

FEATURES OF COLUMN, BEAM & SLAB

Components of Frame Structure

LOAD
TRANSFER
PATH

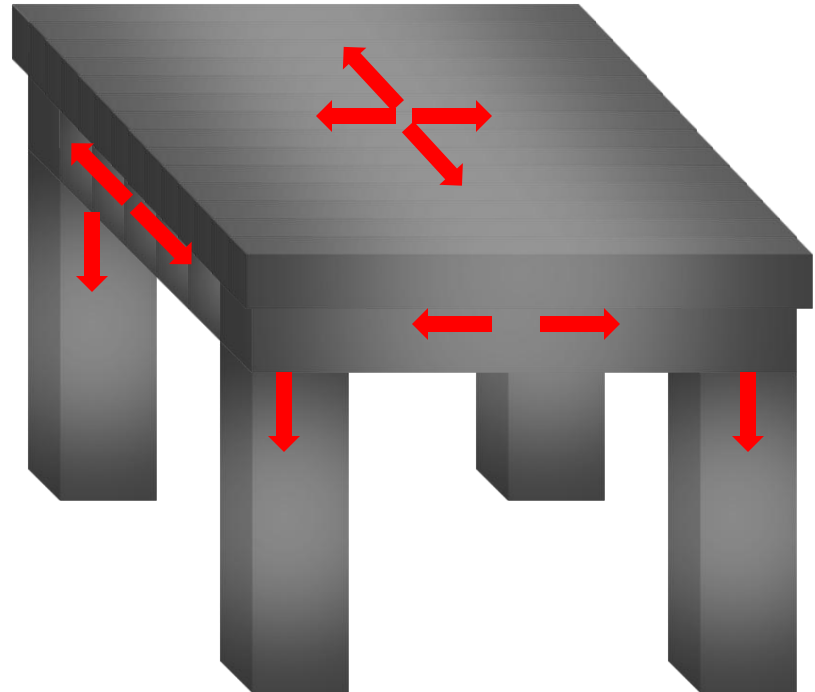
SLAB



BEAM



COLUMN



COLUMN

- 👷 It is a vertical load bearing member
- 👷 Transfers the load of the structure gradually to the ground
- 👷 Transfers load through compression



Types of Column

Rectangular column



Circular column



BEAM

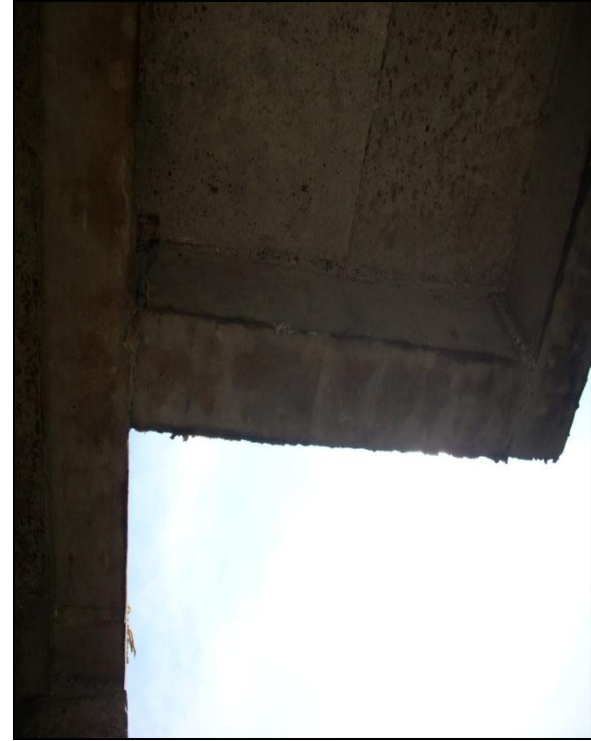
- 👷 Generally a horizontal load bearing member
- 👷 Transfers load from slab to column



Types of Beam



Simply supported



Cantilver

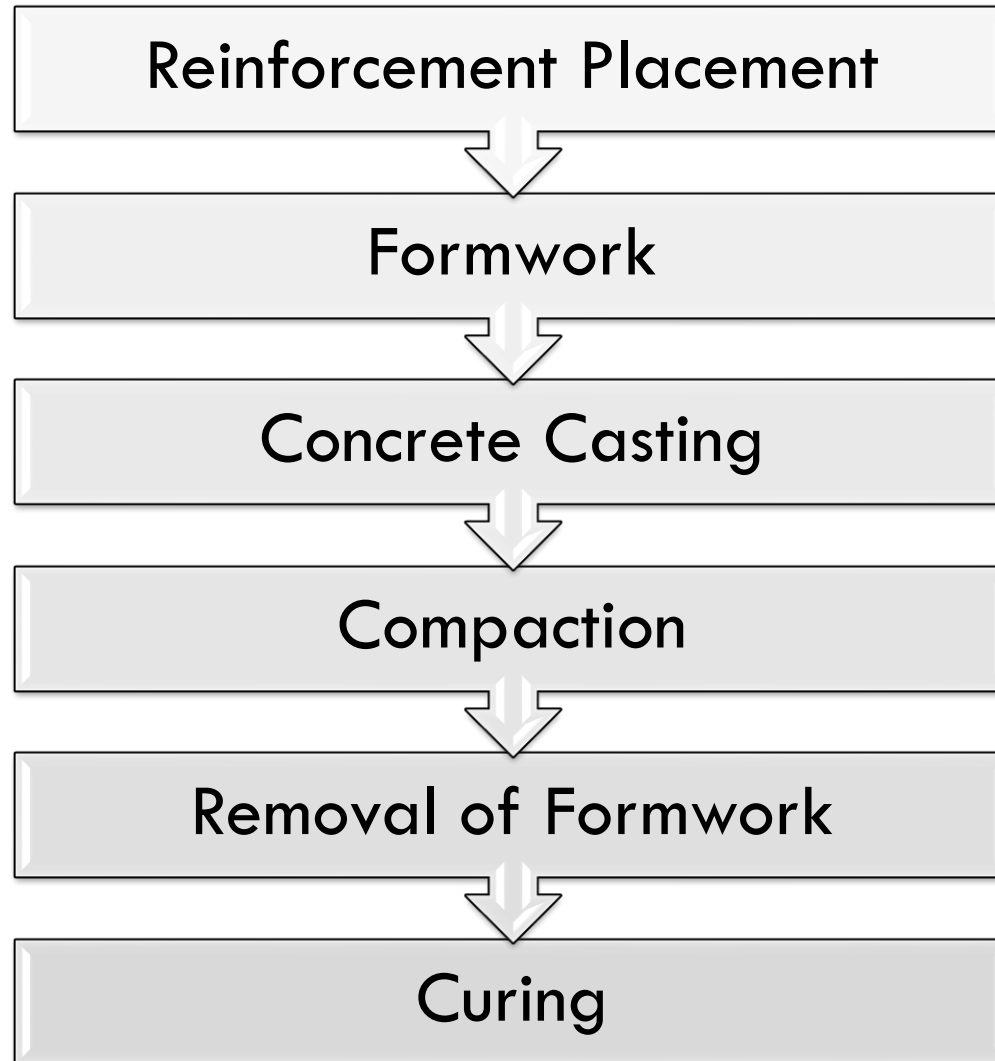
SLAB

- 👷 It is a flat horizontal surface
- 👷 It is supported by beams, columns, wall or ground
- 👷 It transfers the loads to the beam



