

Flying Bridges

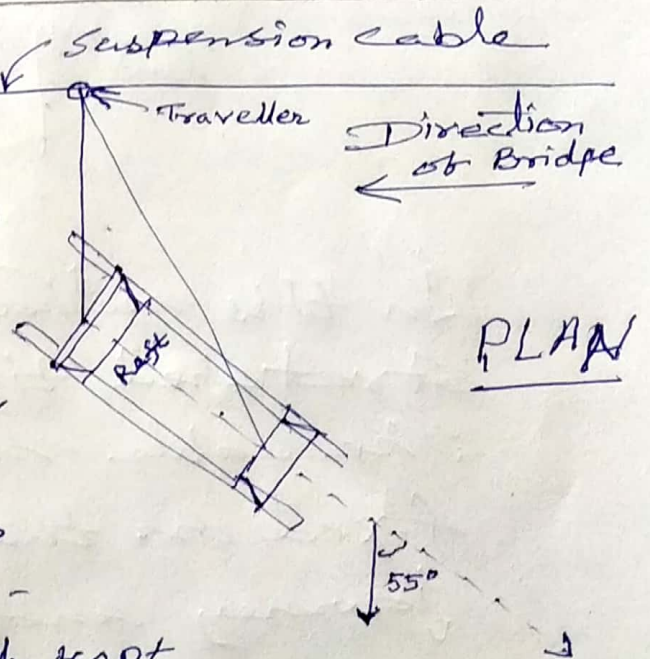
"The bridges consisting of ferry boats or rafts which are usually rowed or poled across the bank of stream or river are known as flying bridges."

Types of Flying Bridges

- (i) By Using a suspension cable
- (ii) By using anchors and swinging cables
- (iii) By Using a Warp.

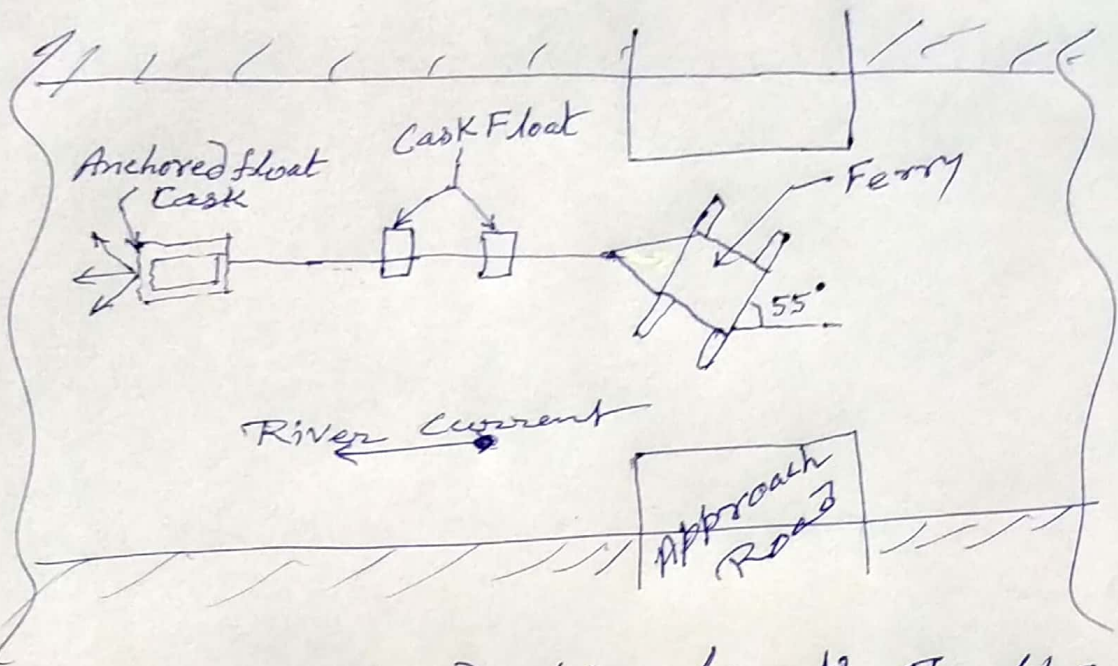
(i) By Using a Suspension Cable

The flying bridge consists of a raft which is rowed ~~across~~ by means of two wires attached to the traveller, running over the suspension cable as shown in figure.



