rope)
- Schedule 5 part 2 will apply
  - Exception :lead climbing (climbing above anchorage level using moving ropes) here functionality is ‘fall arrest’

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Fundamental principle

- If the rope remains stationary and the user moves along it using their own effort, functionality is likely to be rope access
- Schedule 5 part 3 will apply requiring two predominantly vertical stationary lines to be used

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Reminder:
when can you use Single line systems

- Moving rope : [Work Positioning] : if NRP to use 2nd line (and appropriate measures taken to ensure safety) can be single line system
- Static ropes: [Rope Access]: Unless use of second line entails higher risk (and appropriate measures taken to ensure safety),cannot be a single line system

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Inspection implications.

- Current position:LOLER applies to WP & RA
- Likely Future Position - LOLER may be dis-applied to RA
  - will not apply because the person (load) moves themselves along the rope
- WAH reg 12 will apply to RA

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Inspection (Pragmatic)

- Work positioning and rope access equipment require inspection under WAHR or LOLER
- If same equipment can be used in both configurations - sensible to apply LOLER 6 monthly thorough examination in such circumstances
- For other equipment, Advocate INDG 367 regime - recommend 3 monthly, if used in arduous environments, 6months otherwise.

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Summary

- Work positioning

  Rope moves (LOLER does apply)

- Rope access

  Ropes stationary

  LOLER currently applies but in time this may become WAH Reg 12

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Functionality :

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Functionality?

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Functionality?

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Rope access v cradles

- Collective over personal
- Considered at the design stage
- Designers need to justify why they should not provide a platform
- Rope access should not be the preferred option

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Hierarchy dictates AVOIDANCE - WORKING PLATFORM – ROPE ACCESS

Designers need to consider during CDM

Should provide cradles unless good reason not to eg odd shape building

Need to weigh up pros and cons. There is a CDTU minute and Commercial and Consumer Services, Transportation and Utilities Sector (CACTUS) press release.

Window cleaning debate- reasonably practicable to use a cradle !

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Rescue systems

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Rescue system – definition (not in regs)

- Personal fall protection system by which a person can carry out a rescue, rescue themselves, or be rescued from a height or depth by pulling, lifting, lowering or self ascent/descent

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Rescue systems

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Suspension Trauma

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Questions?

Work positioning system

- Personal fall protection system which normally includes a body holding device (harness) connected to a reliable anchor to support the user in tension or suspension in such a way that a fall is prevented or restricted

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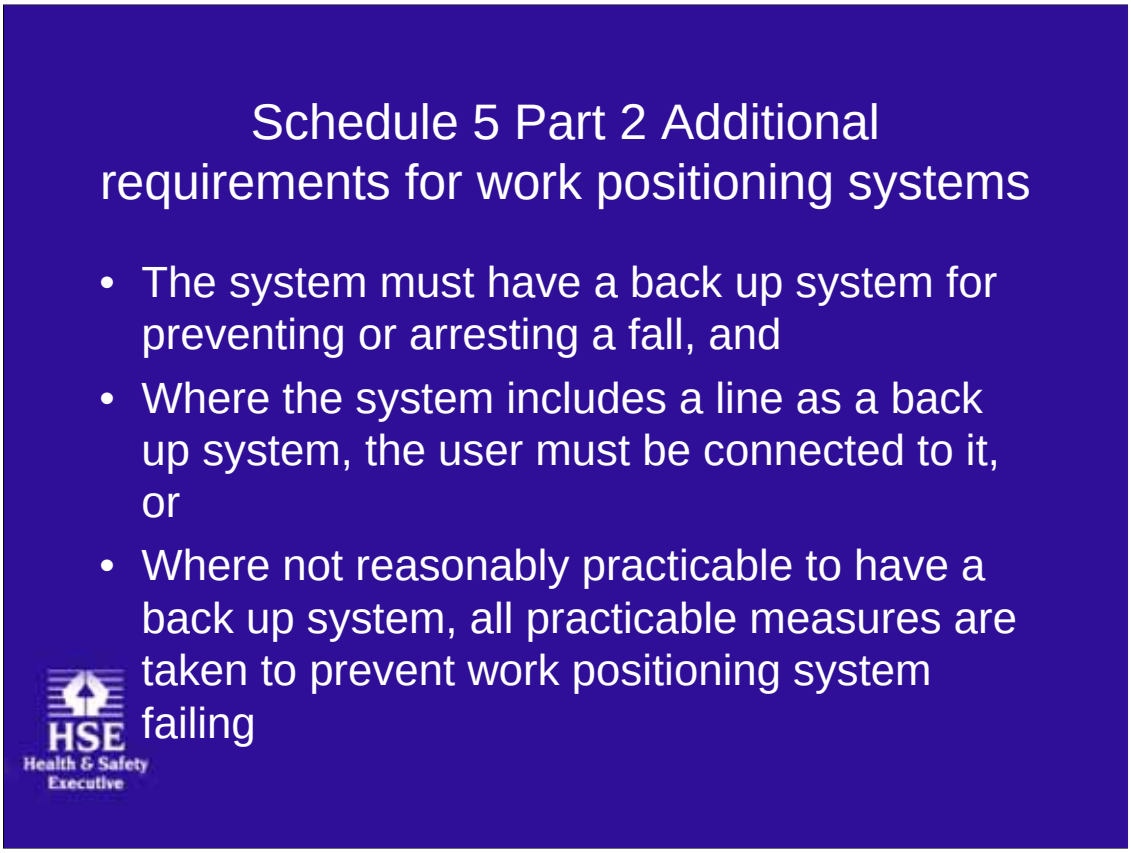
Differs from rope access in that the rope moves up and down.

