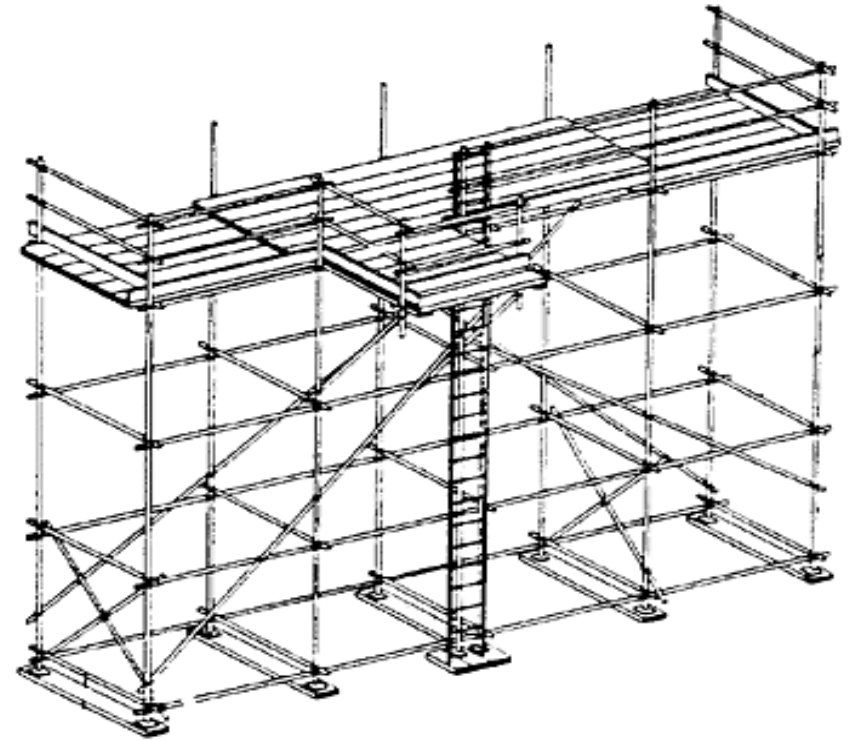


Scaffolding Safety



Objectives

To give a better awareness and understanding of the regulations concerning;

- The suitability of materials used to construction scaffolds.
- The manner in which these materials should be erected to form the more common types of scaffolds.
- The correct construction of boarded out platforms, handrails and ladder access common to all scaffolds.

Hazards

Employees working on scaffolds are exposed to these hazards:

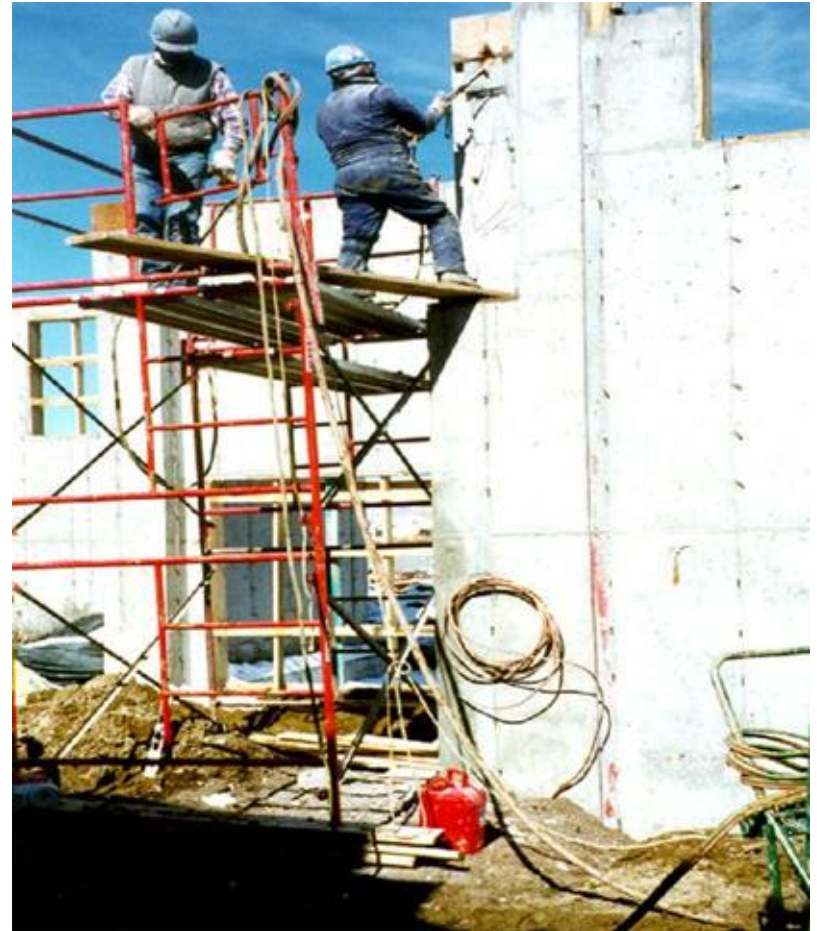
- **Falls from elevation** – caused by slipping, unsafe access, the lack of fall protection and bad planking (giving way)
- **Struck by** falling tools / debris
- **Electrocution** – from overhead power lines
- **Scaffold collapse** - caused by instability or overloading



Fall Hazards

Falls may occur:

- While climbing on or off the scaffold
- Working on unguarded scaffold platforms
- When scaffold platforms or planks fail
- While ascending or descending in a ladder



What is a Scaffold?

- A scaffold is a temporary structure which provides access from which persons may work.
- It can also be used to support materials or equipment.
- A scaffold is a safe working platform.

Types of Scaffold

- Scaffolding consisting of two rows or more of standards connected together longitudinally with ledgers and braces and transversely with transoms or putlogs.
- Stationary scaffolds can be built-up as high as the job requirements dictate. The vertical members must be kept plumb and straight to avoid eccentric loading and possible collapse. Rigid bracing, usually a combination of horizontal and diagonal bracing, is required to prevent swaying and displacement. The footing or anchorage for scaffolds must be sound, rigid, and capable of carrying the maximum intended load without settlement or displacement.



STATIONARY SCAFFOLD

Types of Scaffolds

Mobile Scaffold

- A mobile scaffold usually has four standards one at each corner.
- These can be placed on the ground and wheels (caster) are used, so that the scaffold can be moved.
- Mobile scaffolds are similar to Stationary scaffolds except that they are wheel mounted. The maximum height of a mobile scaffold must not exceed four times the smallest dimension of its base.