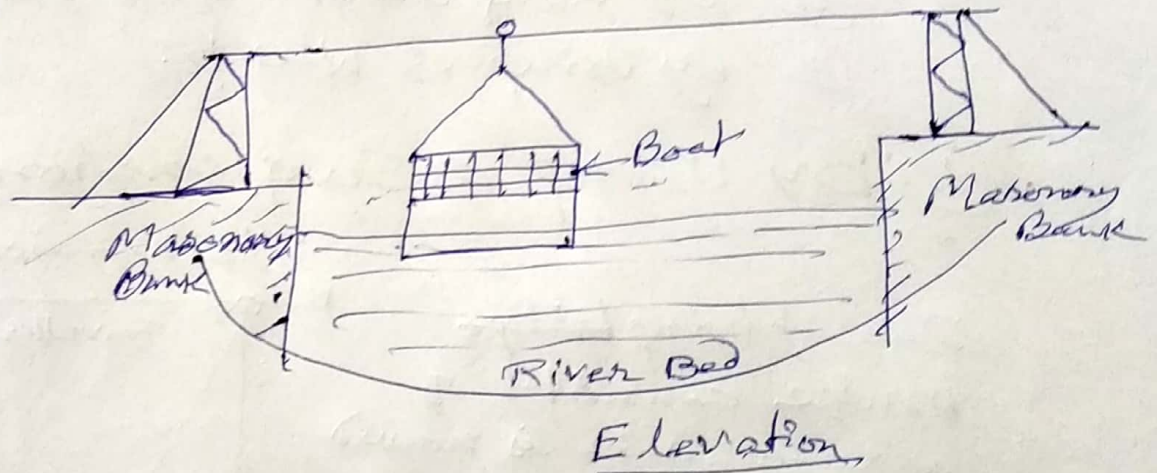
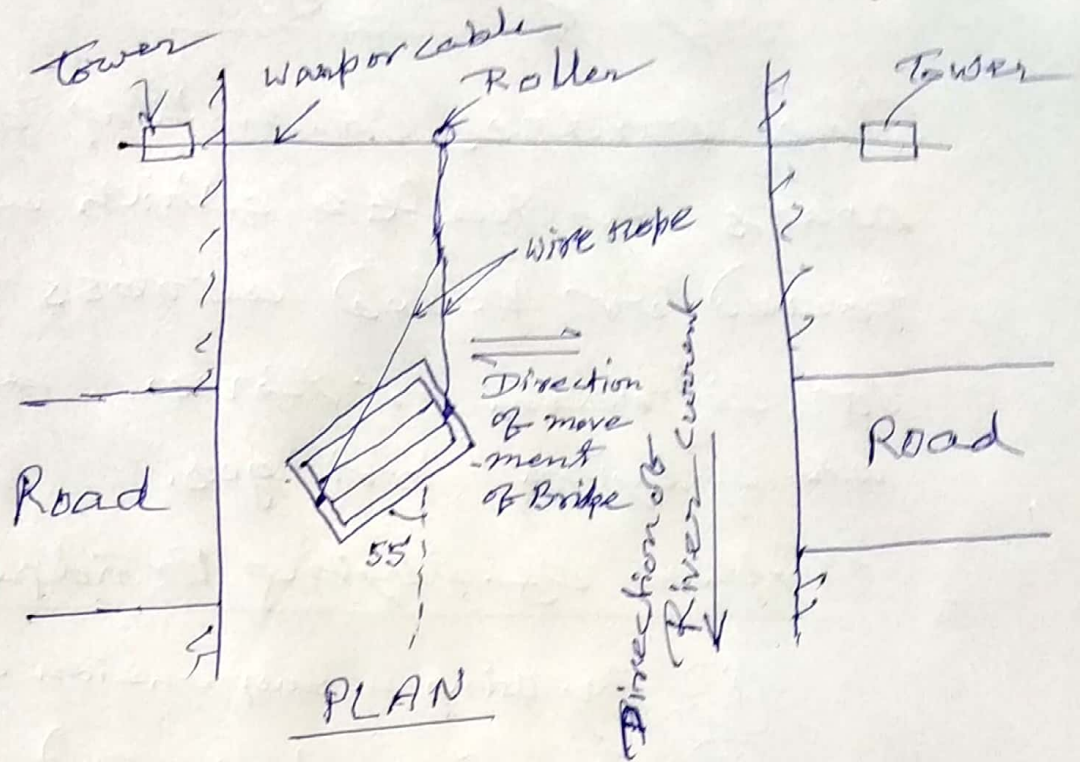
The raft is generally kept in such a position that its length makes an angle of 55° to the direction of stream so as to make use of water current while rowing the raft from one bank to the other in a straight path. The ends of the wire are interchanged for the return journey of the raft.