CONSTRUCTION OF COLUMN

Steps Involving Column Construction



Main Vertical Reinforcement Placement

- 👷 Column is casted directly over the footing
- 👷 It is then continued maintaining vertical alignment



Minimum Vertical Reinforcement Requirement

- 👷 Minimum 4 main bars
(Rectangular column)
- 👷 Minimum 6 main bars
(Circular column)

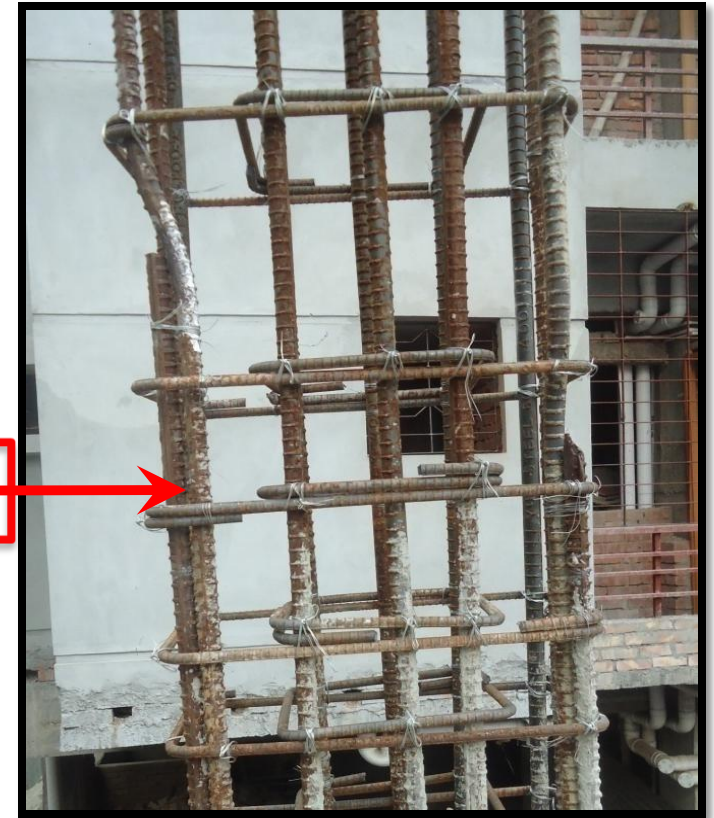


Overlapping of Rods

- 👷 Provided mainly in the mid span
- 👷 Overlapped in sufficient amount to transform load
- 👷 Tied with wires



Overlapping

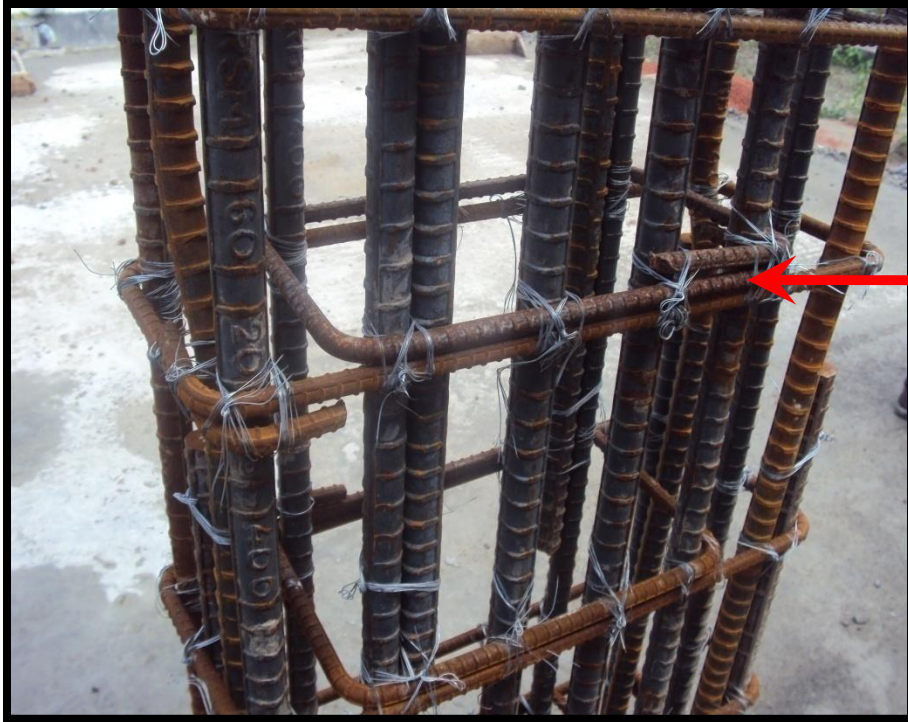


Ties

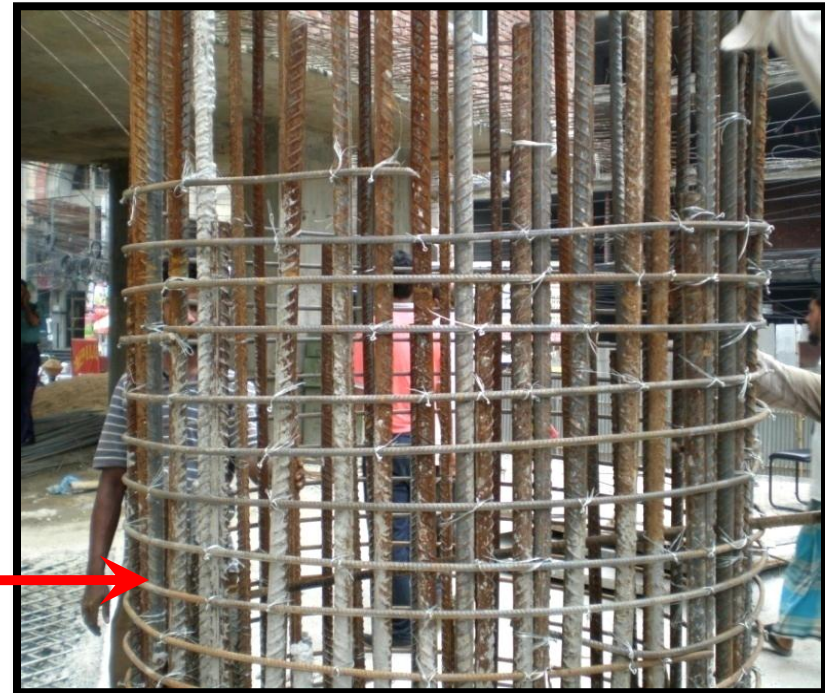
- 👷 To resist bursting out effect
- 👷 To maintain the vertical rods