Mobile/Stationary Towers

Indoor

- Stationary Tower - 4.0 times the SBD (Smallest Base Dimension)
- Mobile Tower - 3.5 times the SBD

Outdoor

- Stationary Tower - 3.5 times the SBD
- Mobile Tower - 3.0 times the SBD

Independent Scaffold



Indoor Mobile Scaffold

Indoor Mobile Scaffold:
This Mobile system scaffold was erected and needing rakes to add stability



Scaffold Couplers

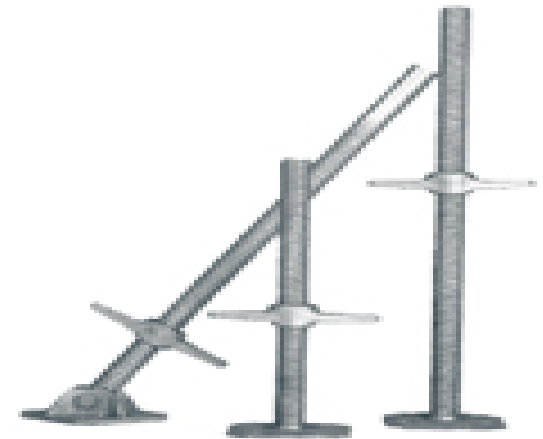
- Sometimes called scaffold fittings.
- These have been designed and tested to BS. 5973 (British Standards) Specifications.
- Because some of them is load bearing components, most fittings achieve a SWL (Safe Working Load).

Types of Couplers

- Base Plate
- Right Angle Coupler
- Putlog Coupler
- Swivel Coupler
- Spigot Coupler
- Sleeve Coupler
- Girder Coupler
- Wheels (casters)

Base Plate

- This is a metal plate with a peg in the middle used under the standards.
- Used for distributing and spreading the load from the standard to the scaffolds foundation.
- In some cases, a screw jack is attached to maintain the levelling of the platform if is erected in unlevelled ground



Right Angle Coupler

- Right angle coupler are also known as a Double Coupler.
- Used to connect ledgers to the standards.
- They have been designed and tested to achieve a right angle connection with a maximum safe working load of 630KG



Putlog Coupler

- Also called Clips and single clamp.
- Used to connect the transoms to the ledgers
- These fittings are only suitable for light duty use only.
- This putlog coupler is not a load bearing fitting.



Swivel Coupler

- Swivel couplers are used to connect two tubes at any angle through 360 degrees.
- Normally use to connect the bracing to the scaffold.
- The swivel coupler should never be used as a right angle coupler.
- This fitting is a load bearing coupler with an SWL of 550kg.



Spigot Coupler

- Also known as a joint pin.
- This fitting is used to connect two tubes together in longitudinal (end to end) and in vertical position.
- This fitting is placed inside the two ends of the tubes.
- This fitting should never be used in positions where it will be subject to bending or tension.



Sleeve Coupler

- The sleeve coupler is used in the same way as the spigot coupler, but this time used on the outside of the tube.
- This fitting has a resistance to bending, at least equal to any tube.
- It has a safe working tension load of 315Kg.



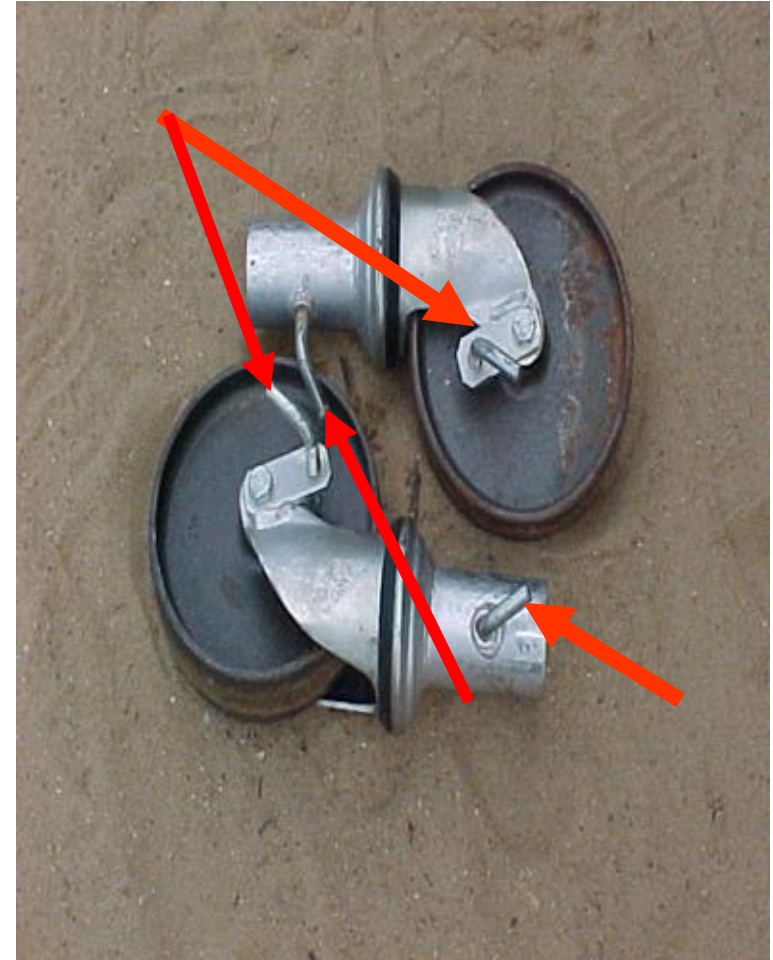
Girder Coupler

- Girder Coupler or commonly know as Beam clamp. This coupler is used to connect the scaffolding pipe in to the beam.
- This fitting should always used in pairs to prevent movement.
- It has a safe working tension load of 315Kg if use in pairs.



Wheels (Caster)

- Wheels (casters) are used on towers allowing them to be moved.
- Wheels (casters) have two (2) locking systems.
- One to connect the wheel to the standard.
- One to lock the wheel in place to stop it moving.

