

# Scaffolding

## All About Scaffold In Details

Types of Scaffold

Types of Clamp

Types of Bracing

Types of Safety Net



Tag System  
Components

Scaffold Rated Capacity

How To Inspect Scaffold?

## HAZARDS

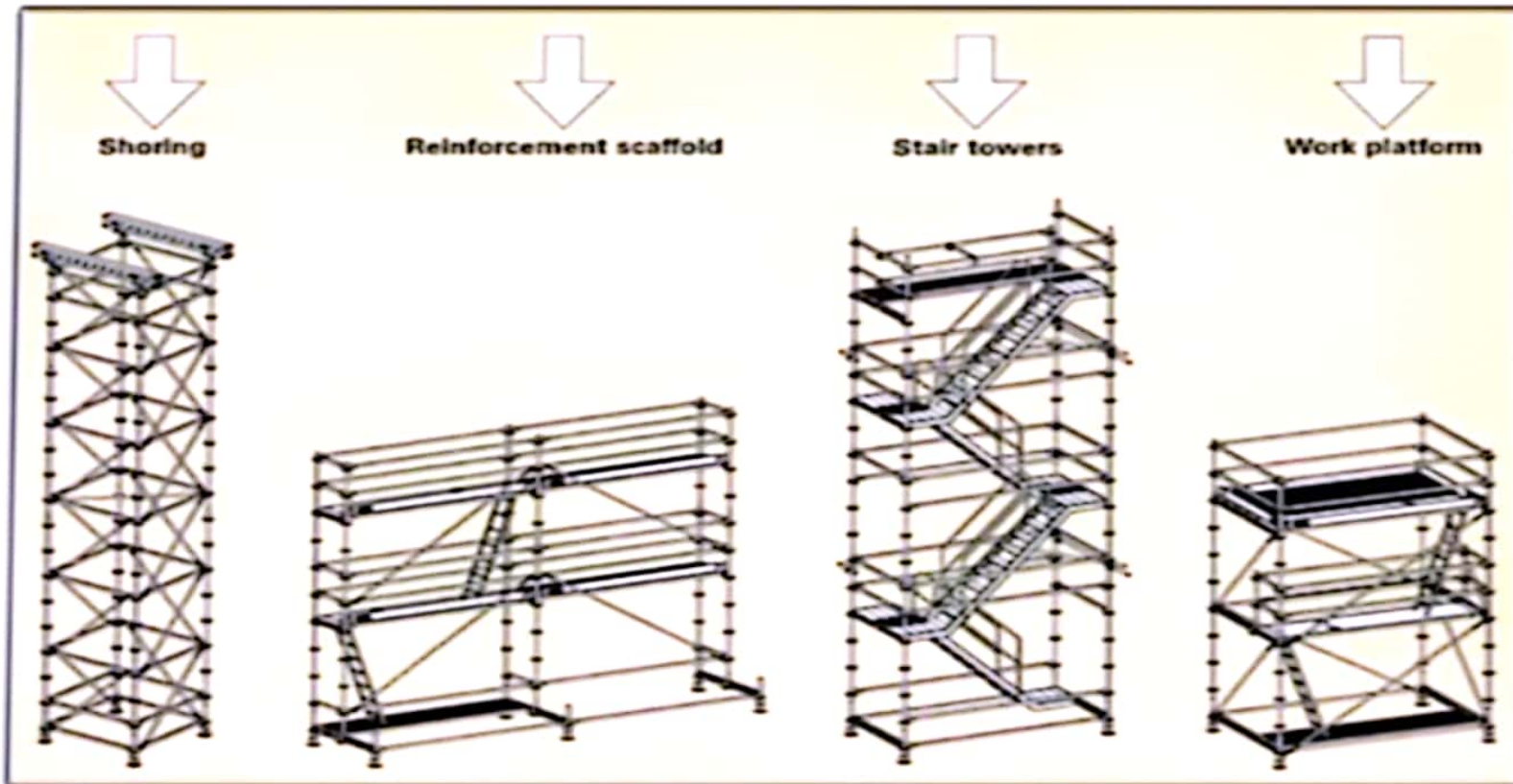
- Falls from elevation
- Struck by Electrocutation
- Scaffold collapse
- Bad planking
- Falling of materials
- Falling of tools
- Loose soil
- Excavations near the scaffold
- Incompetent scaffolder

## PRECAUTIONS

- Protection from falls
- Guard rails
- Personal fall arrest systems
- Toe boards
- Mid rails
- Top rails
- Anchorage
- Lifeline
- Body Harness

# SCAFFOLDING

**Scaffolding is defined as a temporary structure which provides access, or from which persons work, or which is used to support materials, plant or equipment.**





# SACFFOLDING TAG SYSTEM

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**Green Tag**

- Scaffolding ready to use

**Yellow Tag**

- Scaffolding under modification (only scaffolders can work)

**Red Tag**

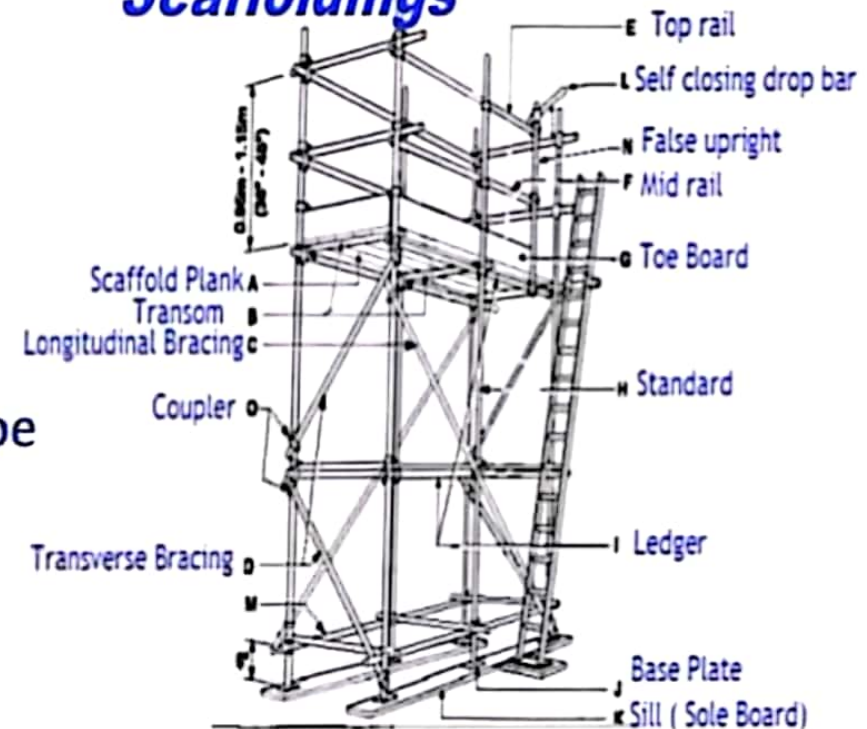
- Do not work



# Scaffolding Components

- |                |                           |                    |
|----------------|---------------------------|--------------------|
| 1. Sole plate  | 9. Clamp                  | 17. Status of Tag  |
| 2. Base plate  | 10. Toe board             | 18. Pulley         |
| 3. Standards   | 11. Plank                 | 19. Rope           |
| 4. Ledgers     | 12. Top Rail              | 20. Lifting Bag    |
| 5. Kicker lift | 13. Mid Rail              | 21. Barricade Tape |
| 6. Transoms    | 14. Self Closing Drop Bar |                    |
| 7. Bracing     | 15. False Upright         |                    |
| 8. Pipe        | 16. Ladder                |                    |

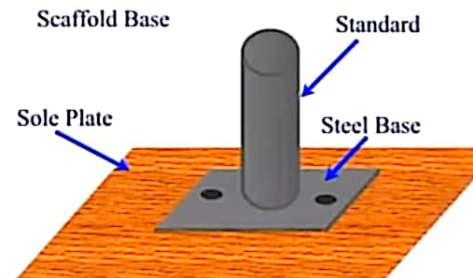
## Components of Scaffolding



# Scaffolding Components Uses

## Sole Plate

- Used to distribute the load
- Large pieces of metal put under the base plate to spread the load over a wide surface area when the scaffold is erected on soft ground.
- Size 300mm x 300mm x 6mm
- Use under every base plate where the foundation surface is soil or on soft ground.
- Use of sole plate if thickness of concrete roof less than 75mm.



# Base Plate

- Used for distribute load

- Small square metal plates that the standard rest on to prevent them to sinking into the ground.

- Size 150mm x 150mm x 6mm

- It is placed under every standard except Mobile Scaffold.



# Adjustable Base Jack

- Maximum load bearing capacity = 30KN

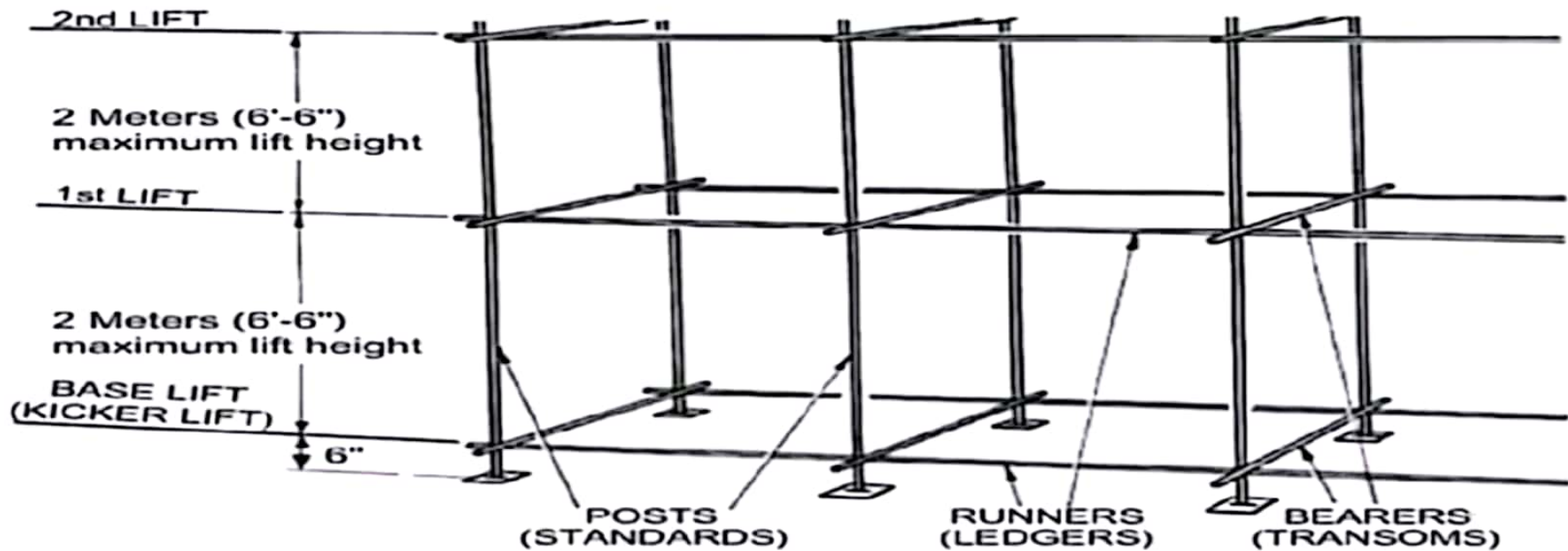
- Lift the jack nut up (2/3) of its height.