Types of Ties



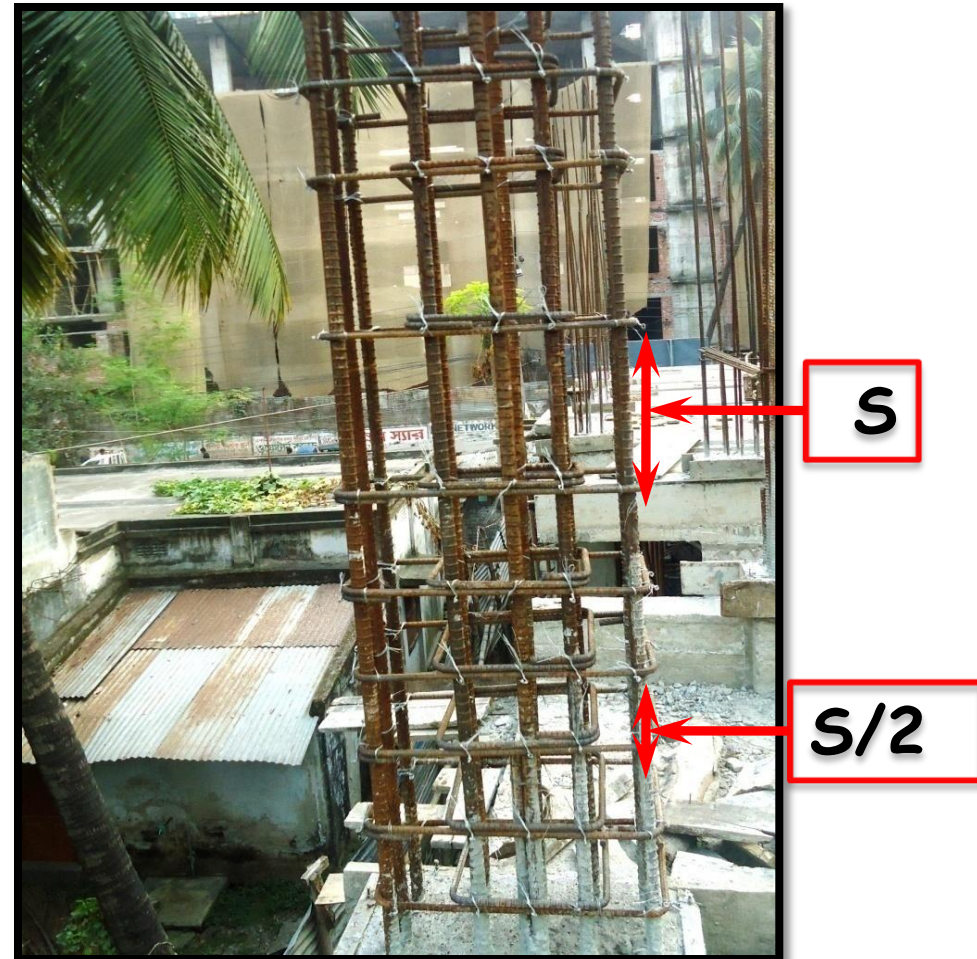
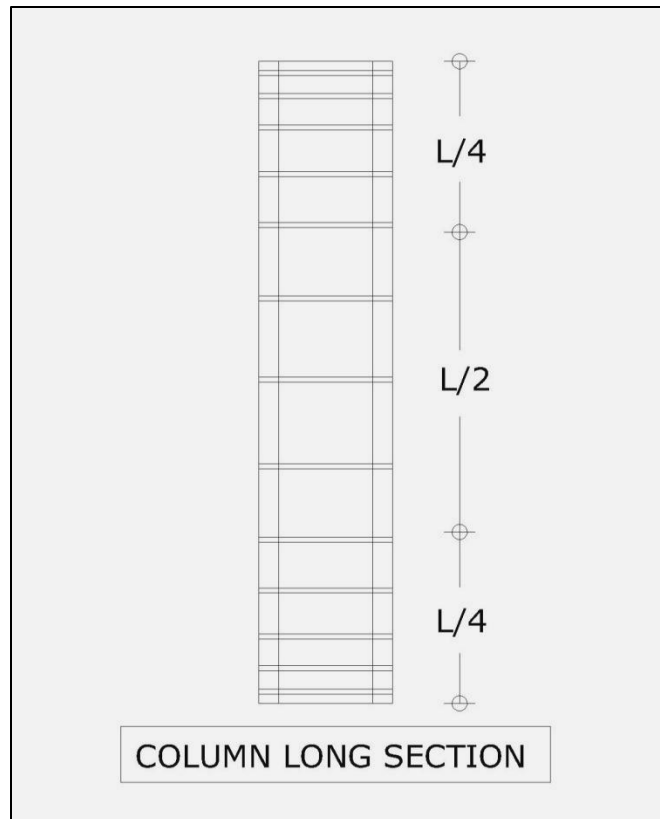
**Rectangular
Ties**