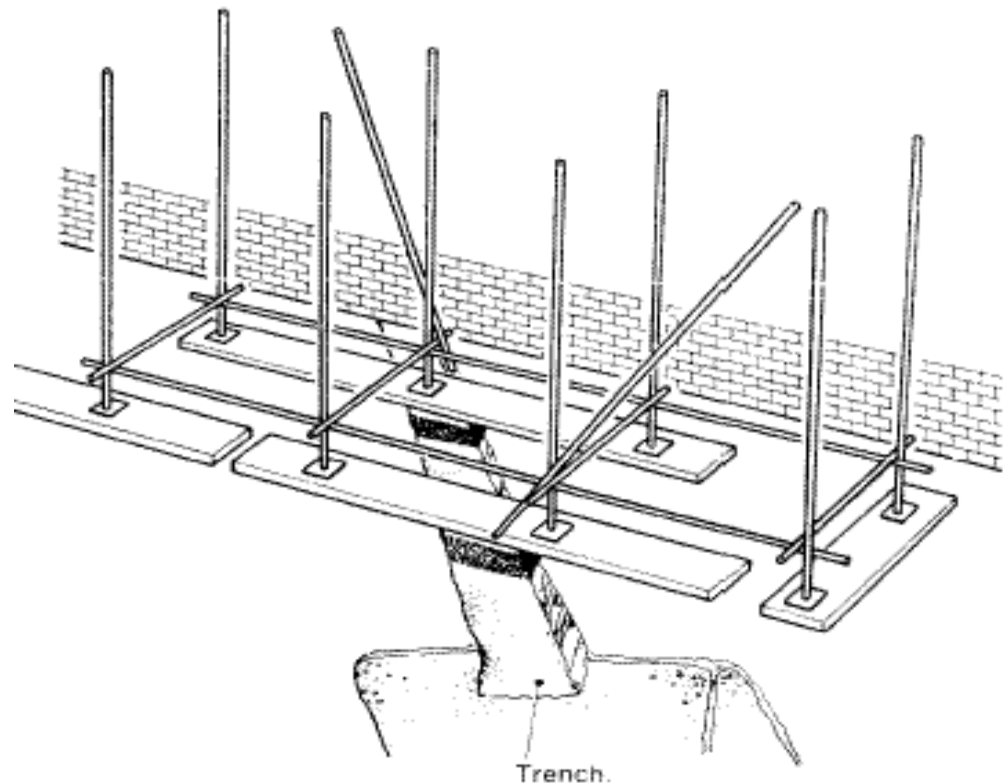


Foundations

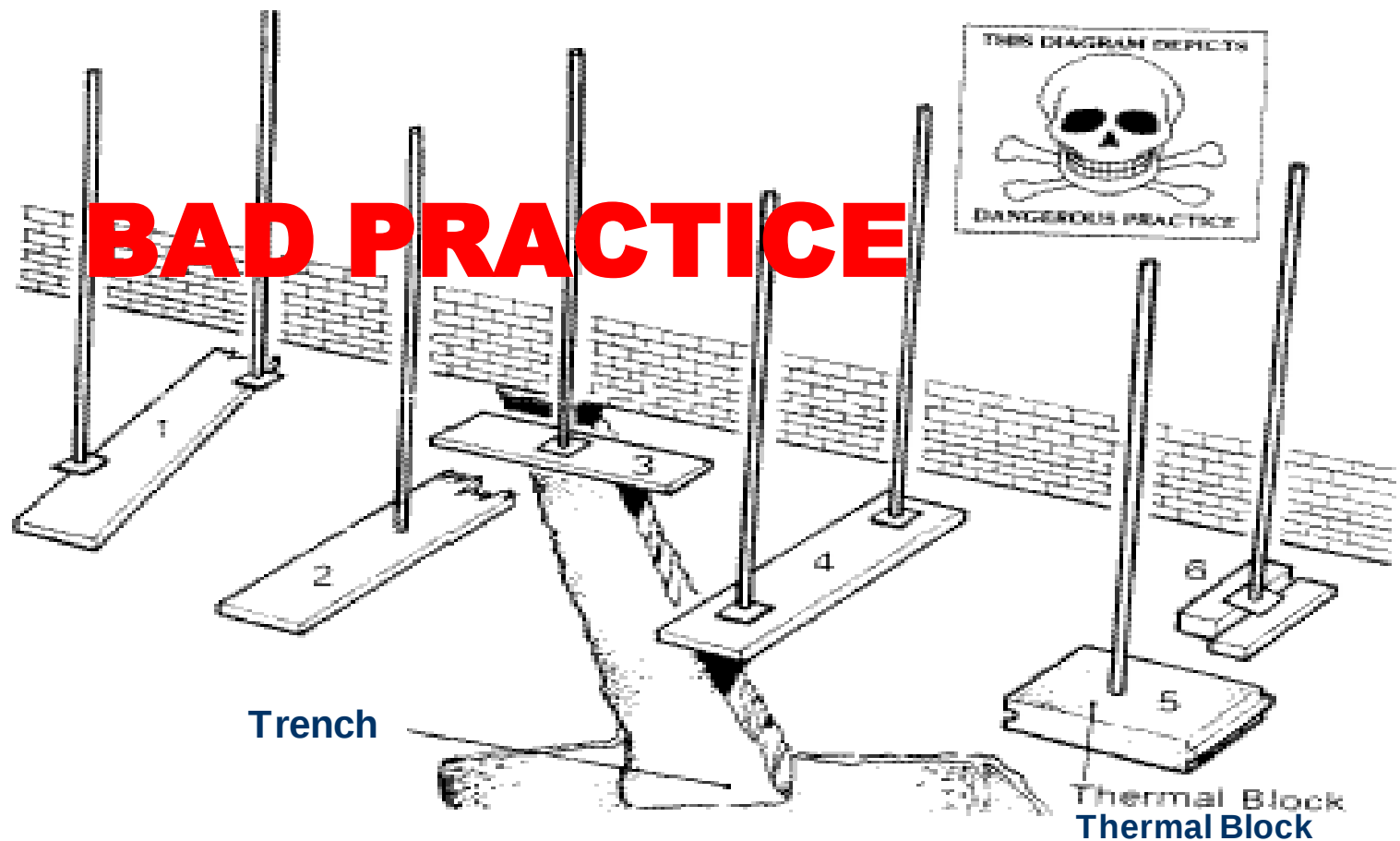
- The soil or ground beneath the sole board should be well compacted and free from irregularities, which could make the sole board unstable or poorly bedded.
- On slopes exceeding 1:10 a check may have to be made on the foundations to ensure the stability of the scaffold.
- The ground must be capable of supporting the scaffold.
- The sole boards must be capable of spreading the weight of the structure without distortion.
- Two standards per sole board are better than one.
- Sole boards should be placed at right angles to the building and should not project too far out beyond the scaffold.
- Sole boards should not be undermined.

Foundations

This diagram shows how the scaffold foundations should be corrected. Note that the cross braces have been added to transfer loading away from the base of those standards, which are near the trench