# Kicker Lift

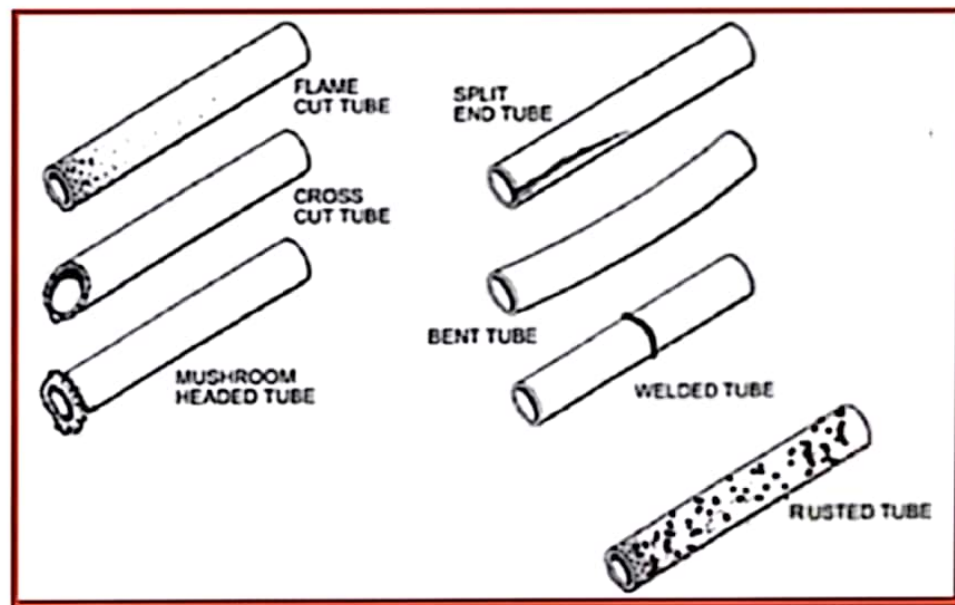
- The first runner is installed 150mm above the ground surface is called Kicker lift.



# Tubes

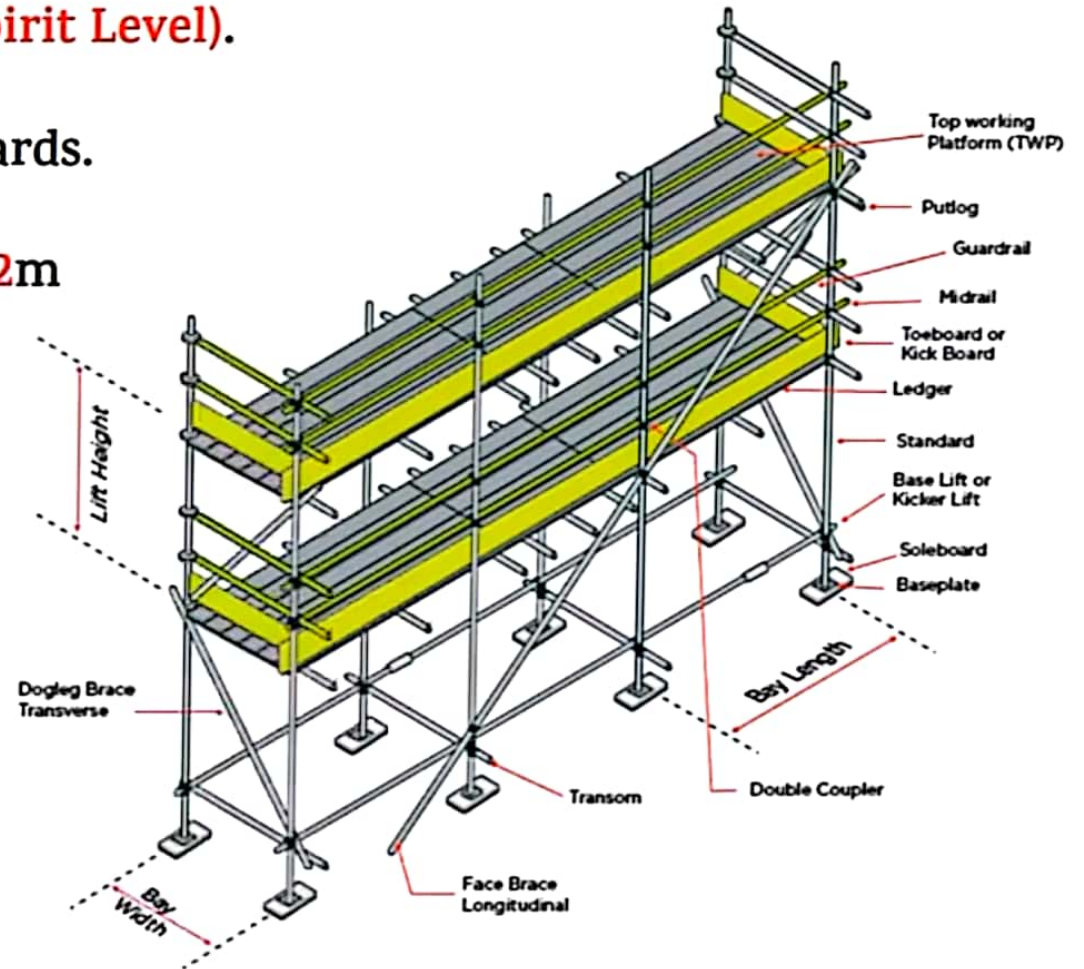
- Outer diameter of scaffold pipe = 48.3mm

- Before use, check it properly.

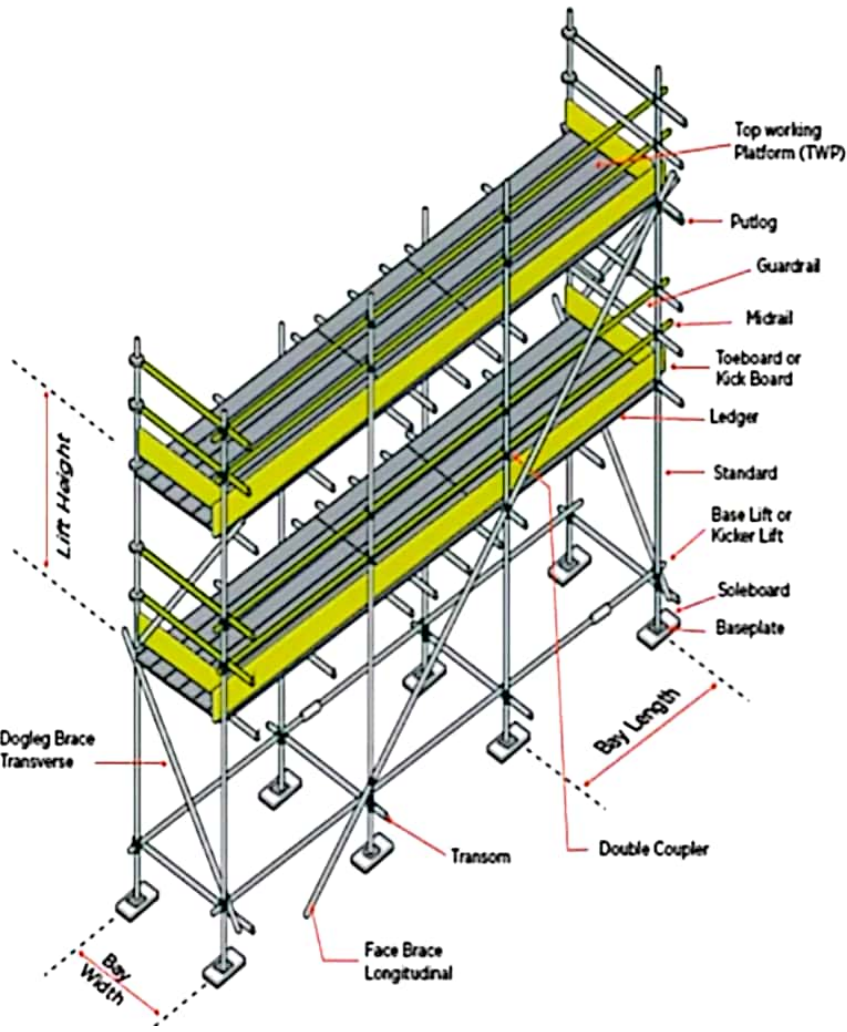


# Standards / Post / Vertical

- Standards should be perpendicular (Use Spirit Level).
- The whole weight of the scaffold on standards.
- Maximum space between two standards = 2m



# Ledgers/Runners

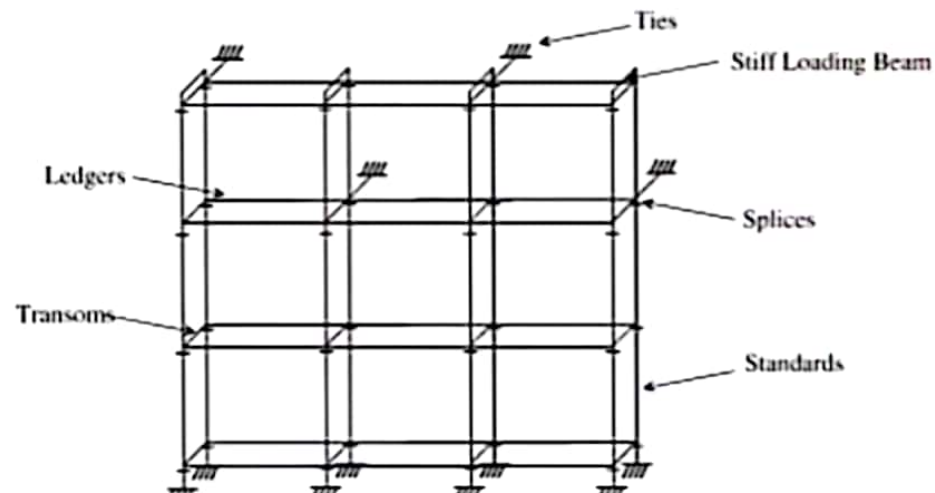


- Ledger should be 180 degree (Horizontal brace)
- Ledger/Transom should be fixed inside the standards.
- Only fix clamp use to join standards & ledgers
- Two joints of ledger should not come together in same bay
- Use box clamp to join two ledgers otherwise we use sleeve coupler
- The vertical distance between two ledgers is not more than 1.8m.
- The first ledger known as kicker lift (Height from ground = 150mm)
- Minimum overhang pipe from standard = 50mm
- Maximum overhang pipe from standard = 150mm