**Spiral
Ties**

Placement of Tie Bars

👷 Close ties are used near supports




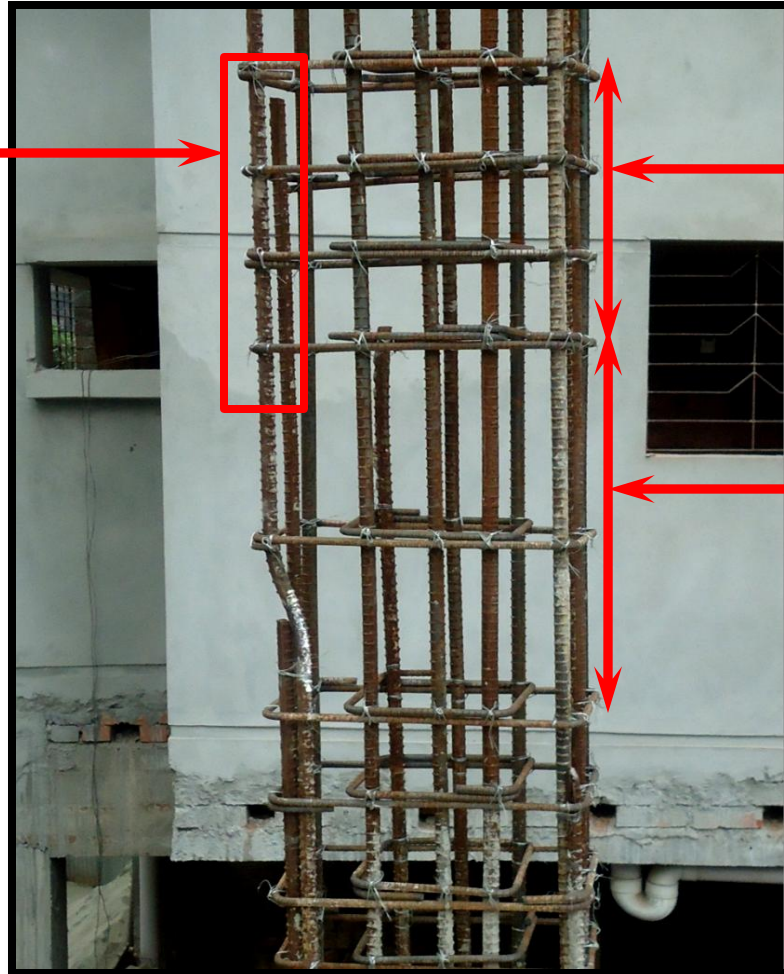
Placement of Tie Bars

Overlapped

Close ties

Less dense ties

 Close ties are also used where rods are overlapped



Hooks



Formwork or Shuttering

- 👷 Must have smooth inside
- 👷 Must be leak proof
- 👷 Must be properly aligned.



Types of Formwork/Shuttering



Wooden Shuttering



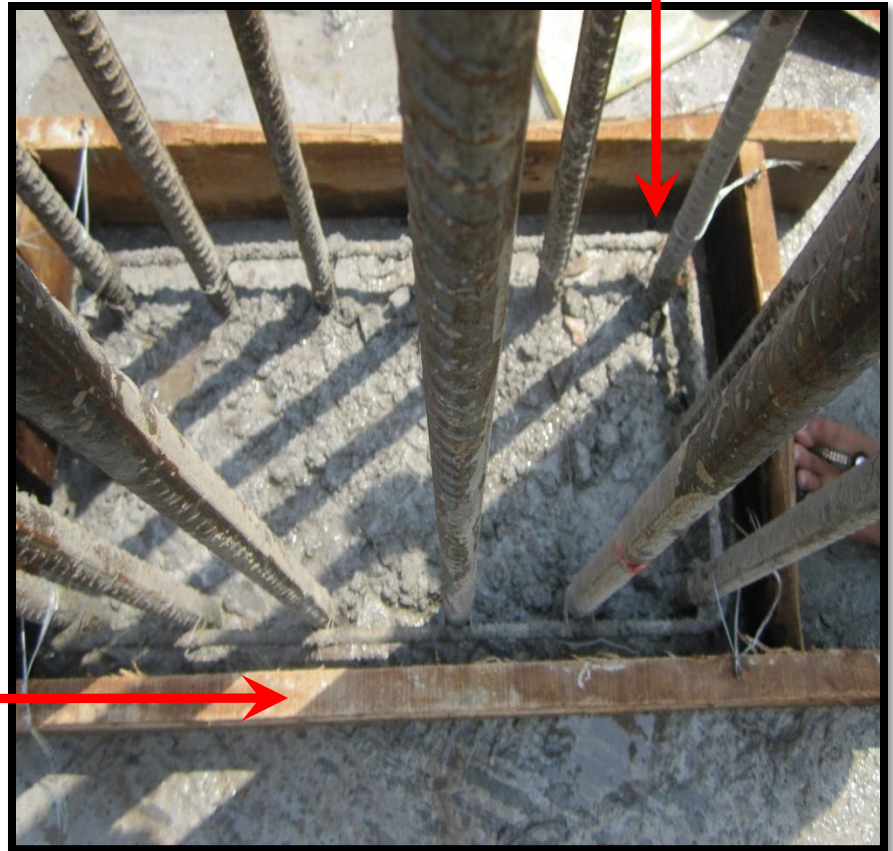
Steel Shuttering

Base of Formwork

- 👷 Used to maintain clear cover
- 👷 Used to maintain alignment

Clear cover

Base



Maintaining Vertical Alignment



Concrete Casting



Casting



Use Of Vibrator

Concrete Casting in Multiple Lifts



Column casting is done in at least two lifts because-

- Difficulties in compaction
- Segregation
- Heat evolve during hydration



Binding of Old and New Concrete

Groove

-  A piece of wood or brick is used as groove
-  It is used to bind new and old concrete



Groove

Removal of formwork

👷 Formwork of column is generally removed after approximately 3 days



Curing

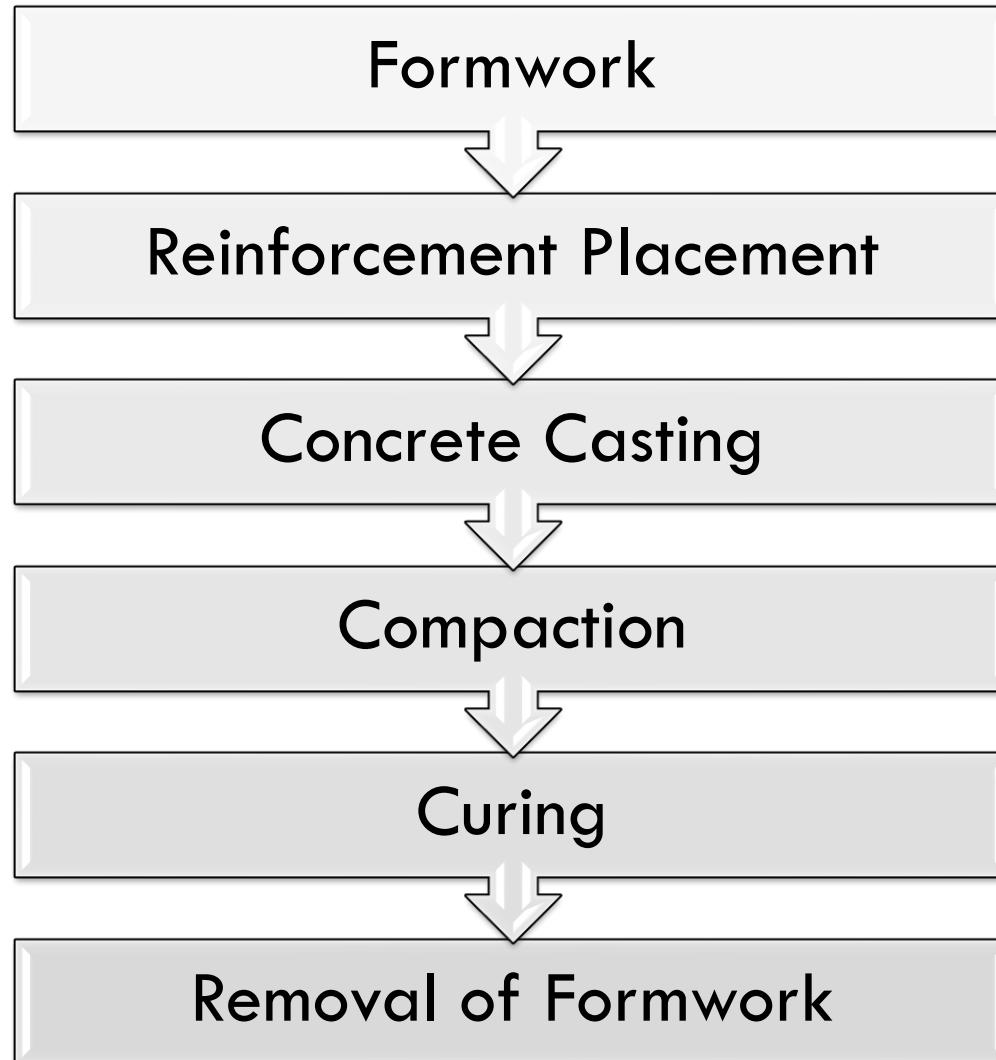
- 👉 Provides water to continue the hydration reaction of cement
- 👉 Increases strength up to 2.5 times
- 👉 Generally done for 21 days
- 👉 Gunny bags are used for curing of Column