Foundations

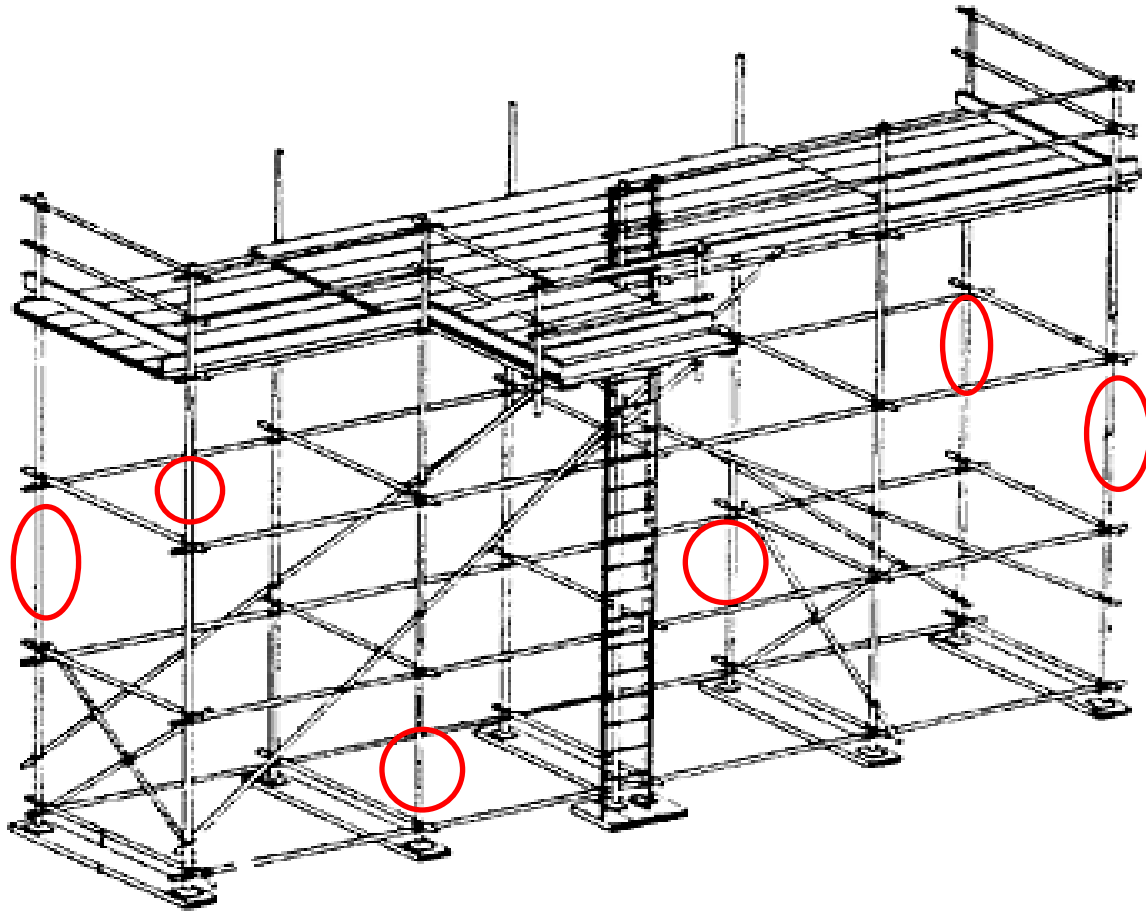


Standard

A vertical or near vertical tube based on the ground or a structure. Used to carry the ledgers.

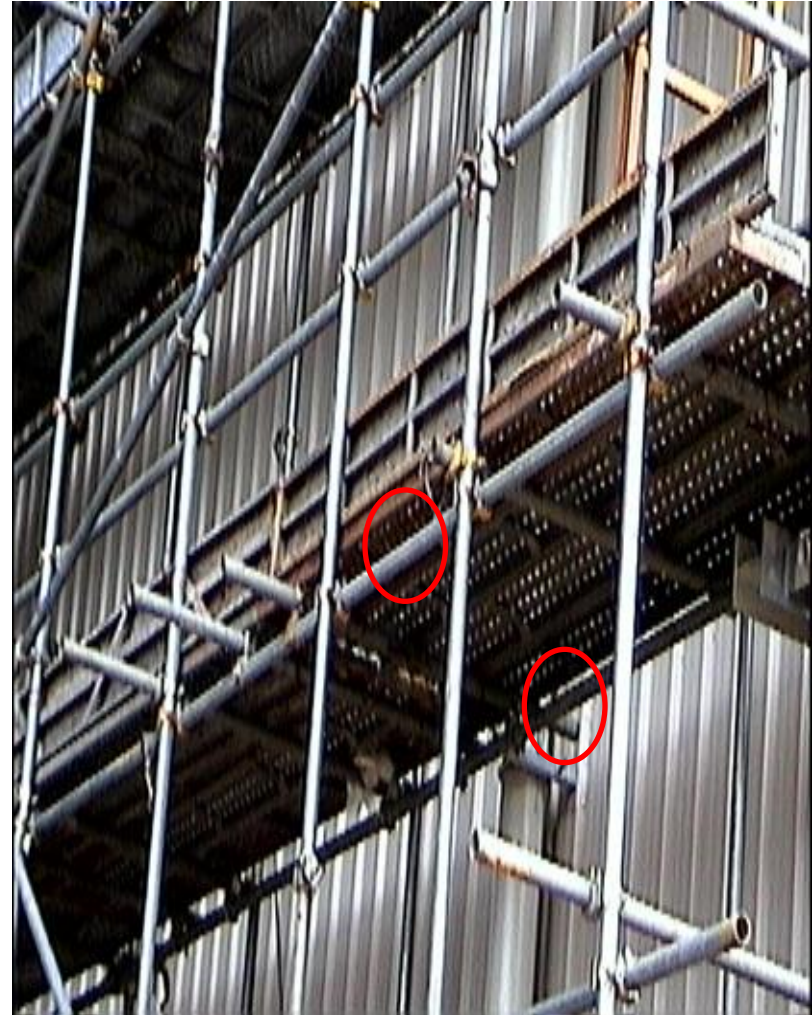
Scaffold use	Standard spacing	
	BS spacing (meters)	Daewoo Materials (meters)
Very light Duty Scaffold	2.7	2.2
Light Duty Scaffold	2.4	2.0
General Purpose Scaffold	2.1	1.8
Heavy Duty Scaffold	2.0	1.6

Standards



Ledger

- A longitudinal tube fixed parallel to the face of the building.
- It also act as a support for the transoms.
- It can also be use to form part of the ties in the scaffold.

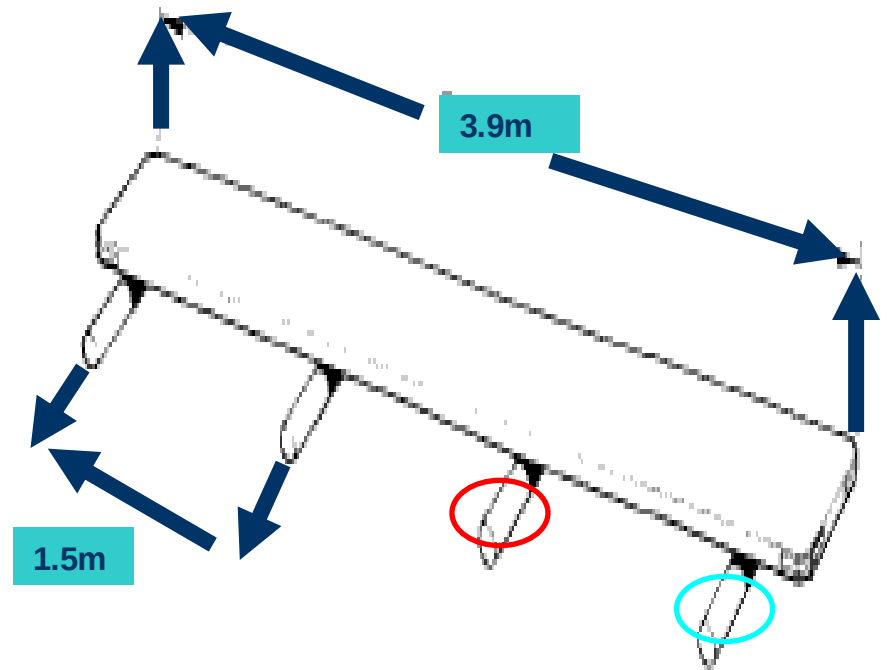
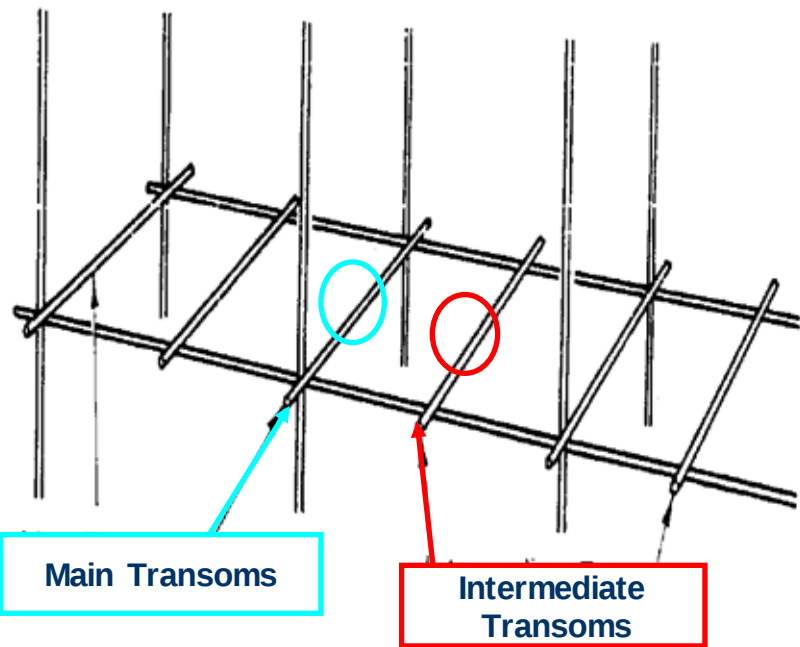