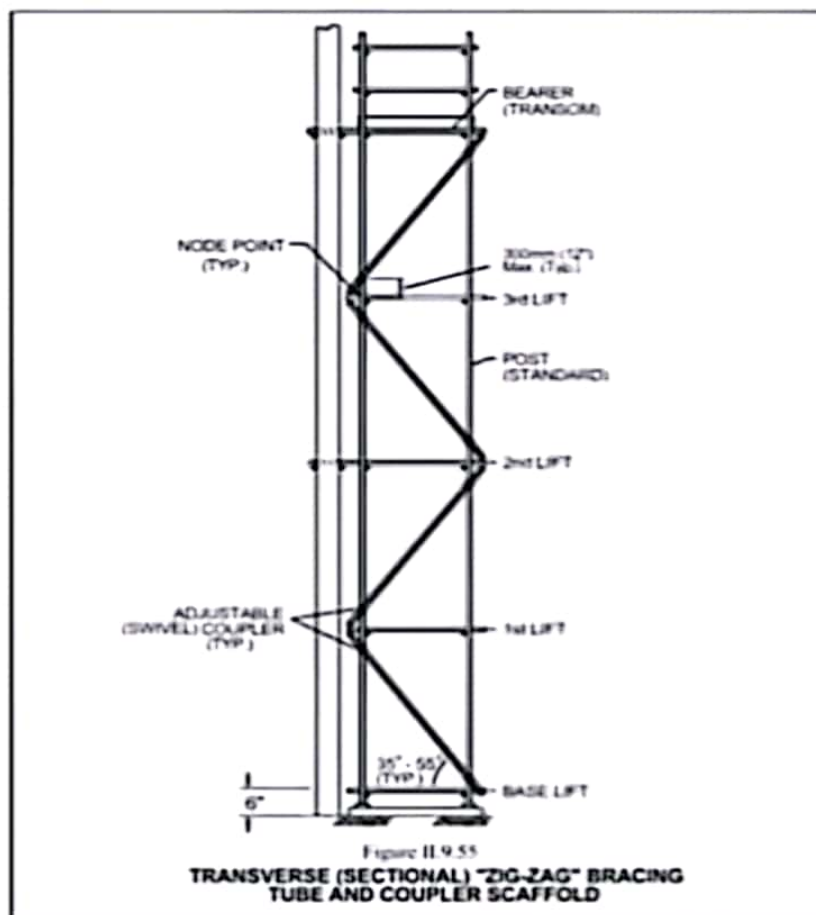
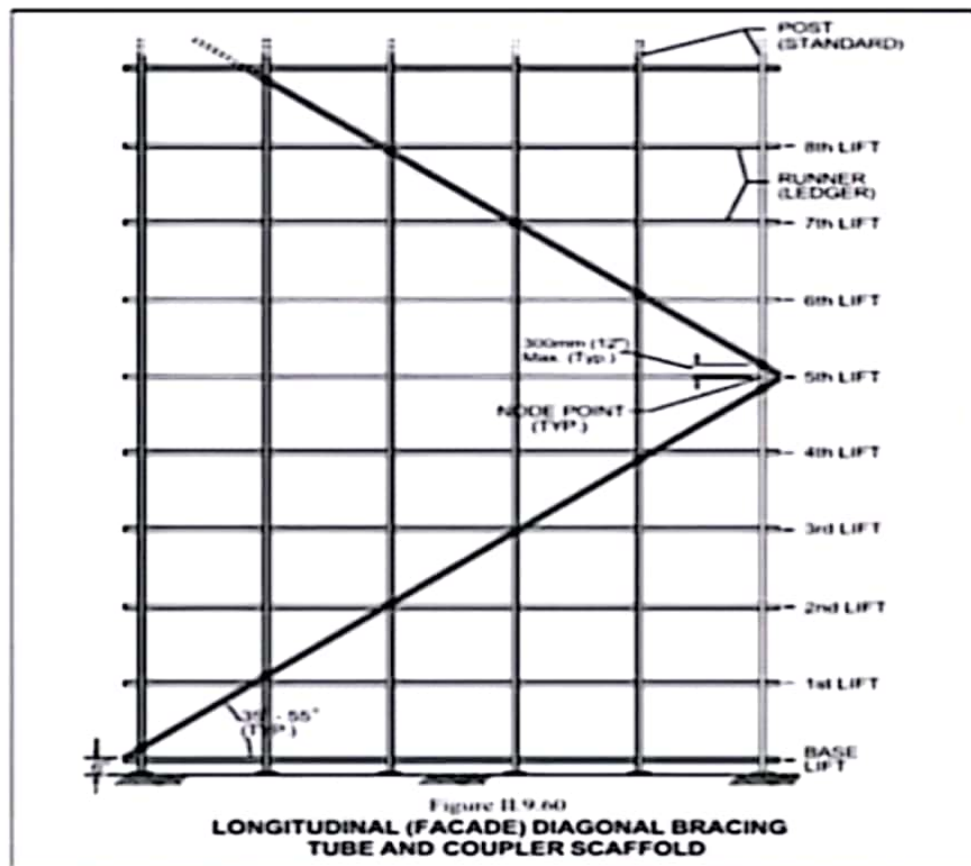


# Transom (Bearer)

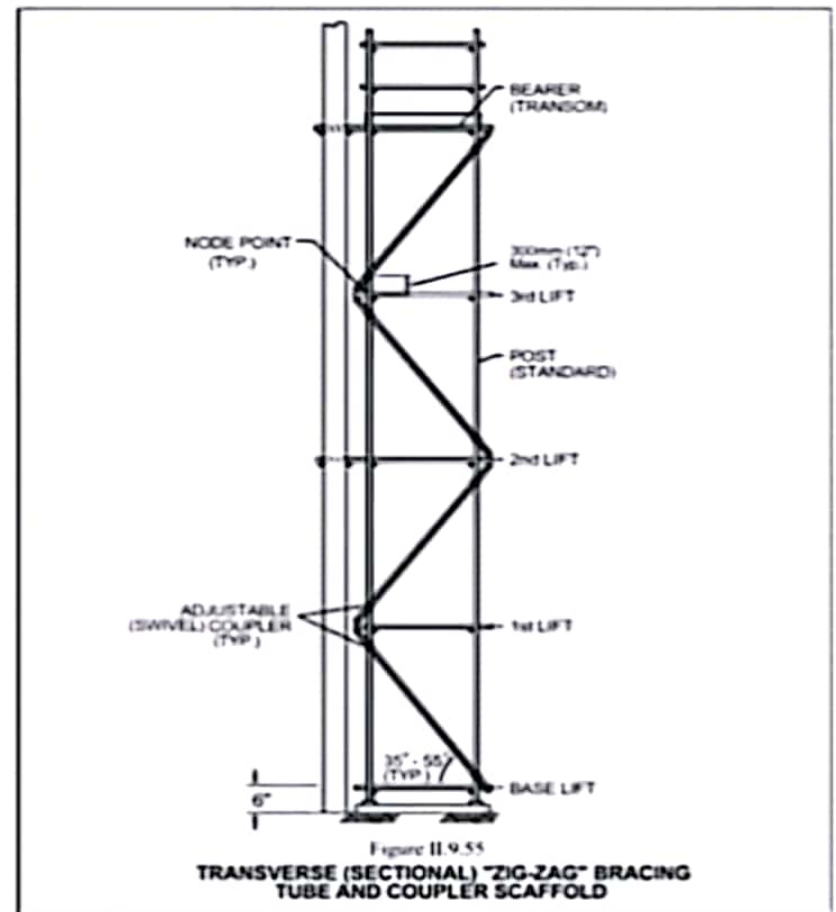
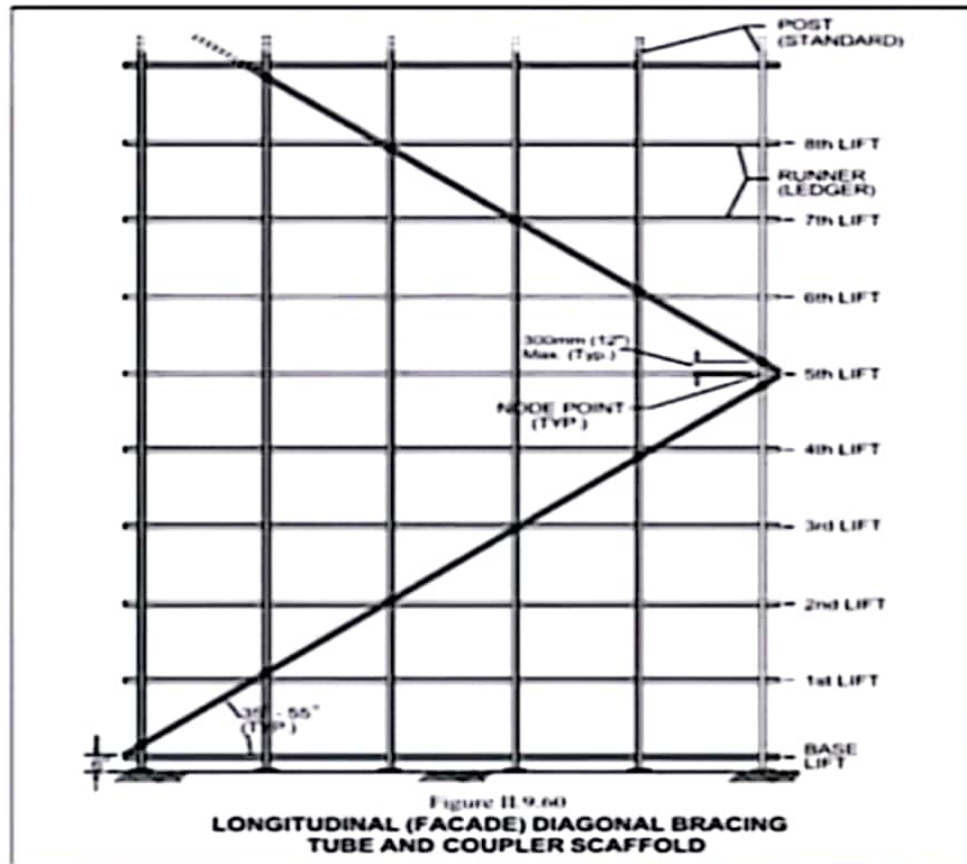
- Place the transom inside the standard & over the ledger.
- Transom must be fitted with fix clamp.
- Transom pipe is to be installed every 1.5m below the platform.
- Minimum overhang from the ledger = 50mm
- Maximum overhang from the ledger = 150mm.
- Put the plank on transom which bear the weight of working platform.



**Bracing** - It is a diagonally tubes that makes the scaffold structure strong & stable.



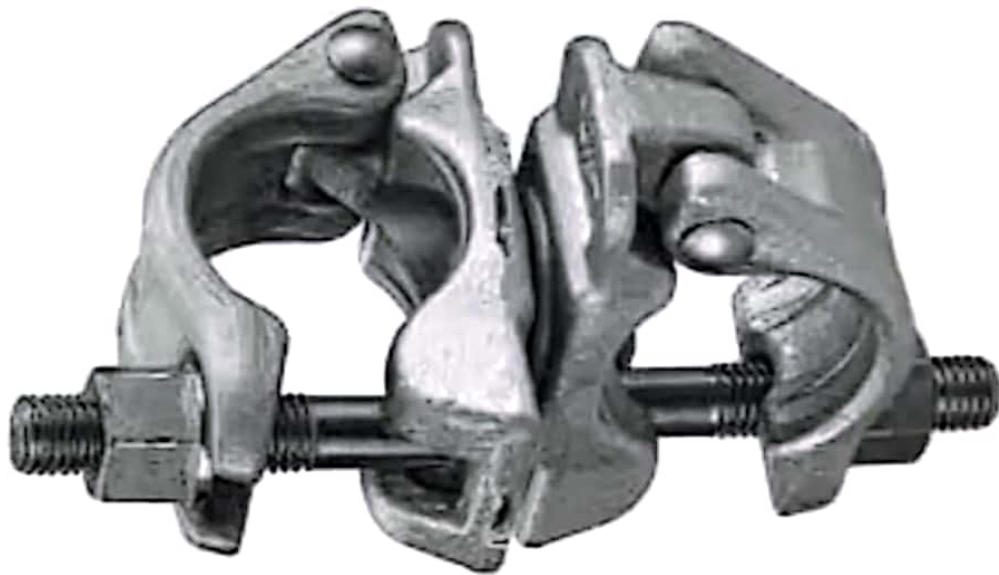
**Bracing** - It is a diagonally tubes that makes the scaffold structure strong & stable.