Gunny bag for curing.

CONSTRUCTION OF BEAM

Steps Involving Beam Construction



Formwork of Beam



Steel formwork



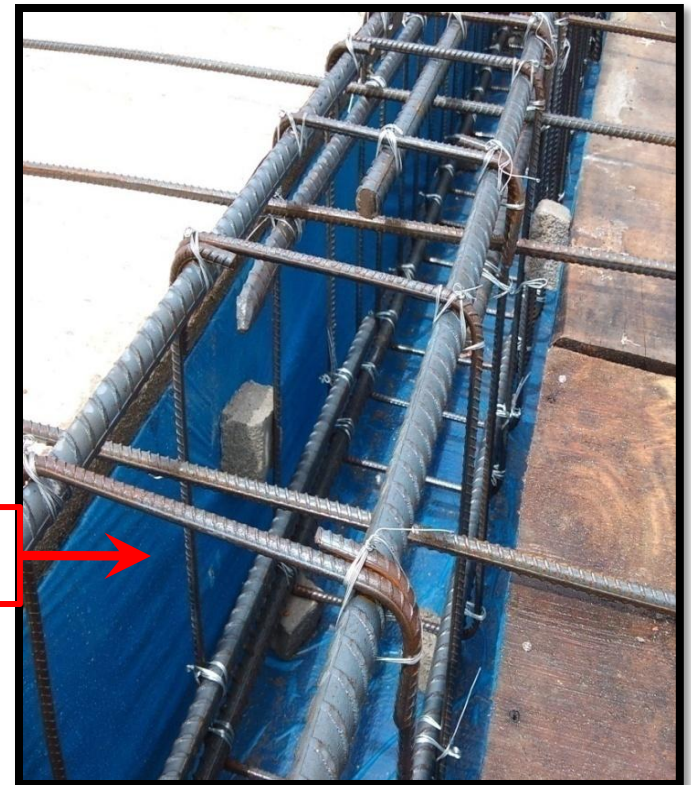
Timber formwork

Measures for Retaining Water

- 👷 Steel sheet is used to make leak proof
- 👷 Polythene is also used

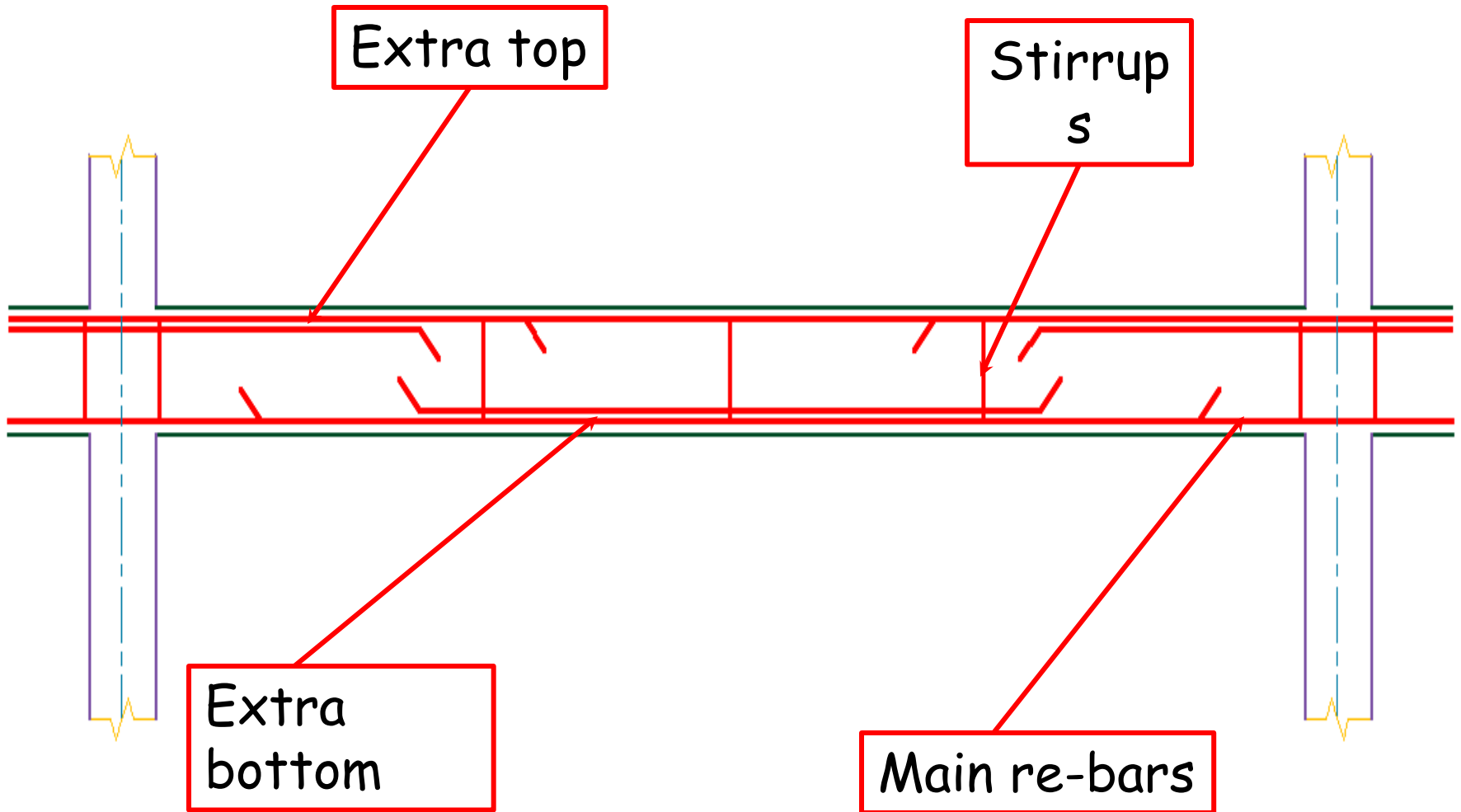


Steel sheet



Polythene

Reinforcement of Beam



Reinforcement

- 👷 Minimum 4 rod is used to construct a beam
- 👷 Extra (top and bottom) rod is used if required