In rope access the rope remains static and the user moves up and down it.



Back up could be edge protection, 2nd line, personal or collective fall arrest

Rope access system

- Personal fall protection system, using two lines (or ropes), each positionally static and separately secured to reliable anchors, one using a body holding device (harness) acting as the primary means of support and the other equipped to act as a safety back up to arrest and restrict the fall in the event of the primary support failing

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Schedule 5 Part 3 Requirements for rope access and positioning techniques

- Unless a risk assessment has demonstrated the use of a second line entails higher risk (and appropriate measures have been taken to ensure safety),cannot be a single line system
- Must have a ‘working line’ and a ‘safety line’ (separately anchored)
- The user is provided with a suitable harness which is connected to both lines

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Schedule 5 part 3 cont.

- The working line must have a safe means of ascent and descent which has a self locking system to prevent a fall should the user lose control of their movements
- The safety line must be equipped with a mobile fall protection system which is connected to and travels with the user
- Provide a seat with appropriate accessories

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MOBILE FALL PROTECTION SYSTEM

A moveable device which provides fail to safe fall protection in the event of the working line support system failing which follows or is moved with the worker during any task he performs.

SEAT

Provision depends on the risk assessment which should take into account duration of the job and **ergonomic constraints (could otherwise involve an unfavourable posture or working conditions without a seat)**

Fall arrest system

- Personal fall protection system which uses a body holding device (harness) connected to a reliable anchor to arrest and restrict a fall so as to prevent the collision of the user with the ground or structure whilst limiting the forces on the body

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Need to consider fall factors so as to limit the forces on the body

REMEMBER

A typical fall arrest system will take 5 metres to deploy so no good if used 4 metres above the ground

RESCUE (Reg 4)

You should have a rescue plan in place to deal with deployed systems so that suspension trauma does not become a problem

INSPECTION (Reg 12)

Use regime advocated by INDG367 ‘Inspecting fall arrest equipment made from webbing or rope’

COMPETENCE (Reg 5)

Training critical

USED IN A HORIZONTAL MODE

Unless specifically designed for use in a horizontal mode anchored at foot level, they should be mounted above the user.

Work restraint system

(a specific sub set of personal fall prevention)

- Personal fall protection system which uses a body holding device connected to a reliable anchor to prevent a person from reaching zones where the risk of a fall exists
- Examples of use
  - Permanent roof inspection system
- Benefits
  - Prevents a fall
  - Removes the need for rescue

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Provides fall prevention so comes before collective fall mitigation in the hierarchy. A later slide includes a diagram which shows the hierarchy and the relationship with collective and personal work equipment.

Schedule 5 Part 5 Requirements for work restraint systems

- Must be designed to prevent the user from getting into a position where a fall could occur
- Must be used correctly

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Functionality
Work restraint NOT Fall Arrest

In this case fall prevented

Sch 5 part 5 applies

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Functionality ?