# Coupler/Clamp - Join two scaffold tubes to each other to assemble a scaffold.

1) Right Angle Coupler (Fix Clamp) - Load Capacity of A Class = 610kg, B Class = 910kg

- Join two pipe at 90 degree



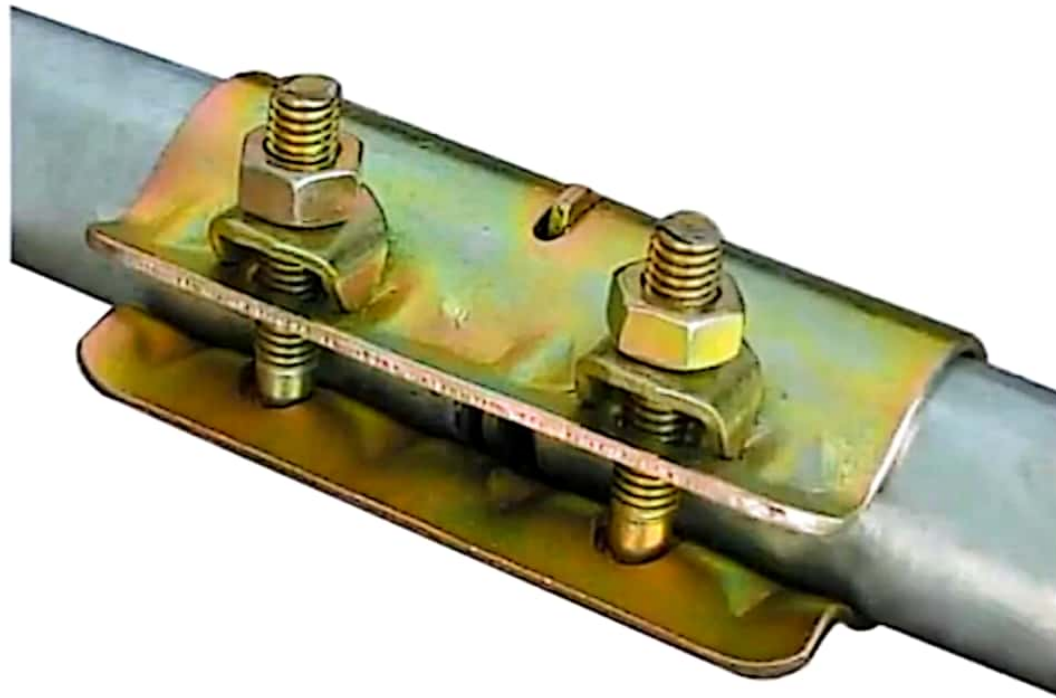


2) Swivel Coupler (Chalu Clamp) - Load Capacity of A Class = 610kg, B Class = 910kg

- Join two pipe in any degree



### 3) Sleeve Coupler (Box Clamp) - Load Capacity = 550kg



#### 4) Ladder Clamp - Load Capacity = 550kg







## 6) Putlog Coupler - Load Capacity = 63kg



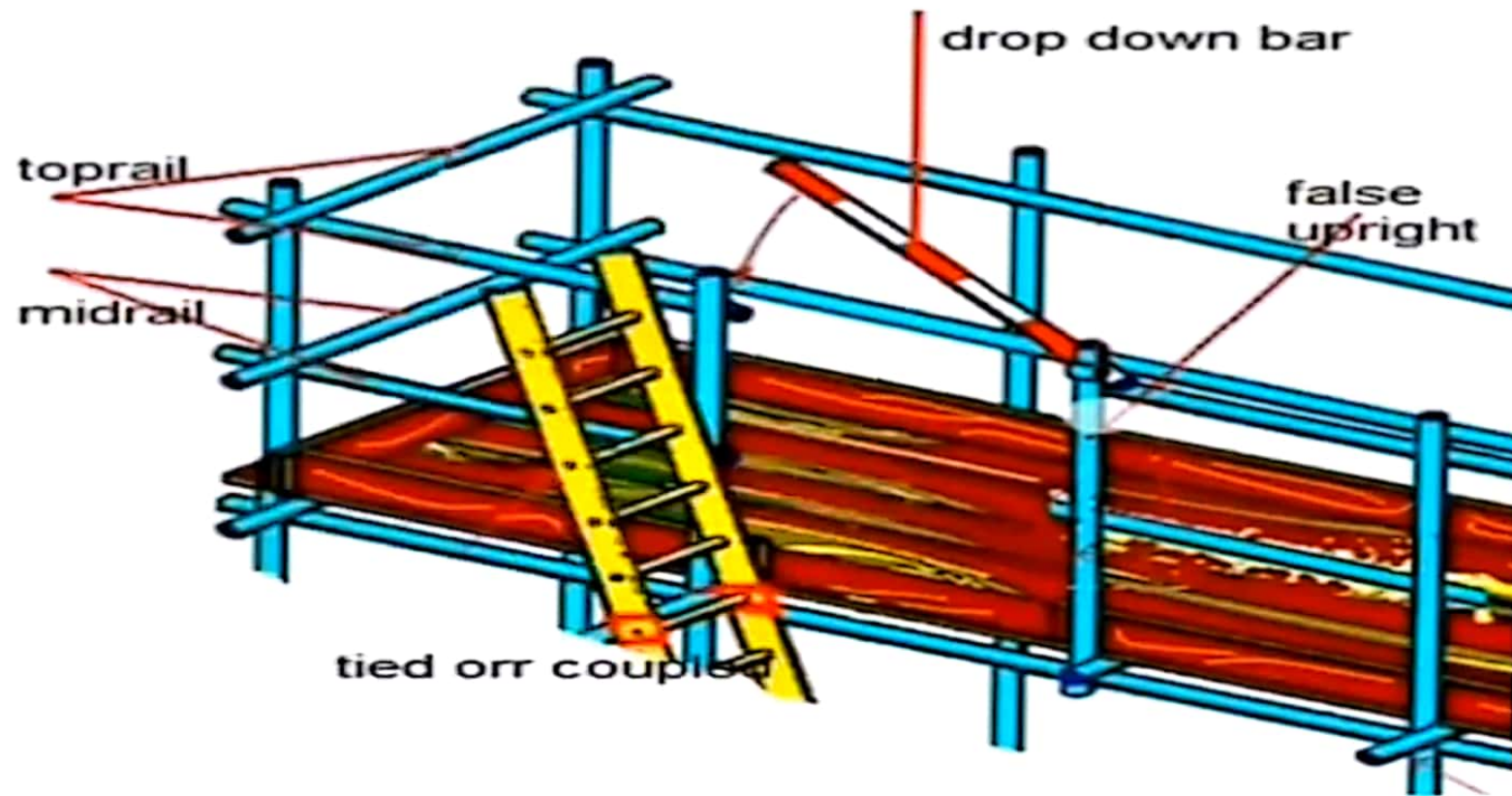
**7) Beam Clamp** - Load Capacity = 3000kg in pairs  
- Size = (50mm, 75mm, 100mm)



# Ladder

- A ladder is a piece of equipment used for climbing up & down.

- Ladder should be projected at least 1.05m (3 runs) above the working platform.



# Scaffold Plank

- It should be free from any defect or corrosion.
- Size = 2100mm x 280mm x 38mm
- Plank comes in three thickness 38mm, 50mm, 63mm
- Minimum overhang from transom = 50mm
- Maximum overhang from transom = 150mm  
(38mm x 4 = 152mm, 50mm x 4 = 200mm, 63mm x 4 = 250mm)
- Transom pipe is to be installed every 1.5m below the platform.

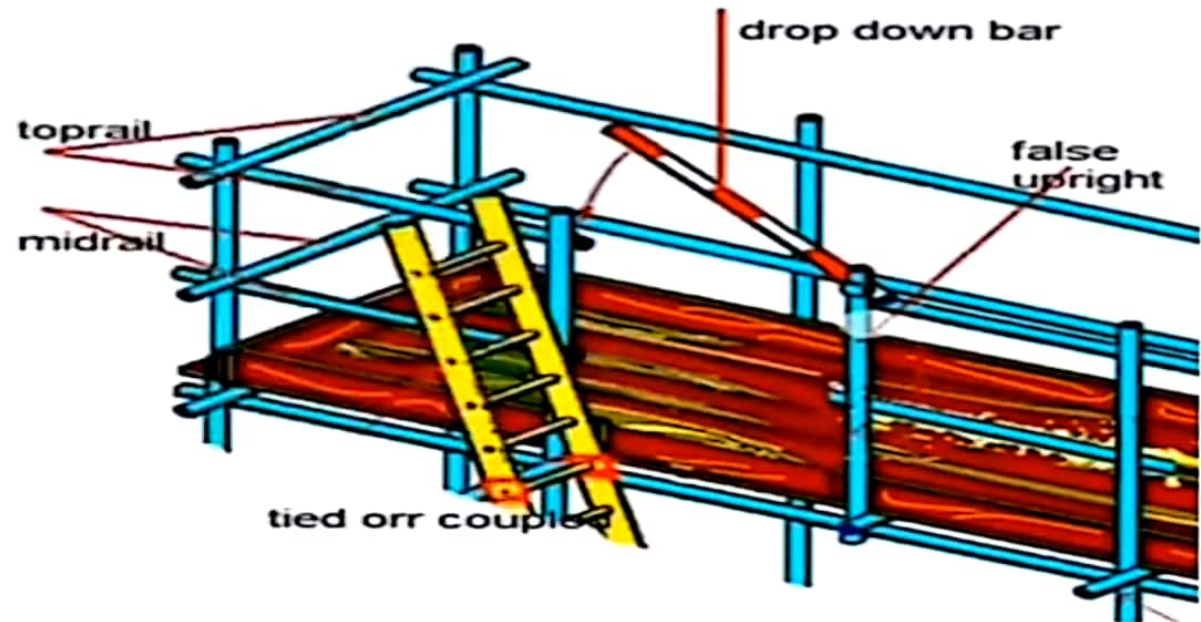




# Platform

- There are three types of platform

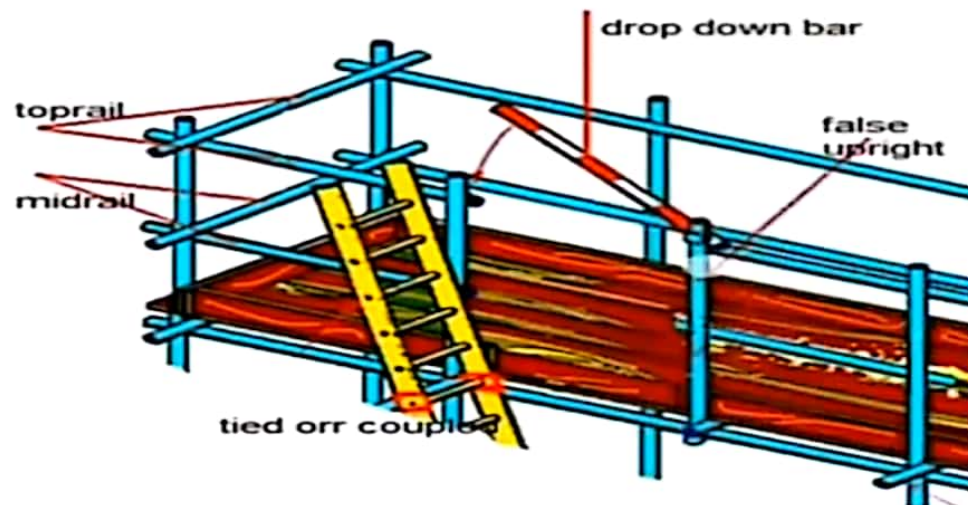
- 1) Service Platform
- 2) Access Platform
- 3) Working Platform