Extra
top



Extra
bottom

Stirrups

- 👷 Stirrups in beam functions like ties in column
- 👷 Main purpose is to ensure horizontal alignment and resist shear

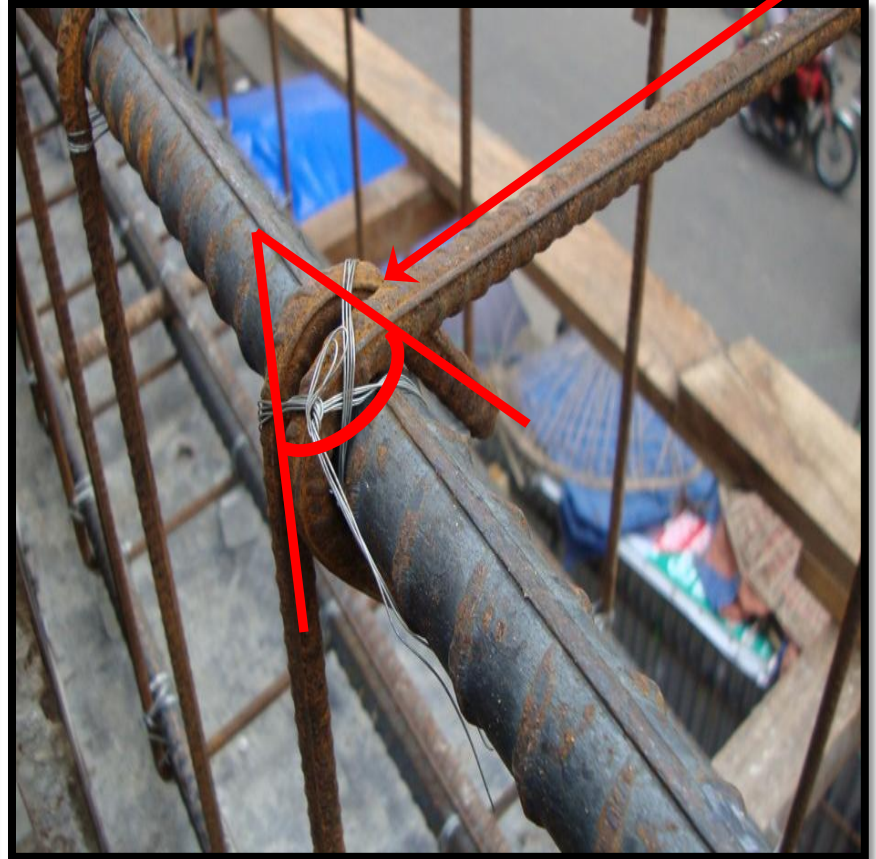


Hooks

Alternate hooking



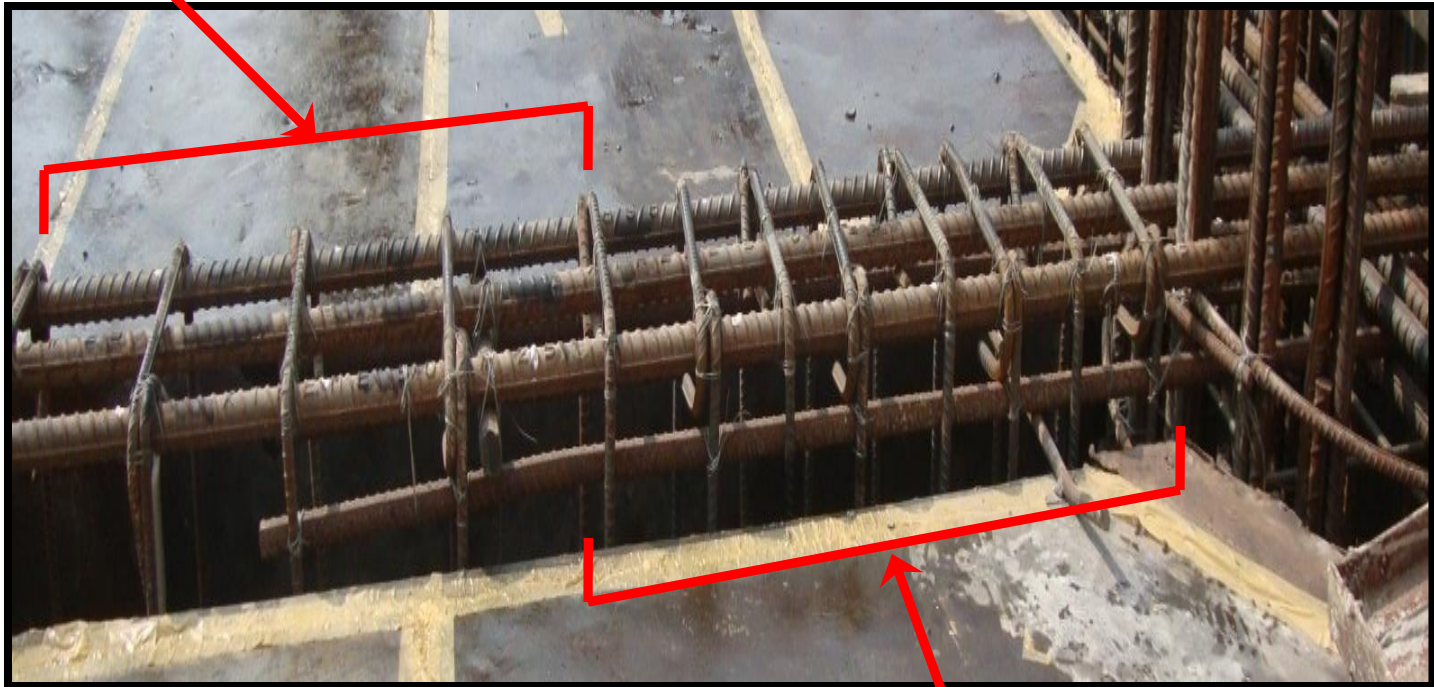
Hooking 45°



Spacing of Stirrups

Less densed stirrups

Close Stirrups are used near joints



Densed stirrups


Clear coverage


C.C Blocks are used to maintain clear cover



Casting and Curing

Casting

 Generally the casting of beam is done along with slab.