(ii) By Using anchors and swinging cables

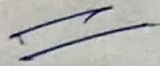


- In this method the length of the cable should be from $1\frac{1}{2}$ to 2 times the breadth of river.
- The cable runs in the direction of the river with its one end anchored to the river and the other secured to the roped bridges attached to the boat or raft.
- The cable keeps the raft at the inclination 55° to the ~~raft~~ direction of flow.
- The ferry is guided by the boat on which the cable is ~~is~~ supported.

(iii) By using a warp or cable and swinging cables



In this method the warp or cable is stretched tightly across the river. The cable moves through the roller fixed on the raft. For return journey another set of rollers is adopted.



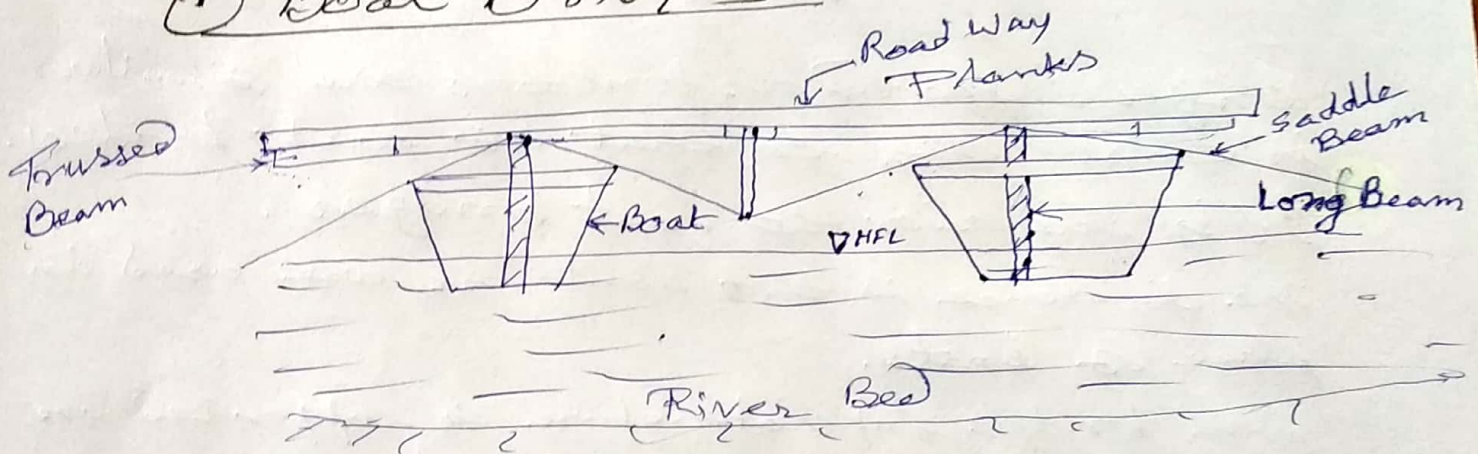
Floating Bridges

The bridge having their substructure floating on the water surface of a stream or river and known as floating bridges.