**Top Rail** - Height (950mm - 1200mm) = 1050mm

**Mid Rail** - Height (450mm - 600mm) = 525mm

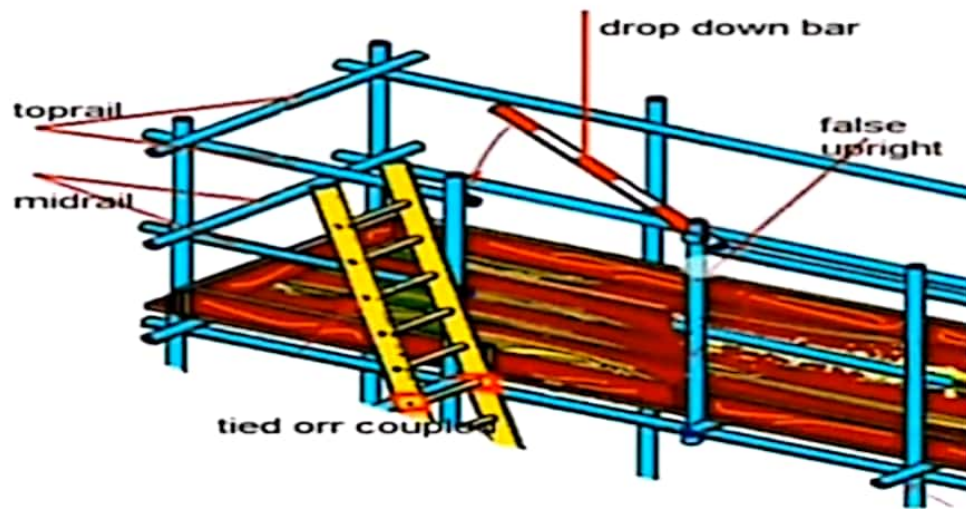
**Toe Board** - Height 150mm



**Top Rail** - Height (950mm - 1200mm) = 1050mm

**Mid Rail** - Height (450mm - 600mm) = 525mm

**Toe Board** - Height 150mm  
- Prevent to fall loose material from the platform





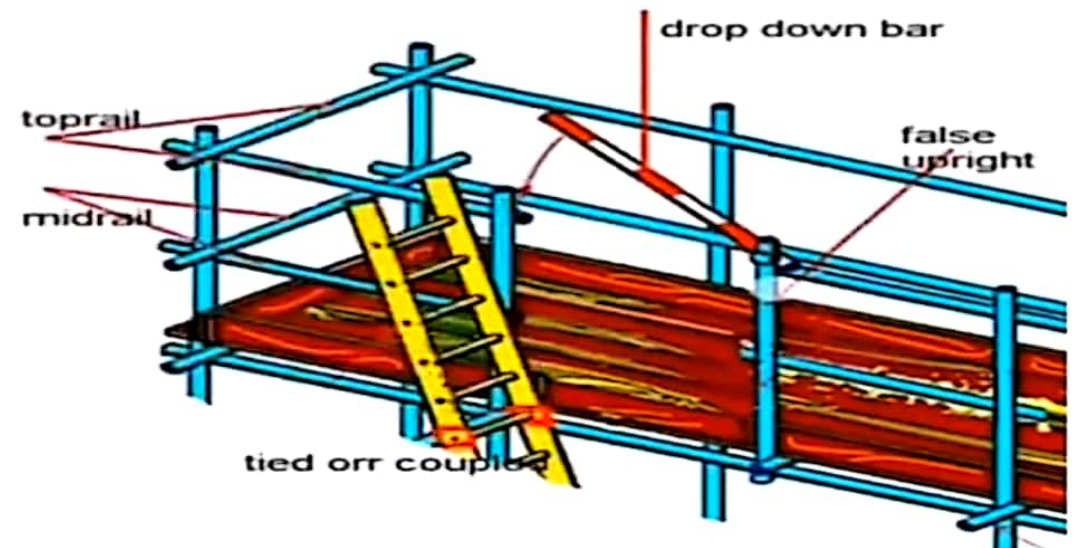
**False Upright** - It is a vertical pipe which is fitted with ledger, mid rail & top rail.

- Minimum length of false upright should be = 1.5m

**Drop bar** - It works like a door (gate).

- Drop bar is fitted in false upright with swivel clamp.

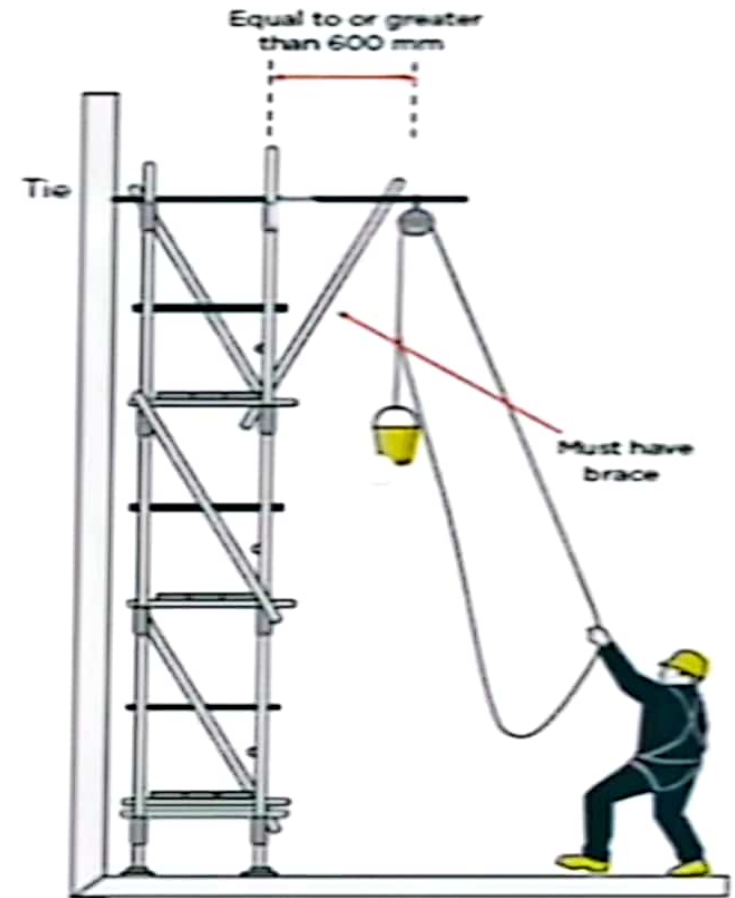
- Gate size = 1000mm x 600mm.





# Rope

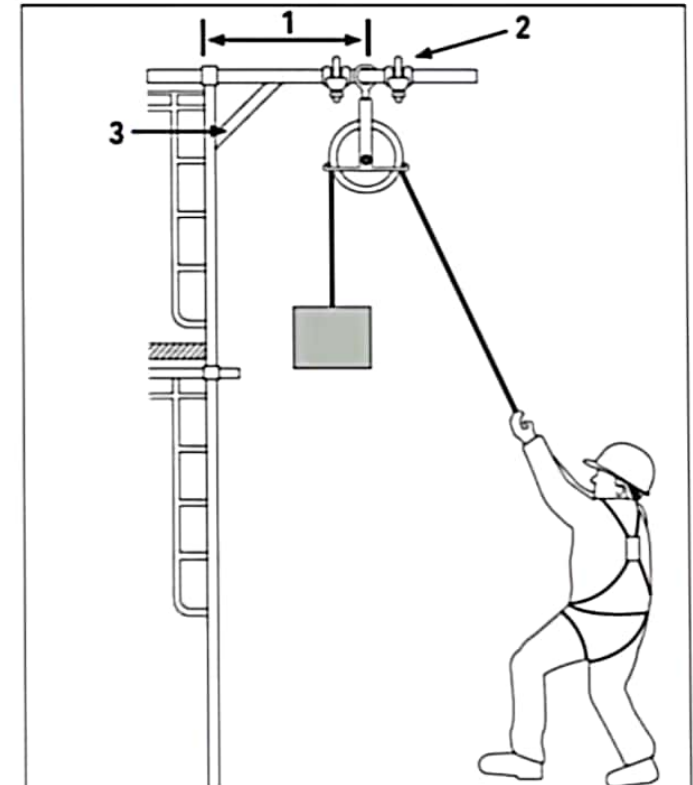
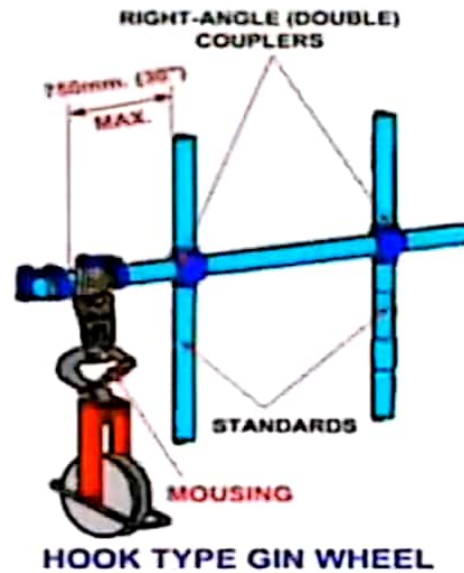
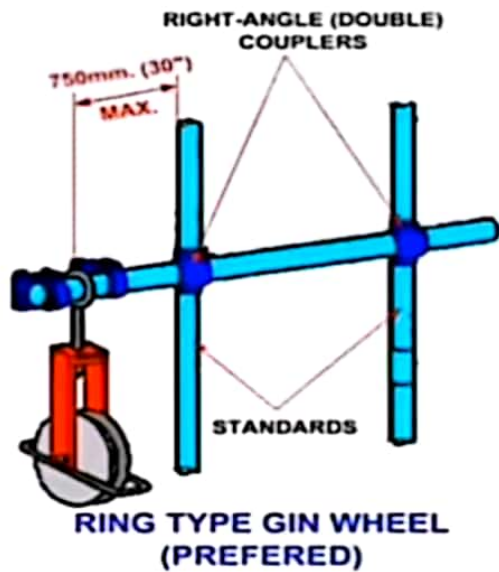
- Polypropylene rope will be used for the lifting up & down the materials.
- Rope will be used for lifting (18mm - 20mm) in diameter.
- Tail rope should be 4.2m long.
- Before use the rope, check it properly.



# Pulley (Gin Wheel)

- It is used to move material from ground to top or top to ground.
- SWL = 250kg but maximum allowable for lifting = 25kg
- It has divided into two parts.

- 1) Ring type pulley
- 2) Hook type pulley



# Lifting bag

- It is used for lift clamp & material.
- Lifting capacity = 25kg
- Before use it, check it properly.



**Barricade tape** - These tapes alert the public to a danger zone.



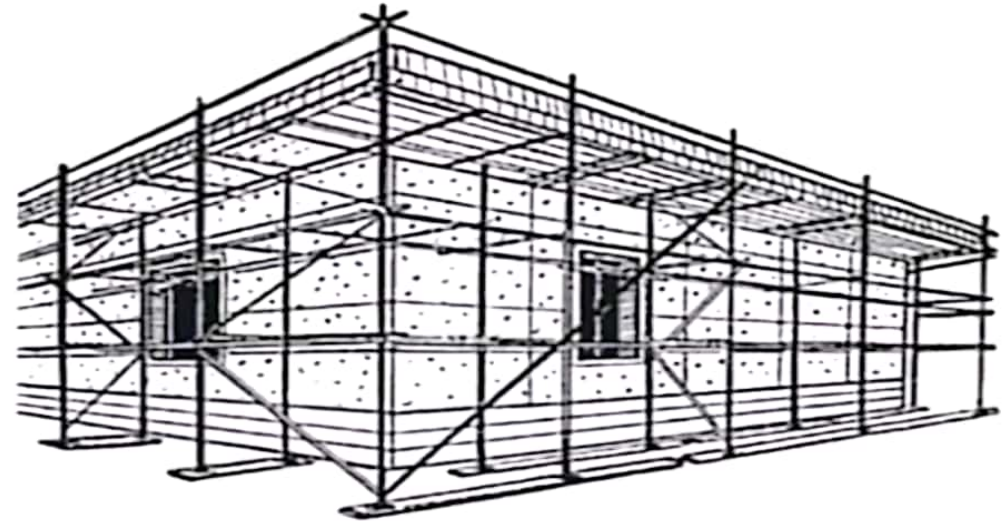
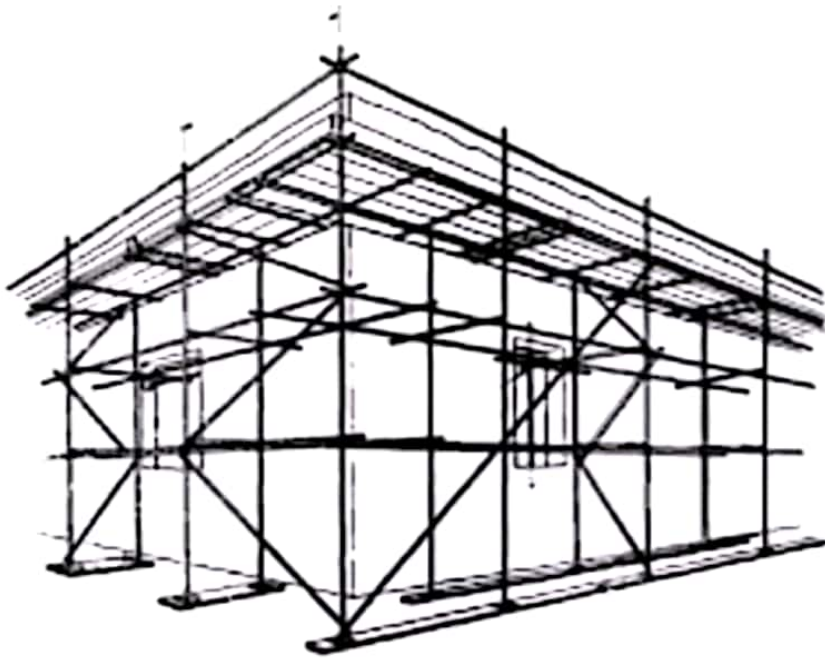