Deadweight anchor using a fall arrest lanyard

Here lanyard length prevent fall position being reached Functionality is ‘Work Restraint ‘ Sch5 Part 5 applies

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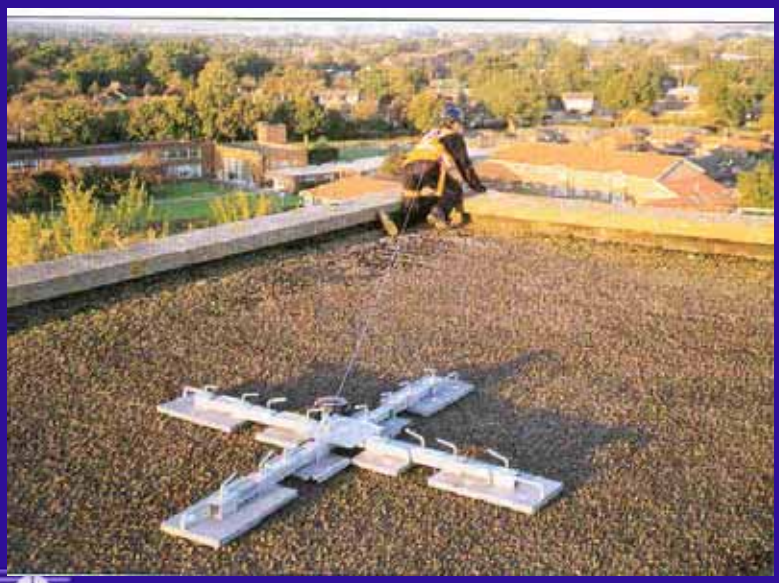
Functionality ?



Deadweight anchor inertia reel

Here cable length does not prevent fall position being reached : Functionality is ‘Fall Arrest ‘ Sch5 Part 4 applies

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Functionality
Fall Arrest NOT Work restraint

In this case fall still possible - equipment minimises height and consequences
-top level i.e. good FF0 using inertia reel

Sch 5 part 4 applies

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Functionality:
This is NOT Work restraint
a fall can occur !
Functionality here is
‘Fall arrest’
(Sch5 part4 applies)

must have energy absorbance
poor FF
over edge
Mewp stability

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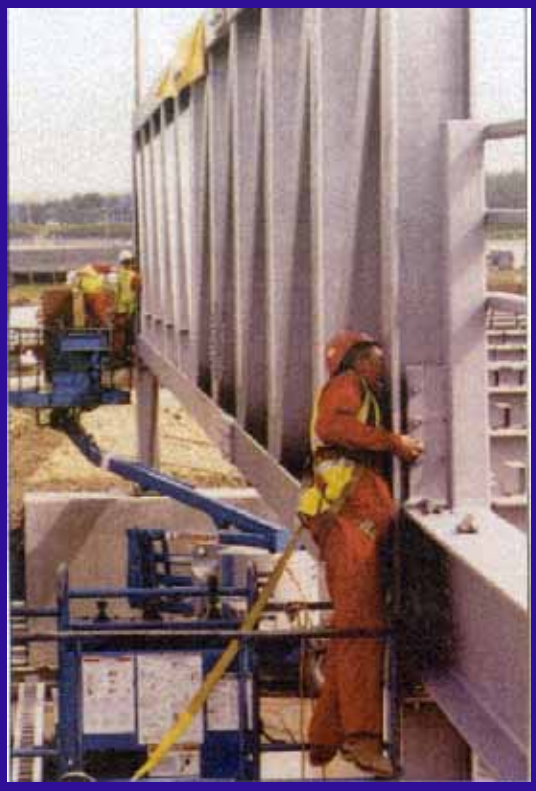

Work positioning but using ‘rope access techniques’ so Sch5 part 3 applies

Work positioning
Sch5 part 2 applies

Functionality ?