Transoms

- A tube spanning across the two ledgers to form support for the boards. It is sometimes called as the board bearers
- Maximum spacing between each transom is 1.5 metres. When a 38mm board is used.
- A minimum of four transoms to a 3.9 meter board.

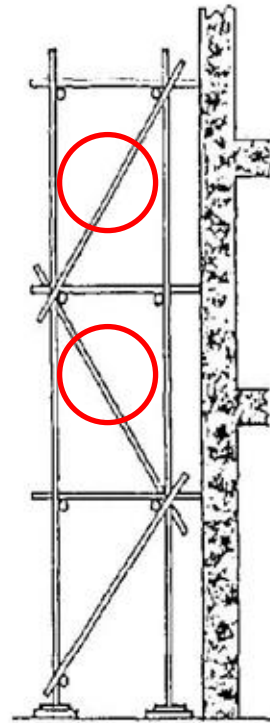


Transoms

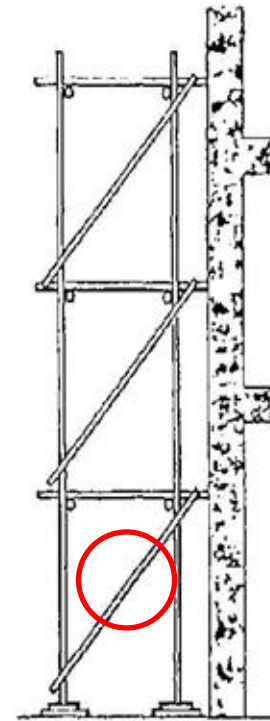


Brace

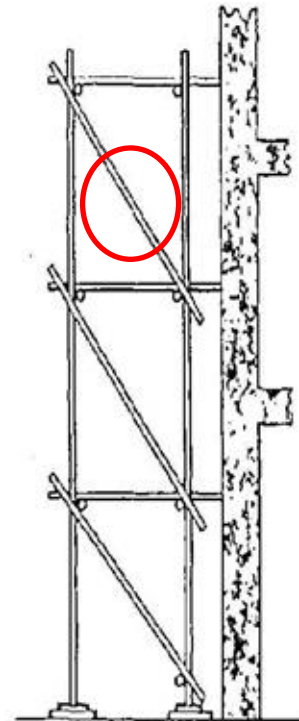
- A tube placed diagonally with respect to the vertical or the horizontal members of a scaffold and fixed to them to afford stability.
- The best angle for setting the brace is 45 degrees.



Dog-leg or zig-zag
Ledger-bracing.



Cross Braces
fixed with swivel couplers
to standards



Alternative
method.

Working Platform

All scaffold boards should comply with BS 2482; and should not be warped, twisted, split or badly worn, painted or otherwise treated so as to conceal any defects.

- Two Boards wide - Access Only
- Three Boards wide - For men without tools
- Four Boards wide - For men with tools



Boarded Lifts

- The spacing of transoms for the boarded lifts is limited by the thickness of boards used.
- While boards are available which are manufactured to BS 2482, the majority boards used on scaffolding will conform to NASC Technical guidance Note TG5:91 (Scaffold Board Specification).
- 38mm boards made to TG5:91 standard should be supported at a maximum span of 1.2 meters whereas, when a BS board is employed, a maximum span of 1.5 meters may be used.