# TYPES OF SCAFFOLDING

- **Independent Scaffolding**
- **Birdcage Scaffolding**
- **Cantilever Scaffolding**
- **Hanging (Suspended) Scaffolding**
- **Mobile tower Scaffolding**
- **Patented Scaffolding**
- **Trestle Scaffolding**

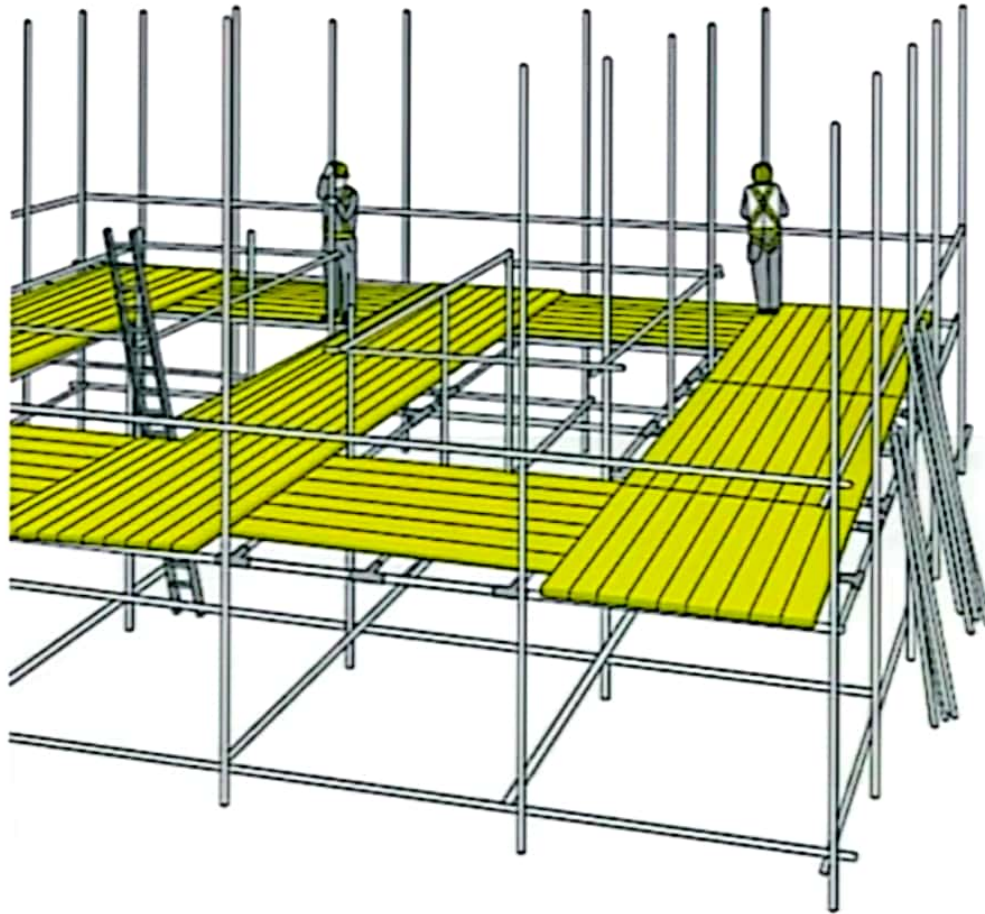
# Independent Scaffolding

Independent tied scaffolds

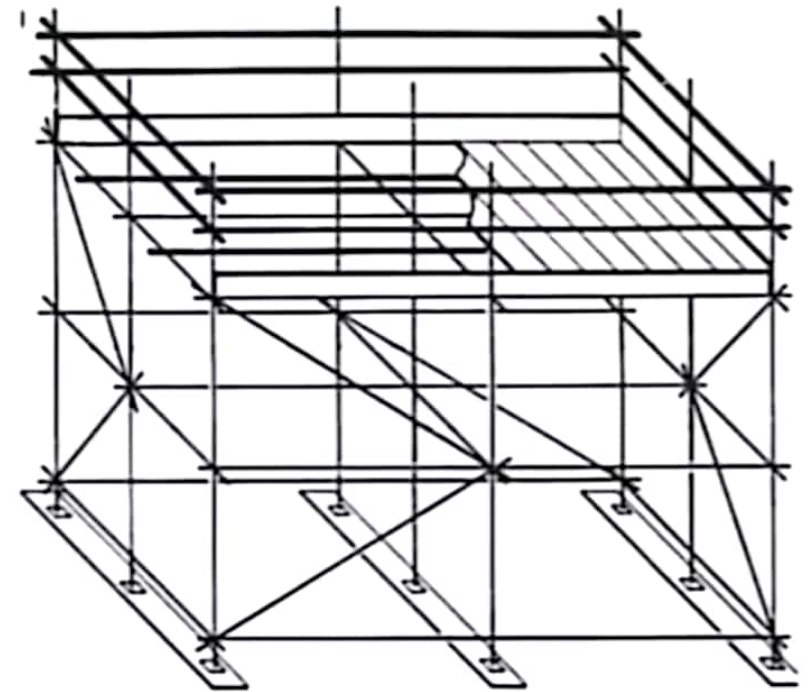


An independent tied scaffold which does not rely on the building for its strength. It has inner and outer rows of uprights or standards