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Functionality : Aboroculture

Moving single line – prussiking - ‘work positioning’ Sch 5 part 2

Stationary Single line – secured foot lock – ‘rope access’ Sch5 part3

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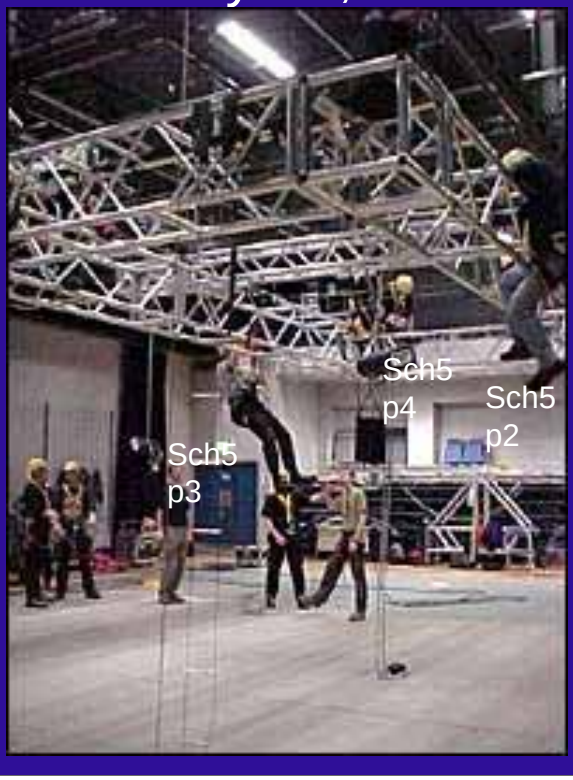
Functionality P2, 3 & 4 :

Bosun chair ch5 p2

Rope access

Sch5 p3



Sch5 p4

Sch5 p2

Sch5 p3

Window Cleaning

- Two static ropes separately anchored
- User moves up and down the rope
- In future LOLER may not apply
- Sched 5 part 3 applies

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Fall arrest – Linesman pylon climbing

- Sch5 p4
- Vertical guided rigid line system (EN353 -1)
- Twin tailed lanyard
- Anchored - Probably FF1.5
- Unsafe ?

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Fall arrest Sch 5 p4

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Defective working platforms

6(3), 6(4)(a) & Sch1 [epow]
or 6(4)(b) & 8(a) – Sch2 [cfp]

6 (3) , 6(4)(b) & 8(b)(i) - sch 3 p1 [wp]

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Information links

- Survivable impact forces on human body constrained by full body harness http://www.hse.gov.uk/research/hsl_pdf/2003/hsl03-09.pdf
- Harness suspension review of available information http://www.hse.gov.uk/research/crr_htm/2002/crr02451.htm
- Thorough examination and inspection of particular types of lifting equipment http://www.hse.gov.uk/research/crr_htm/2002/crr02429.htm
- CRR 418/2002- Ergonomics evaluation into the safety of stepladders: literature and standards review. Phase 1 http://www.hse.gov.uk/research/crr_htm/2002/crr02418.htm
- Ergonomic evaluation into safety of stepladders : user profile and dynamic testing Phase 2 http://www.hse.gov.uk/research/crr_htm/2002/crr02423.htm
- CRR 394/2001 Investigation into aspects of falsework
- http://www.hse.gov.uk/research/crr_htm/2001/crr01394.htm
- HSL/2002/16 Assessment of factors that influence the tensile strength of safety harness and lanyard webbings http://www.hse.gov.uk/research/hsl/hsl02-16.htm
- HSL/2002/17 Assessment of factors that influence the tensile strength of safety harness and lanyard webbings.Supplementary Information
- http://www.hse.gov.uk/research/hsl/hsl02-17.htm

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Information links

- CRR 364Industrial rope access – investigation into personal protective equipment. http://www.hse.gov.uk/research/crr_htm/2001/crr01364.htm
- RR302 – A technical guide to selection and use of fall prevention and arrest equipment http://www.hse.gov.uk/research/rrhtm/rr302.htm
- RR234 Improving Health and safety in construction Phase 2 –Depth and Breadth Volume 5 Fall from height : underlying causes and risk control in the construction industry http://www.hse.gov.uk/research/rrhtm/rr234.htm
- RR201- Recidivist risk takers who work at height http://www.hse.gov.uk/research/rrhtm/rr201.htm
- RR205 – Evaluating the performance of ladder stability devices http://www.hse.gov.uk/research/rrhtm/rr205.htm
- RR258 – Preliminary investigation into fall arresting effectiveness of ladder safety hoops http://www.hse.gov.uk/research/rrhtm/rr258.htm
- RR266 - A review of criteria concerning design, selection, installation, use, maintenance and training aspects of temporarily-installed horizontal lifelines http://www.hse.gov.uk/research/rrhtm/rr266.htm
- RR342 - Revision of body size criteria in standards – protecting people who work at height http://www.hse.gov.uk/research/rrhtm/rr342.htm

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