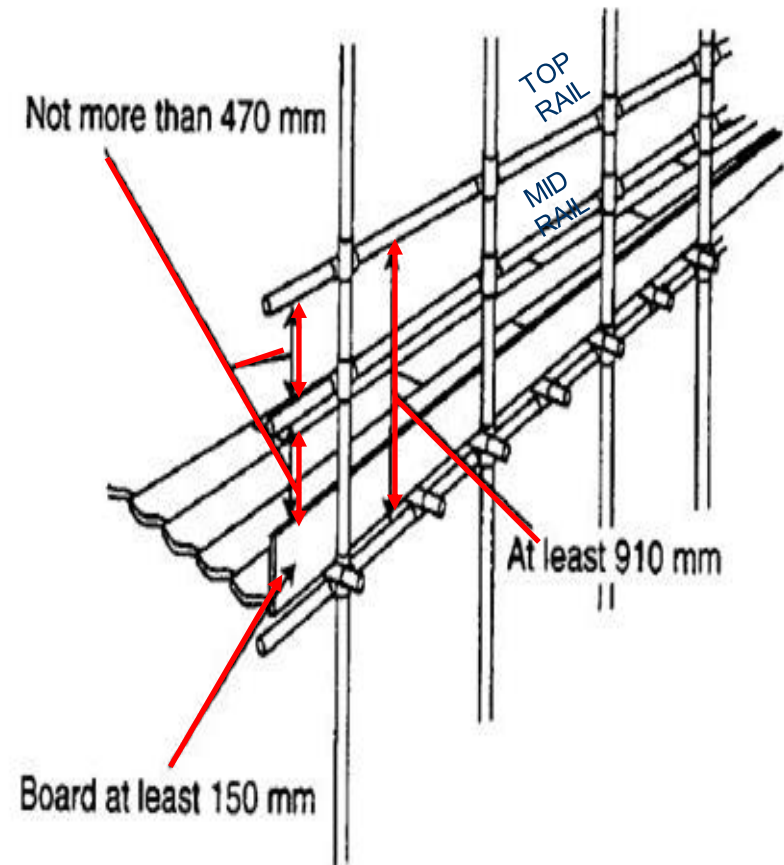
Boarded Lifts

Maximum spacing for
putlogs or transoms
when using boards
conforming to BS 2482

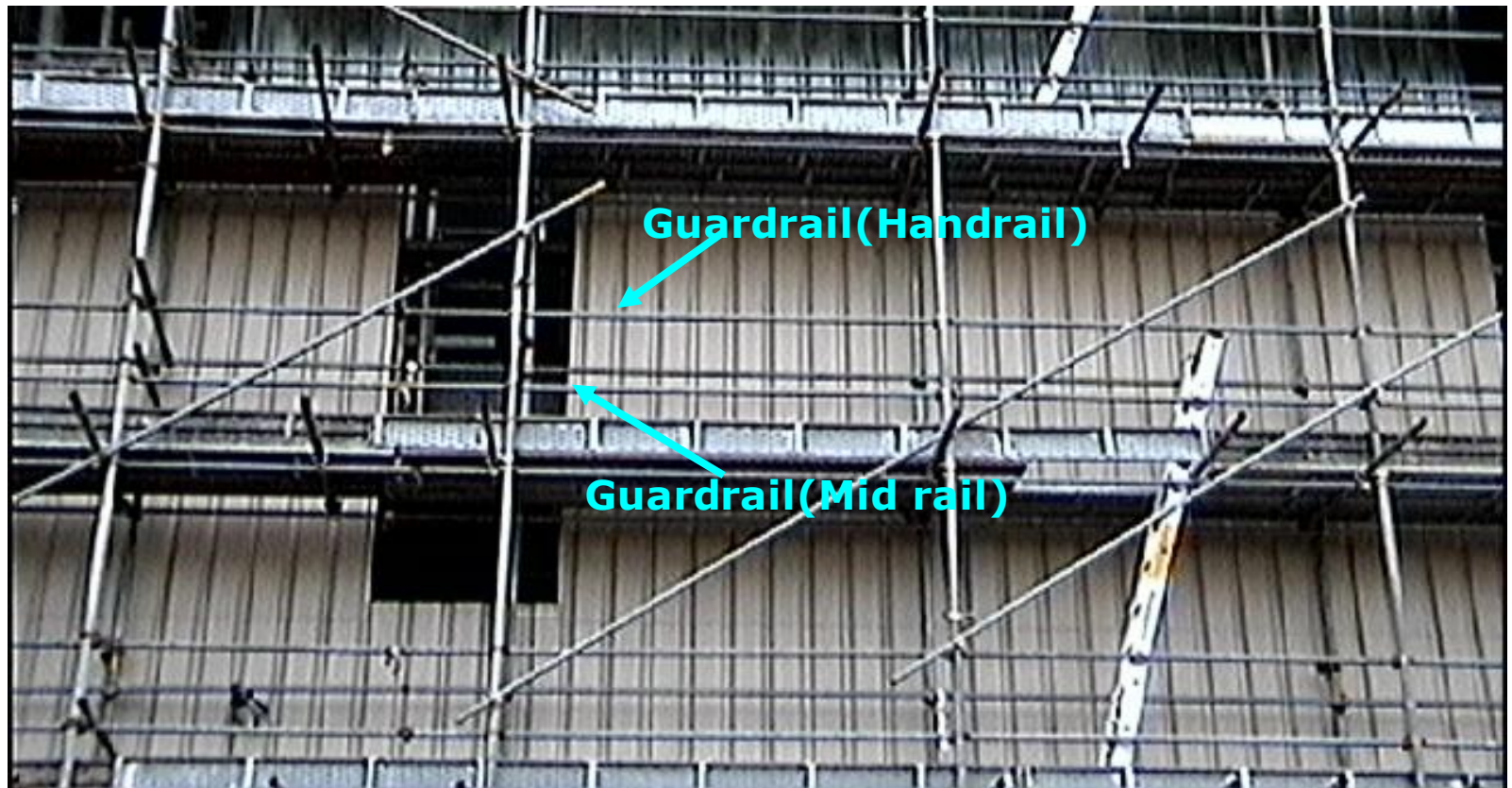
Nominal Thickness of board	Maximum span of transom
32mm	1.0 meter
38mm	1.5 meter
50mm	2.6 meter
63mm	3.5 meter

Guard-rails

- Guard-rails must be provided:
- Where persons are liable to fall 2 meters or more
- At a level at least 910mm above the level of the platform
- At the height approximately halfway between the top edge of the toe-board and the top or subsequent guard-rail, so that no gap is larger than 470mm
- And fixed inside the standards



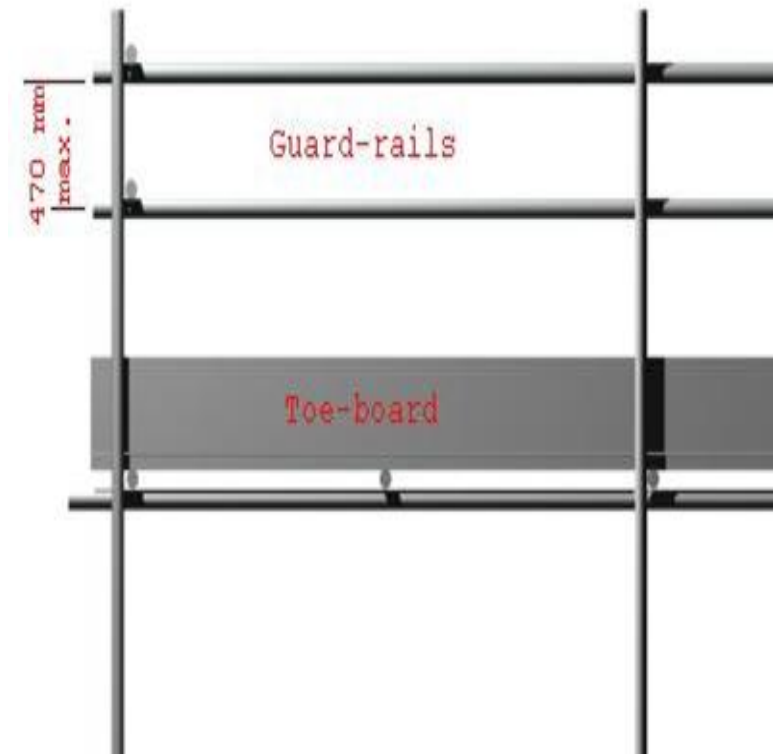
Handrails, Mid-rails



Toeboards

Toe-boards must be provided:

- Toe boards must be fitted to all scaffolds to prevent persons and materials falling from the scaffold. It must be installed in all sides of the scaffold platform except in access point
- To accompany guard-rails
- At least 150mm high above the platform (they are usually made by scaffold board turned on edge)
- And fixed inside the standard with the use of proper clips