 Sometimes at first the lower part of beam is casted, and then the upper part is done along with slab.

Curing

 The curing of beam is done along with that of slab.

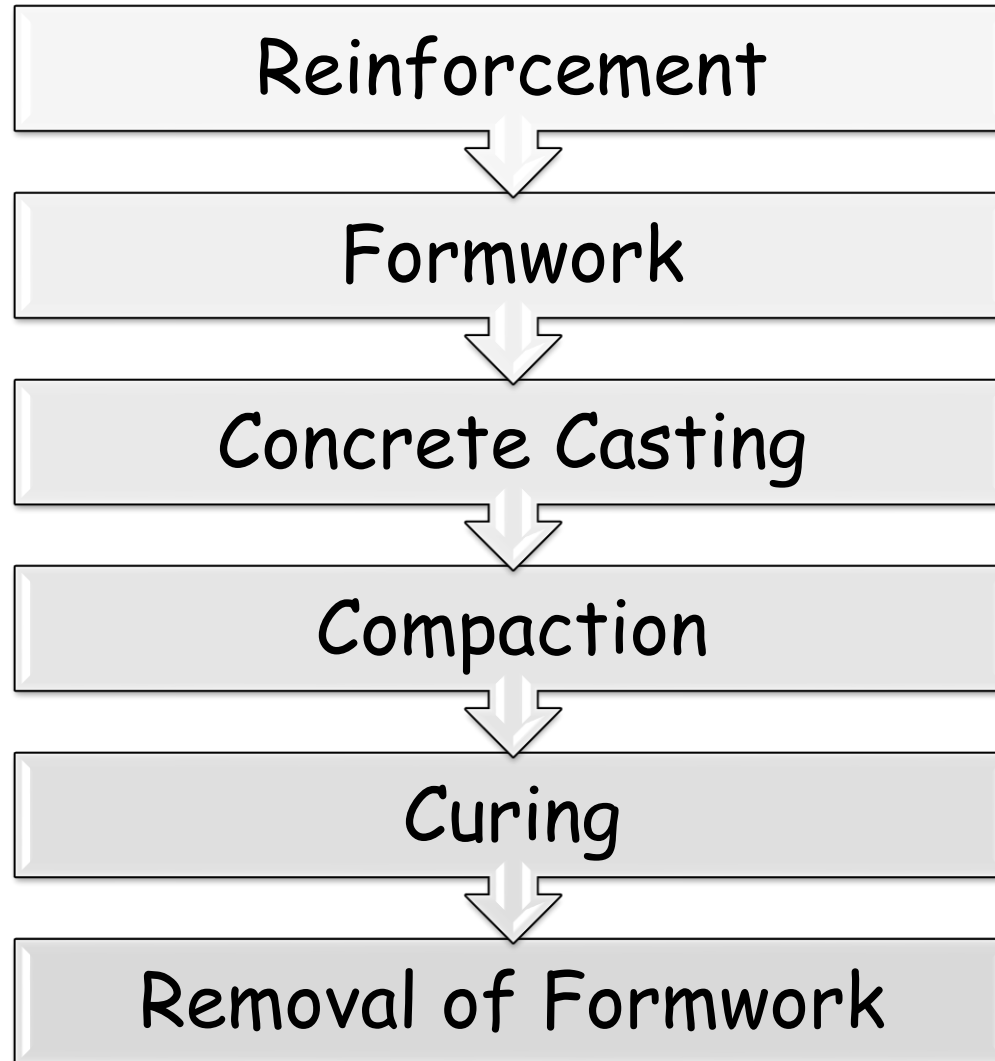


Column and Beam Joint



CONSTRUCTION OF SLAB

Steps Involving Slab Construction



Formwork or Shuttering

TYPES OF FORMWORK

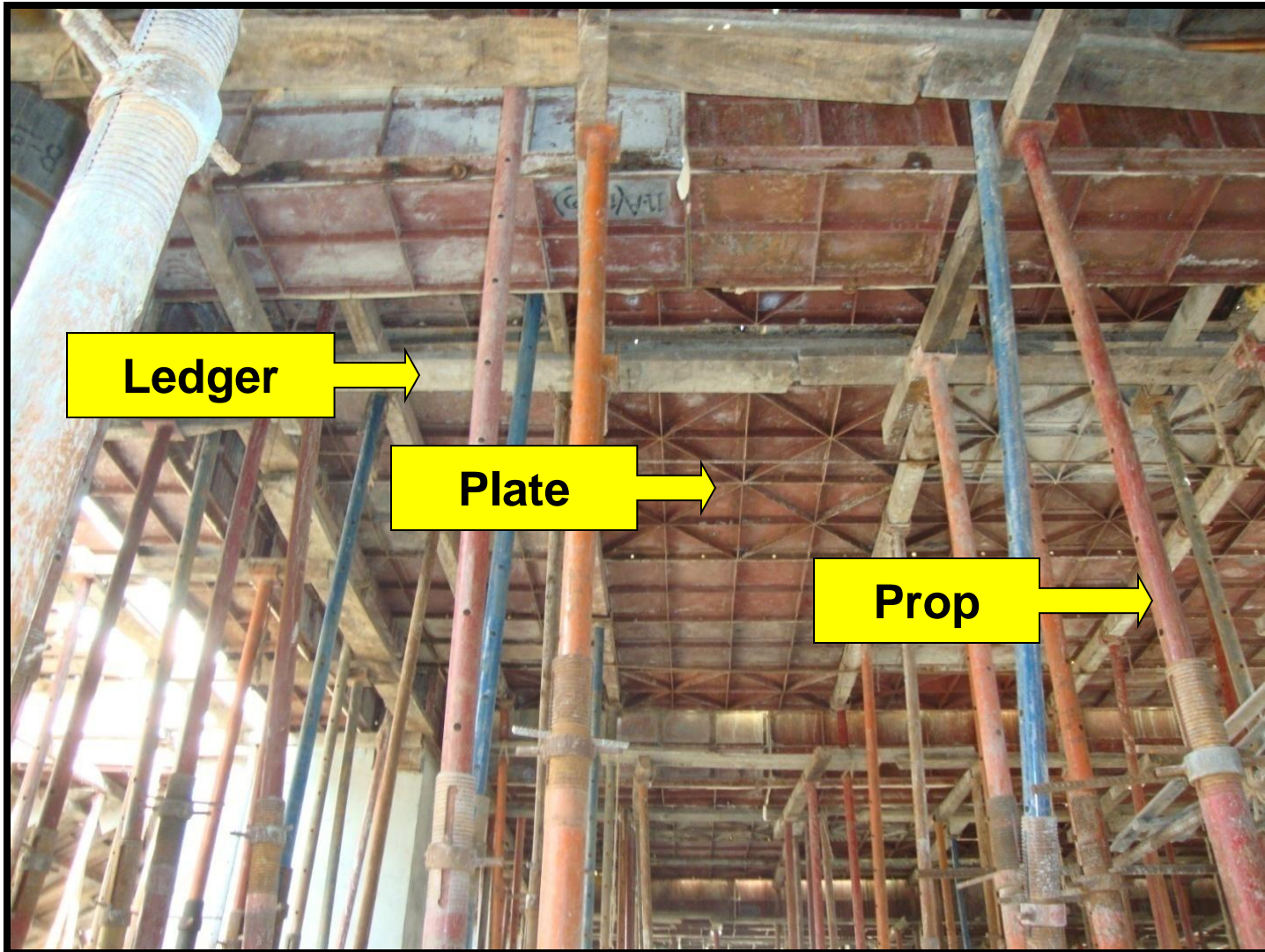


Steel Formwork



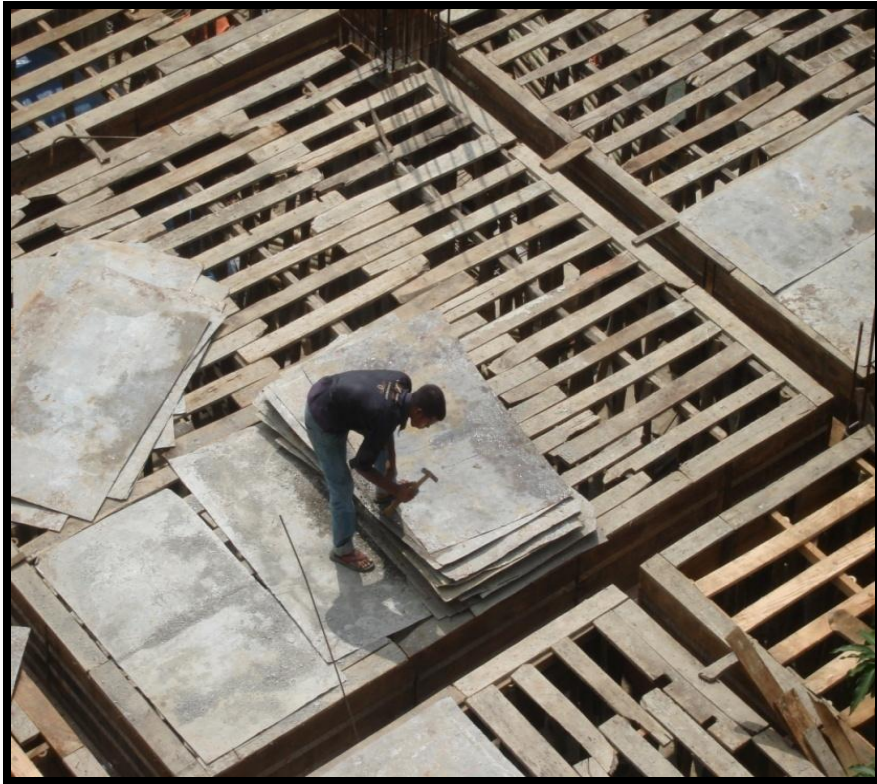
Timber Formwork

Formwork or Shuttering




Formwork or Shuttering