# Birdcage Scaffolding



**BIRDCAGE**





# Cantilever Scaffolding





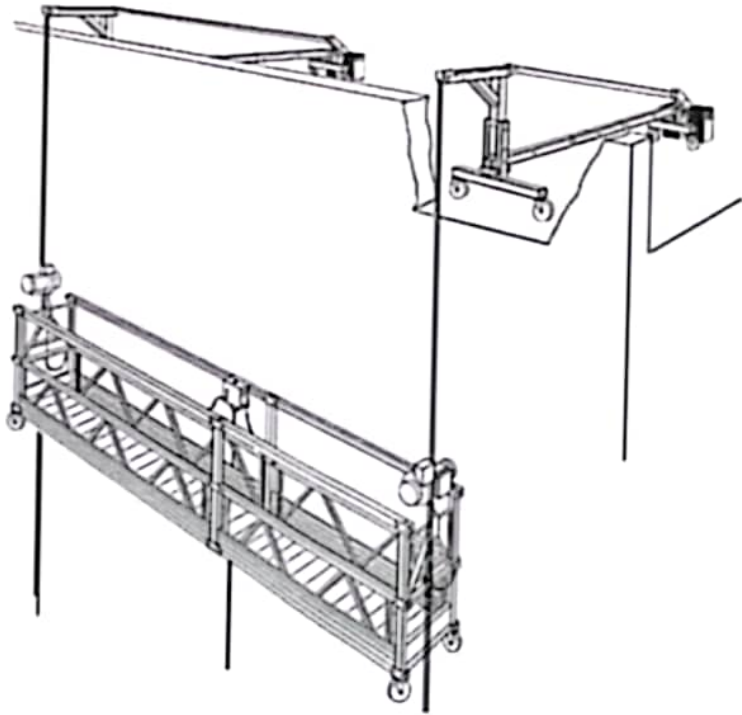
# Cantilever Scaffolding





# Hanging (Suspended) Scaffolding



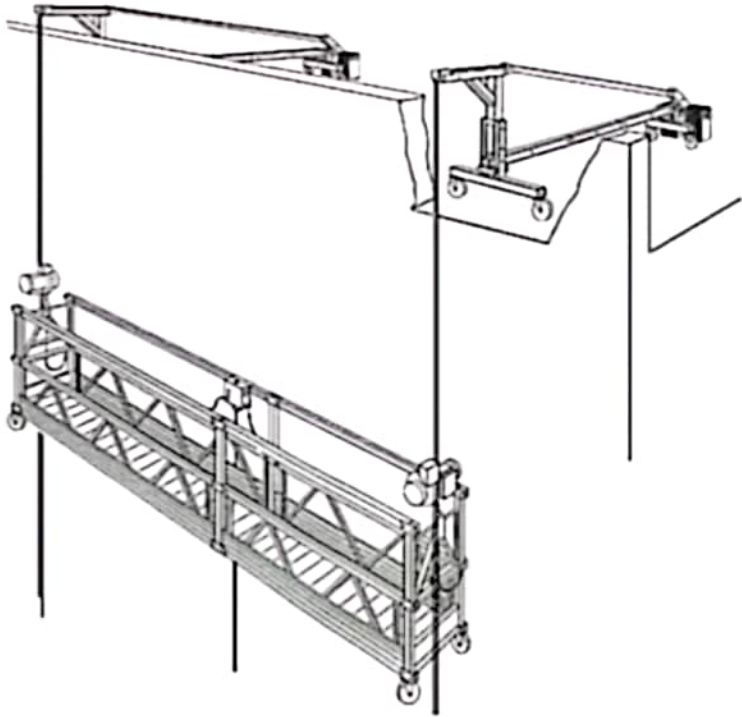




# Hanging (Suspended) Scaffolding



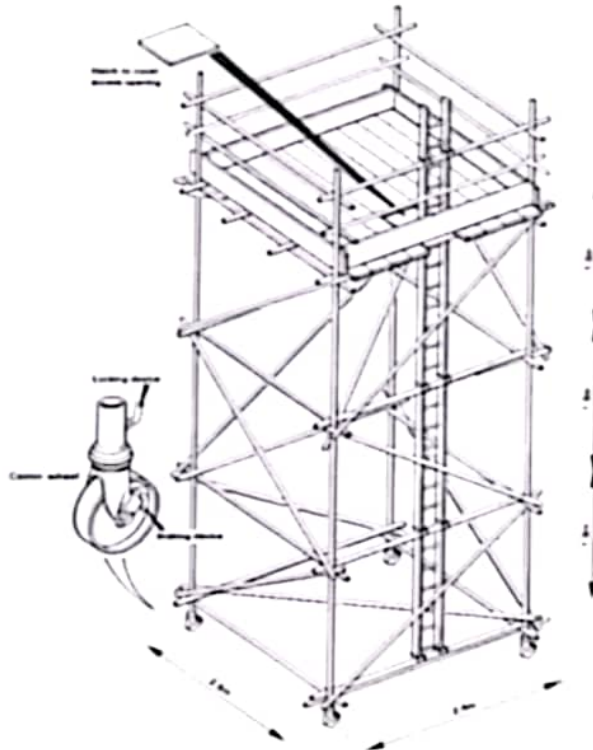




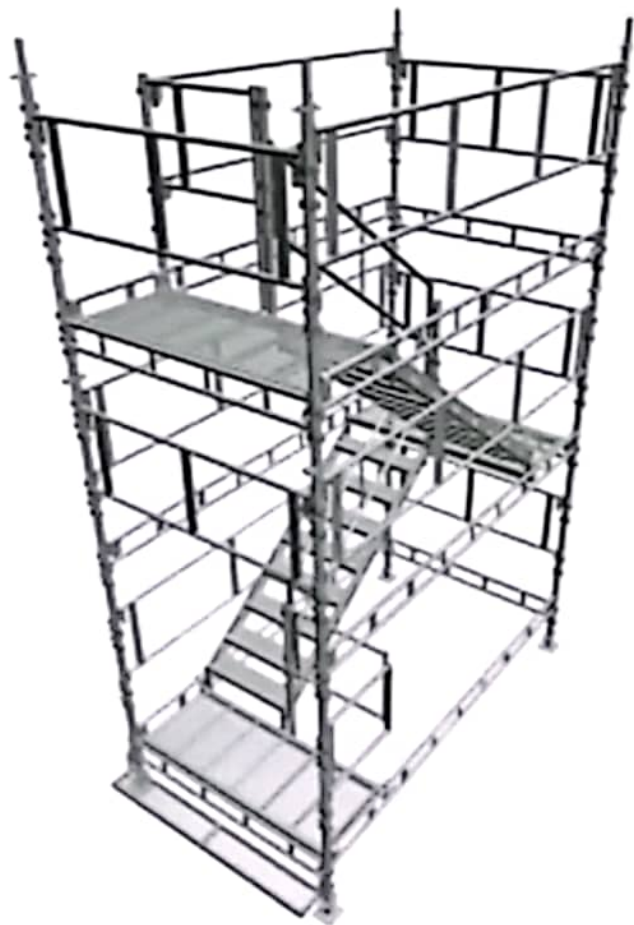
# Mobile Tower Scaffolding



TOWER



# Patented Scaffolding





# Trestle Scaffolding





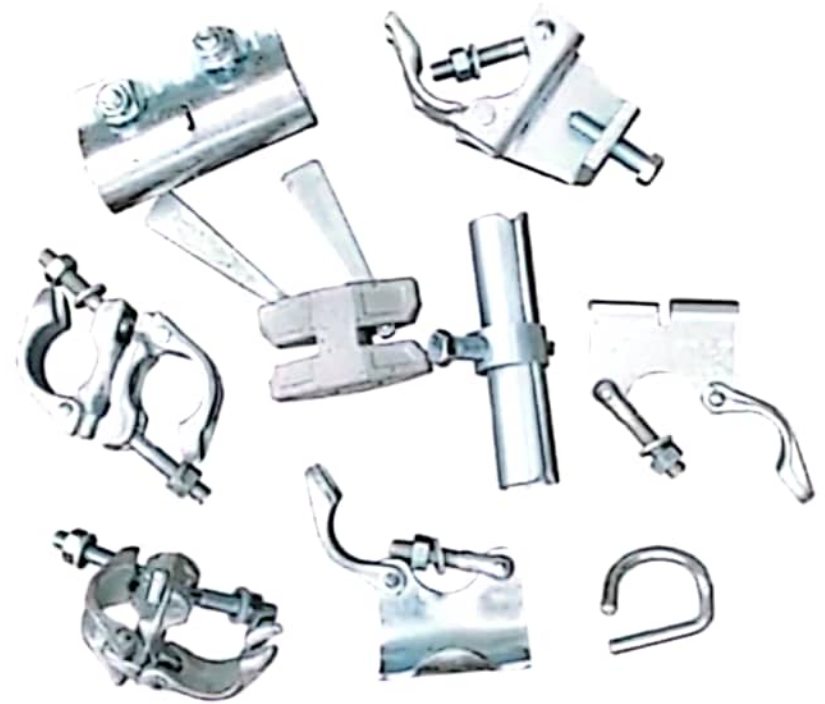
# COUPLING

**Coupling is the most important equipment of scaffolding. Its use to connecting one pipe to another pipe or structure.**



# TYPES OF SCAFFOLDING COUPLERS

- **Single Coupler (Put log Coupler)**
- **BRC (Board Retention Coupler)**
- **Double Coupler (Right angle Coupler)**
- **Swivel Coupler**
- **Girder Coupler (Beam Clamp)**
- **Ladder Coupler**
- **Sleeve Coupler (Box Clamp)**
- **Joint pin**



# Single Coupler (Put log Coupler)

**Its best use for connecting transoms & toe board.**

**Load capacity - 65kg**



# **BRC (Board Retention Coupler)**

**Its best use for maintain stability of one plank to another planks.**





# **BRC (Board Retention Coupler)**

**Its best use for maintain stability of one plank to another planks.**

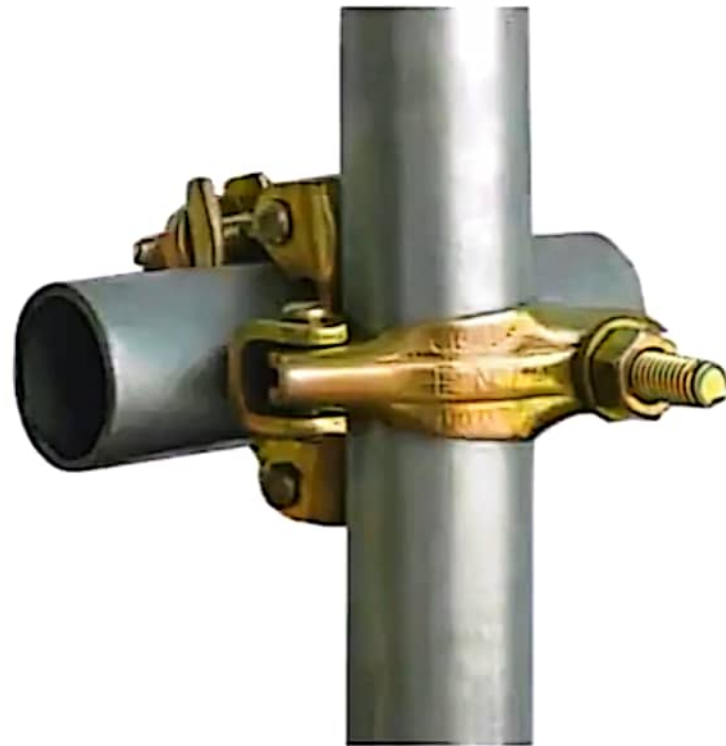
**Load Capacity - 565Kg**



# Double Coupler (Right angle Coupler)

**Its best use for connecting the ledger (Runner) with standard.**

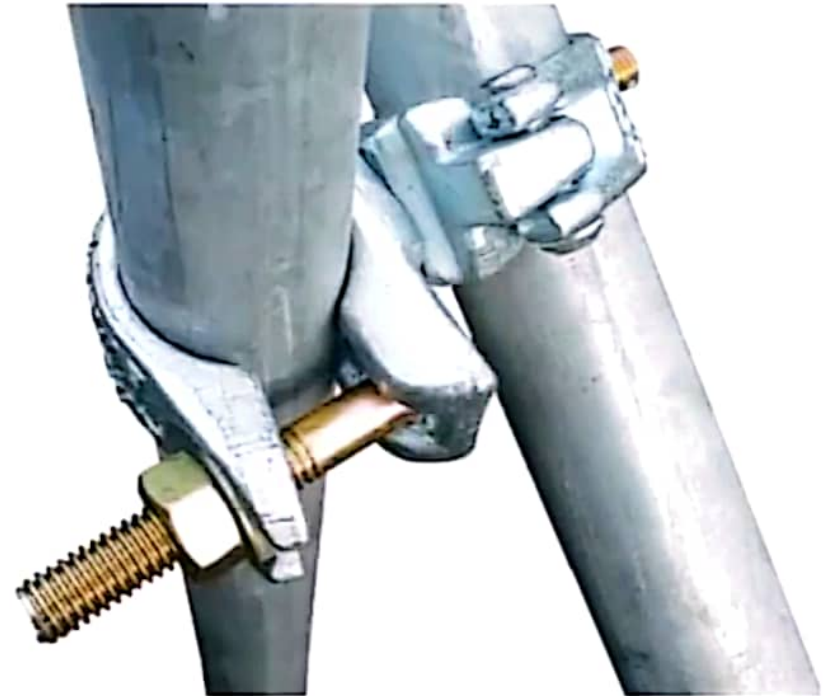
**Load Capacity - 610kg**



# Swivel Coupler

**Its best use for connecting bracing & outrigger.**

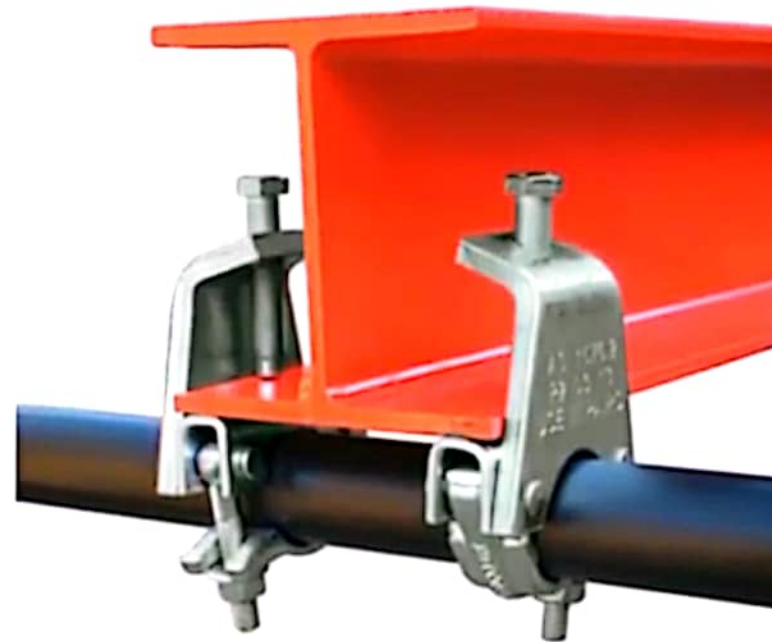
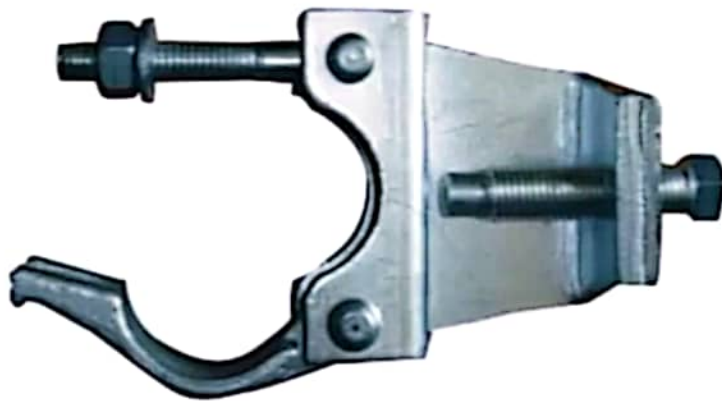
**Load Capacity - 610kg**