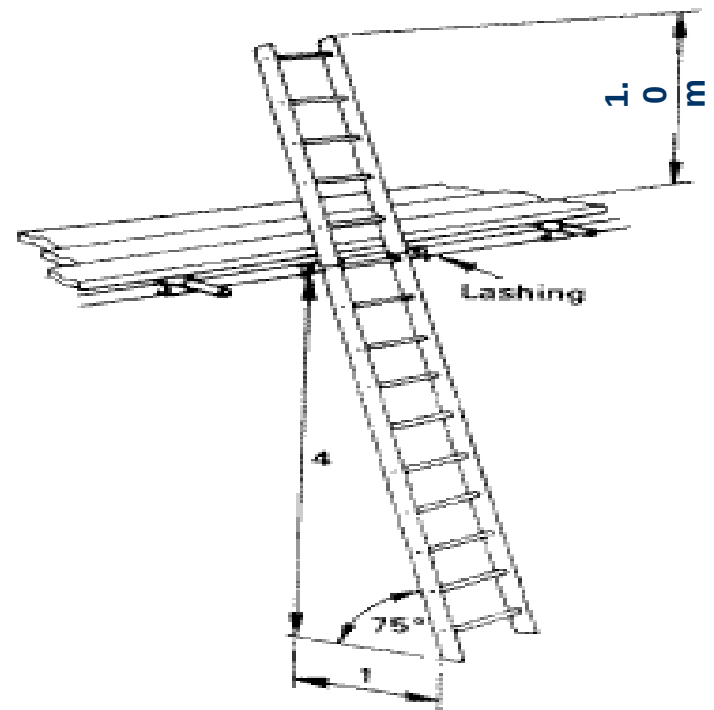
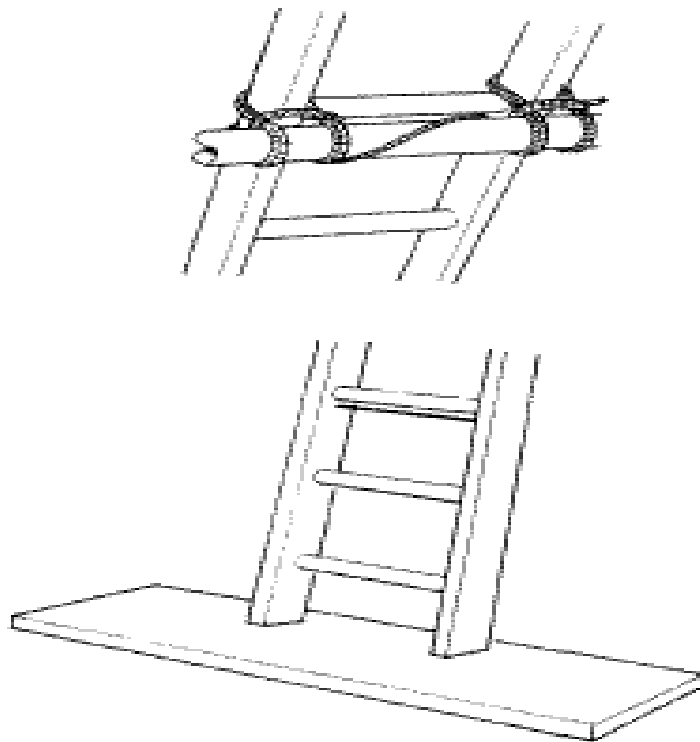


Ladder access

Ladders used as access to the workplace should be:

- Not defective in any way nor painted
- Placed on a firm footing, with each stile equally supported
- So positioned that there is sufficient space at each rung to give an adequate foothold
- Positioned approximately at an angle of 75° , that is: 1 measure horizontal to 4 measures vertical
- When more than 3 meters in length it must be securely tied at the top or footed at the bottom to prevent slipping
- Extended to a height of 1 meter (5 rungs) above the working platform (unless there is another adequate hand hold)
- Positioned so that vertical height of the ladder running between landing does not exceed 9 meters
- When moving or placing a ladder, be aware of overhead power lines and other electrical hazards

Placing Ladders



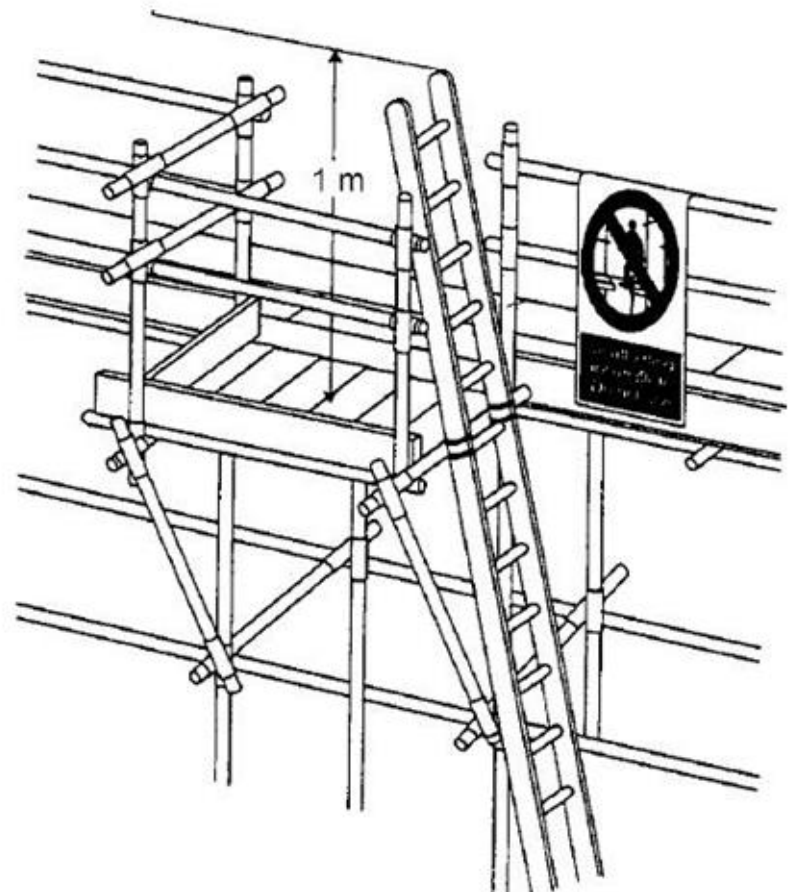
Ladder Inspection

- All ladders must be inspected prior to use.
- Things to look out for.
- Check to see if the ladder is damaged.
- Check the stiles (sides) for cracks or splits.
- Check the rungs are all in place and the
- supporting rods are under the rungs.



Access

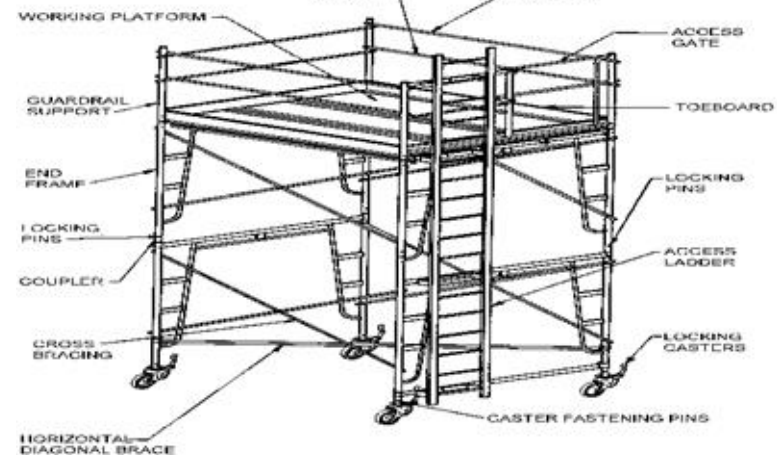
- Working platforms must be provided, where necessary with access holes, which must not be more than 500mm wide, and as small as practicable in the other direction.
- Landing must be fitted with guard-rails and toe-boards, and no materials should be stored.