PLACEMENT OF STEEL SHEETS



Maintaining Clear Cover

 Clear cover is maintained using C.C. blocks

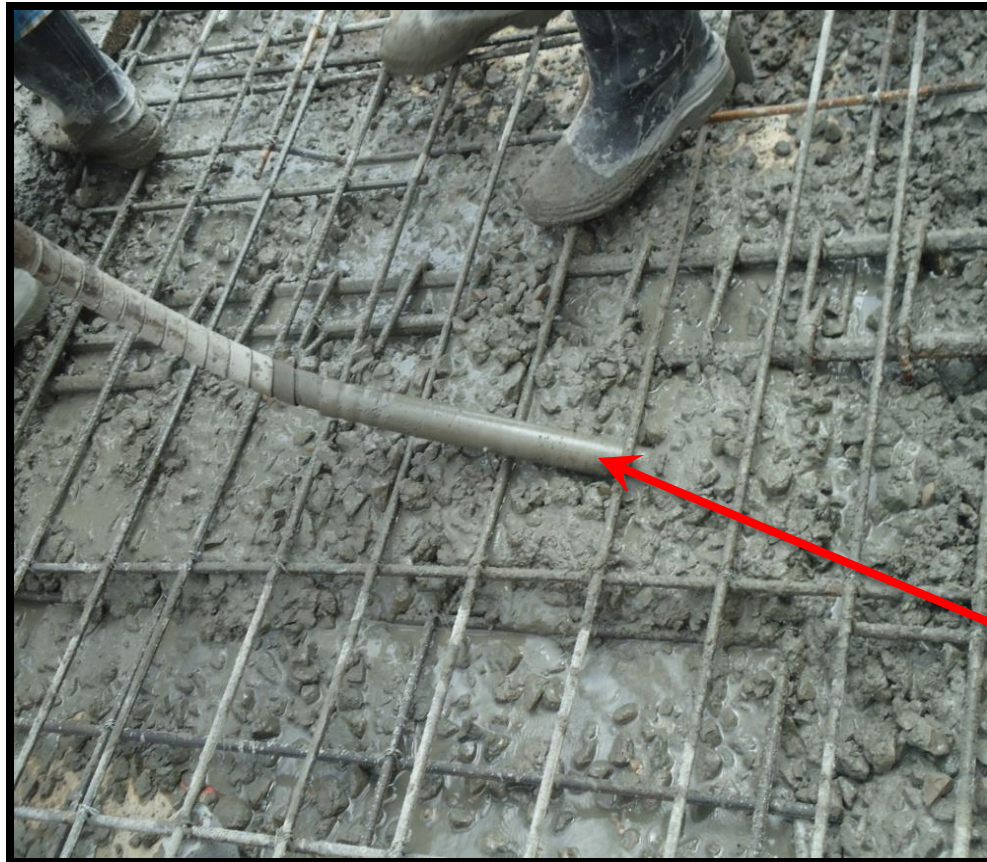


**C. C.
block**

Concrete casting



Compaction



Vibrator

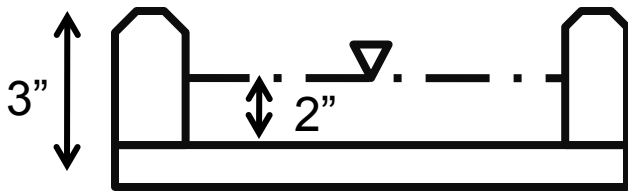
Leveling



Patta

Slab Curing

- Water is kept after final setting time (around 24 hrs)
- Generally done for 21 days



Sand Bund



Ponding

Removal of Formwork

👷 After 21 days of curing, the formwork of slab is removed

👷 Bottom formwork of beam is also removed with this