# Girder Coupler (Beam Clamp)

**Its best use for connecting tube with structure & beam.**

**Load capacity - 3000kg**





# Ladder Coupler

**Its best use for secure ladder on the scaffolding.**

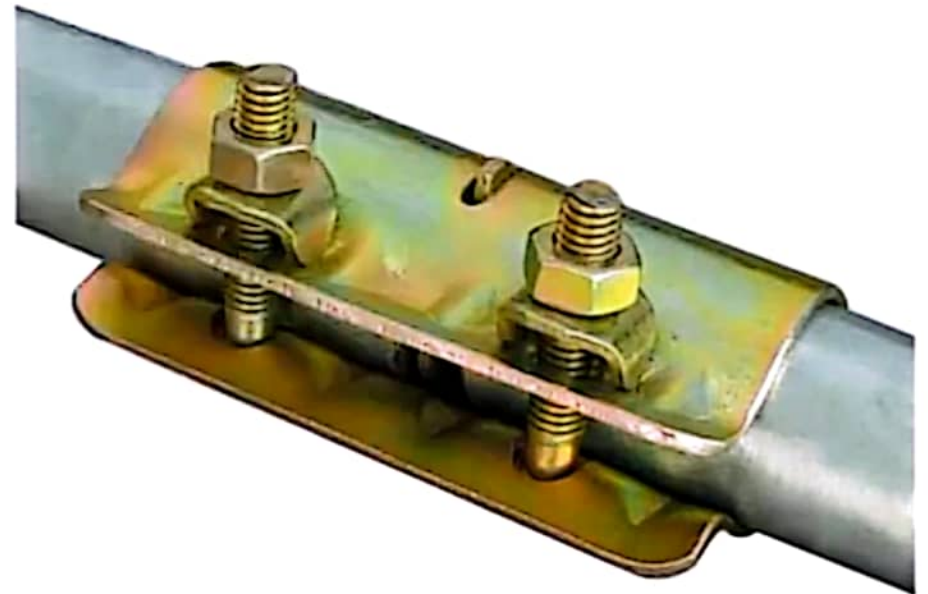
**Load capacity - 550kg**



# Sleeve Coupler (Box Clamp)

**Its use for connecting one standard to another standard in vertical direction & horizontal direction.**

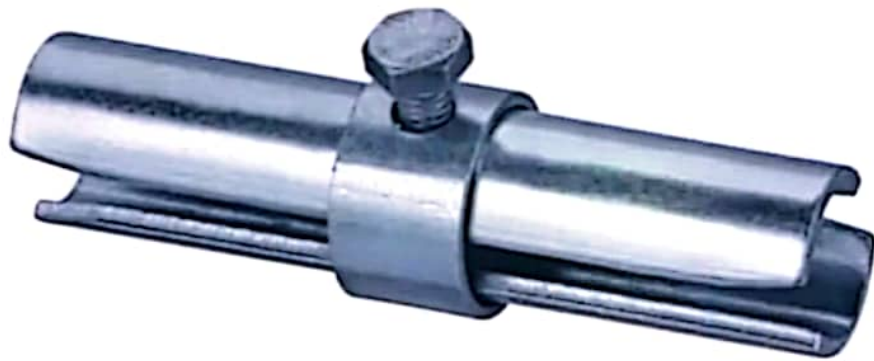
**Load capacity - 550kg**



# Joint pin

**Its also use for connecting two tubes.**

**Under compression loading, this Joint Pin is capable of taking the full capacity of the scaffold tube.**



# TYPES OF BRACING

Four type of brassing

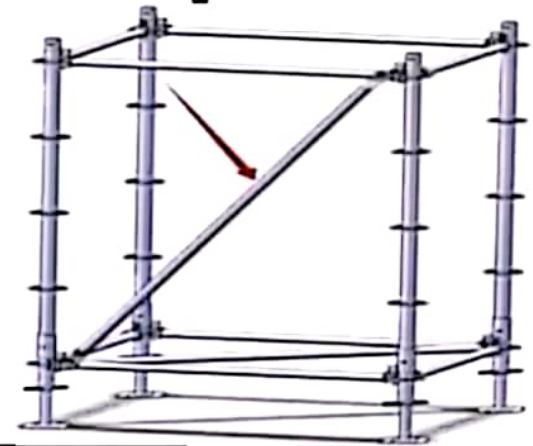
- **Cross brassing**
- **Knee brassing**
- **Sway brassing**
- **Plane brassing**



# TYPES OF BRACING

## Four type of brassing

- **Cross bracing**
- **Knee bracing**
- **Sway bracing**
- **Plane bracing**



# TYPES OF SAFETY NET

Two types of safety nets

## **Man and Materials**

- **Man (Hole-100mm, Rope-8mm)**
- **Material (Hole-25mm, Out line rope-12mm)**

**As per OSHA 29 CFR 1926.454**

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## **Duties of Scaffold**



**Light Duty**

**Medium Duty**

**Heavy Duty**

## **Need specification of Scaffold materials**

**If material is not proper then scaffold could be failure**

**Material specification is very important for scaffold**



# **For Tubing & Coupler Scaffolding**

**Scaffold pipe - 40NB (Nominal Bore)**

**Diameter (Outer diameter of scaffold pipe) - 48mm**

**Thickness of scaffold pipe - 4mm**

**Maximum length of scaffold pipe - 6m**





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**For Heavy duty**

**50mm diameter scaffold pipe should be use instead of 48mm diameter.**



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**For Heavy duty**

**50mm diameter scaffold pipe should be use instead of 48mm diameter.**

**As per OSHA 29 CFR 1926.454**

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## **Duties of Scaffold**



**Light Duty** – **25 lb/ft<sup>2</sup> = 122 kg/m<sup>2</sup> Approx. 125 kg/m<sup>2</sup>**  
**3m (Length) x 1.25m (Width) x 2m (Height)**

**Medium Duty** – **50 lb/ft<sup>2</sup> = 244 kg/m<sup>2</sup> Approx. 250 kg/m<sup>2</sup>**  
**2m (Length) x 1.25m (Width) x 2m (Height)**

**Heavy Duty** – **75 lb/ft<sup>2</sup> = 366 kg/m<sup>2</sup> Approx. 375 kg/m<sup>2</sup>**  
**1.5m (Length) x 1.25m (Width) x 2m (Height)**



**Load increasing & length of Bay is decreasing**

**Light duty scaffold**

**125 kg/m<sup>2</sup>**

**3m length of scaffold pipe**



**Medium duty scaffold**

**250 kg/m<sup>2</sup>**

**2m length of scaffold pipe**

**How much load you can put in 1 Bay?**

**Light Duty Scaffold**

**125 kg/m<sup>2</sup>**

**Bay = Length x Width**

**1 Bay = 3m x 1.25m**

**= 3.75m<sup>2</sup>**

1.25m

3m



**Calculate total load of Bay = 3.75m<sup>2</sup> x 125 kg/m<sup>2</sup>**

**= 468 kg**

**Load increasing & length of Bay is decreasing**

**Light duty scaffold**

**125 kg/m<sup>2</sup>**

**3m length of scaffold pipe**



**Medium duty scaffold**

**250 kg/m<sup>2</sup>**

**2m length of scaffold pipe**

**How much load you can put in 1 Bay?**

**Light Duty Scaffold**

**125 kg/m<sup>2</sup>**

**Bay = Length x Width**

**1 Bay = 3m x 1.25m**

**= 3.75m<sup>2</sup>**

1.25m

3m



**Calculate total load of Bay = 3.75m<sup>2</sup> x 125 kg/m<sup>2</sup>**

**= 468 kg (SWL)**

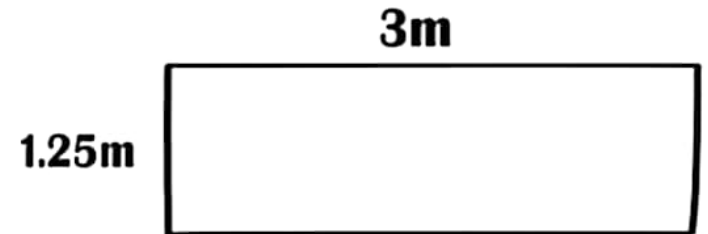
## How much load you can put in 1 Bay?

**Light Duty Scaffold**

**125 kg/m<sup>2</sup>**

**Bay = Length x Width**

$$\begin{aligned} 1 \text{ Bay} &= 3\text{m} \times 1.25\text{m} \\ &= 3.75\text{m}^2 \end{aligned}$$



**Calculate total load of Bay = 3.75m<sup>2</sup> x 125 kg/m<sup>2</sup>**  
**= 468 kg (SWL)**

**2 Person + 250 kg OR 3 Person + 150 kg OR 4 Person + 50 kg**



# HOW TO INSPECT SCAFFOLD?

- Level & firmness of the ground



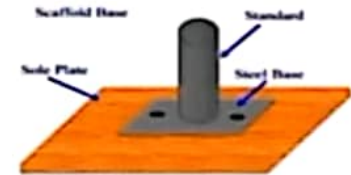
- Sole Plate

LxWxH = 300 x 300 x 6mm

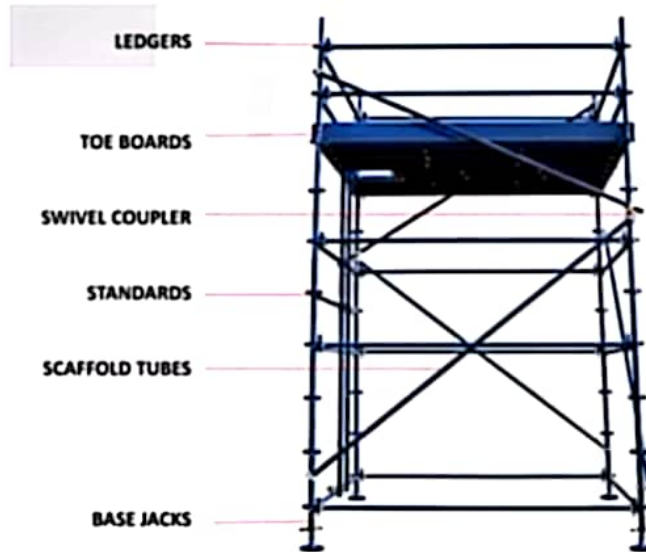


- Base Plate

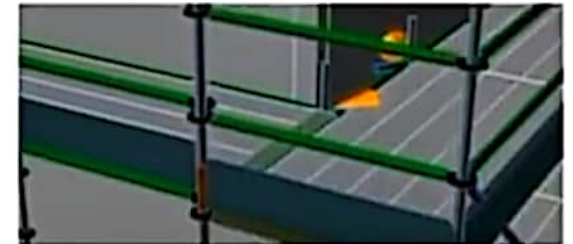
LxWxH = 150 x 150 x 6mm



- Standards
- Ledgers



- Transoms





## - Couplers

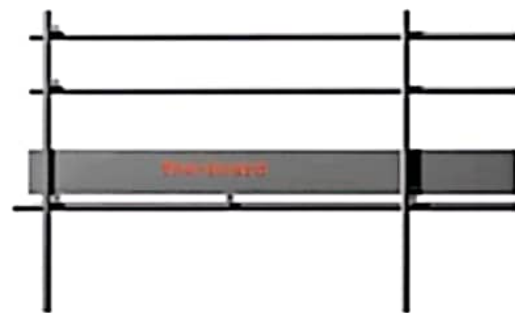


## - Planks



## - Toe boards

Height = 6 inch (150mm)



## - Guard rails

Top rails (Height = 950 to 1200mm)

Mid rails (Height = 450 to 600mm)



## - Ladder



## - Couplers

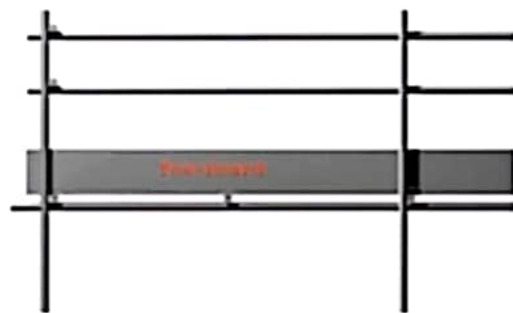


## - Planks



## - Toe boards

Height = 6 inch (150mm)



## - Guard rails

Top rails (Height = 950 to 1200mm)

Mid rails (Height = 450 to 600mm)



## - Ladder



# SCAFFOLD TRAINING

## Components of Scaffoldings