System Scaffolds

Common Types Of System Scaffold

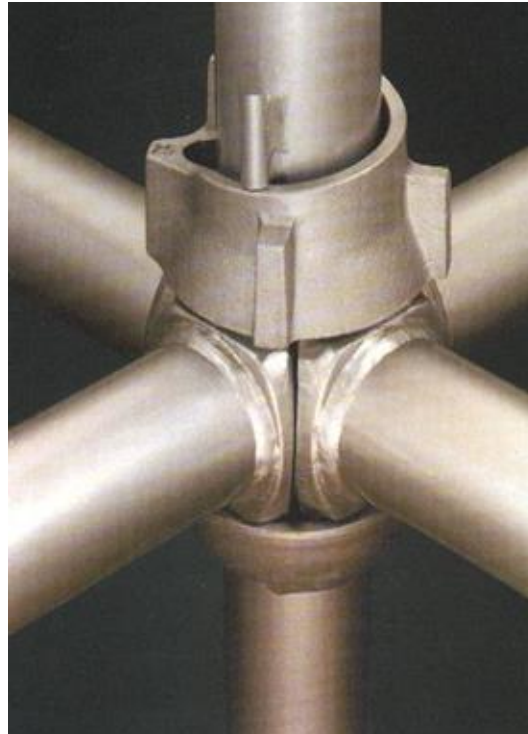
- Most systems are composed of standards with performed connectors welded at intervals along their length to which the ledgers are fitted with a proprietary clamping or wedging arrangement.
- Some earlier systems use tubes made into frames – typically H or X shapes, to avoid the need for bracing.



System Scaffolds



Ring Type



Cuplock
System



Star System

System Scaffolds



Scaffold Inspection

Scaffolding platform must be inspected;

- By Competent Scaffolding Inspector
- Before being use for the first time
- After any substantial addition, dismantling or other alteration
- After any event likely to have affected its strength or stability
- At regular intervals not exceeding 7 days since the last inspection
- Using scaffolding checklist and must have report of inspection
- Handing over certificate shall be given to requestor

Scaffold Short Checklist

Short checklist

Check at each inspection that your scaffold does not have these faults:

Footings

Soft and uneven
No base plates
No sole boards
Undermined

Bracing

Facade and ledger
Some missing
Loose
Wrong fittings

Ties

Some missing
Loose

Standards

Not plumb
Jointed at same height
Wrong spacing
Damaged

Putlogs and transoms

Loose
Wrongly spaced
Wrongly supported

Boarding

Bad boards
Trap boards
Incomplete boarding
Insufficient supports

Ledgers

Loose
Not level
Joint in same bays
Damaged

Couplings

Wrong fitting
No check couplers
Loose
Damaged

Guard-rails and toe-boards

Loose
Wrong height
Some missing

Bridles

Weak support
Wrong spacing
Wrong couplings

Ladders

Not tied
Damaged
Insufficient length

Inspection Report

Report of inspection on scaffolding

The Construction (Health, Safety and Welfare) Regulations 1996, Regulation 30

Inspection carried out on behalf of.....

Inspection carried out by.....

Address of site.....

Date and time of inspection	Description of place of work, or part inspected	Details of any matter identified giving rise to the health and safety of any person	Details of any action taken as a result of any matter identified	Details of any further action required

Handing Over Certificate

SCAFFOLDING - HANDING OVER CERTIFICATE

Contractor: Date:

Site: Time:

Description of section handed over:

Drawing No:
(where applicable)

Scaffolding as described above has now been completed and complies with the Construction (Health, Safety and Welfare) Regulations, 1996. It is structurally sound and should only be used and loaded in accordance with our Quotation No:

(.....)

a) Use only for:

b) Loading to be: working lifts with distributed

Load of: (kN/M2 lbs/ft2 per lift)

The detailed requirements of the Regulations with regard to guardrails - working platforms - toeboards - bracing and ties have been complied with.

In order to comply with Regulation 29 of the Construction (Health, Safety and Welfare) Regulations 1996, this scaffold must be inspected before being taken into use for the first time, at regular intervals not exceeding 7 days since the last inspection, after any event likely to have affected its strength or stability and after any substantial addition, dismantling or other alteration. In order to comply with Regulation 30, particulars of each inspection must be recorded in a Report of Inspection.

It is also the responsibility of every employer under Regulation 3 to see that the requirements of the Regulations which apply to his own men are complied with.

This Scaffold has / has not (delete as appropriate) been designed to take tarpaulin sheets (or other windsails).

Scaffold Contractor:

Depot:

Certificate received on behalf of the Contractor:

Scaffold Tagging System (SCAFFTAG)

The Scaffolding Inspector shall place a weather proof plasticated or equivalent colour coded label (SCAFFTAG) at each access point and at the boundary of each scaffold section from the initial erection stage until final dismantling.

which shall clearly state if the scaffold is “**READY FOR USE**” or “**NOT TO BE USED**”. In addition the label shall state:

- Date erected, with name and initials of Scaffolding Foreman/ Supervisor
- Maximum loading kN/m^2 .
- Date inspected, with foreman name and Scaffolding Supervisor's signature.

Scaffolding Tagging System

Red Scafftag

This means that the scaffold platform is unsafe and must not be used by anybody except by certified scaffolder only for the purpose of rectifying or dismantling



Scaffolding Tagging System

Yellow Scaffoldtag

- When this scaffoldtag is showing it means that the scaffold is under inspection.
- It is recommended that the scaffold should not be use when this tag is posted.



Scaffolding Tagging System

Green Scafftag

When this scafftag is shown it means that the scaffold is safe to use.

SCAFFTAG

ERECTION AND INSPECTION RECORD

LOCATION

REF. NO.

DATE ERECTED

REQUESTED BY

BUILT BY

FOREMAN SIGNATURE

STRUCTURE TO BE USED FOR

Very Light Duty 0.75 kN/m ²	☐
General Purpose 2.00 kN/m ²	☐
Heavy Duty 2.50 kN/m ²	☐
Special Purposes kN/m ²	☐

Fall Protection

- Personal fall protection system, a system used to arrest an employee in a fall from working levels. It consists of an anchorage point, connectors, a full body harness, a shock absorbing lanyard and may include a deceleration device, lifeline or suitable combinations of any of these.
- Anybody who will be working in scaffolding platform 1.8 meters and above must wear and use it properly.

Common Faults



Common Faults



Common Faults



Common Faults



Common Faults



Common Faults



Summary

Remember to:

- Use appropriate scaffold construction methods
 - Erect, move, or alter scaffold properly
 - Protect from falling objects or tools
- Ensure stable access
- Use a competent person
 - Train on scaffold construction and the hazards involved with scaffolds
 - Inspect scaffold before each shift and after alterations
 - Determine fall protection requirements

The fall won't hurt,
but the sudden stop will !



- ✓ Look after yourself
- ✓ Look after the people around you