Types of floating Bridges -

- ① Boat Bridges
- ② Pontoon Bridges
- ③ Raft Bridge

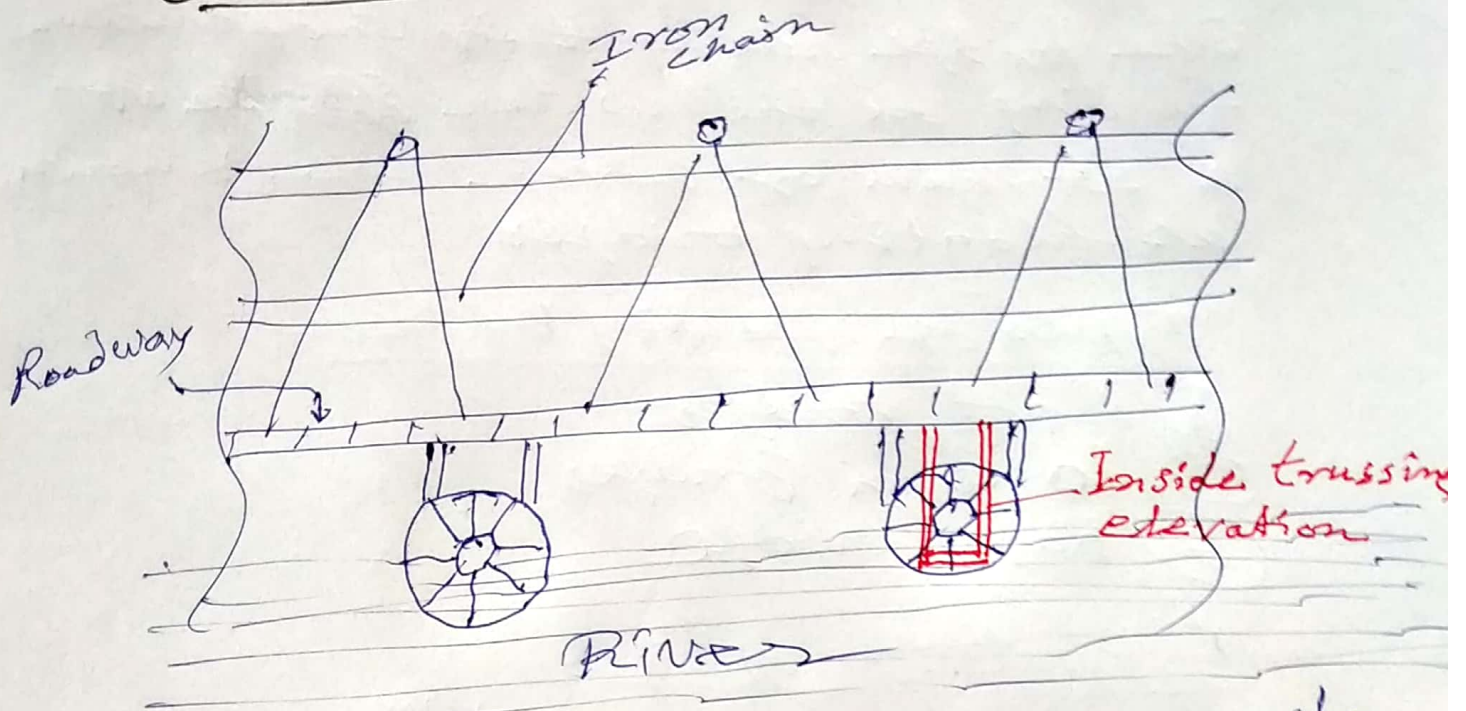
(1) Boat Bridges -



Elevation

- In case of Bridge supported on floating boats, the superstructure consists of trussed beams called gun-wales and transverse plank over them.
- The gun-wales rest on the outer edges of boats.
- Boat is held in position by anchors both on U/S and d/s side.
- The boat is further stiffened by cables along the bridge.

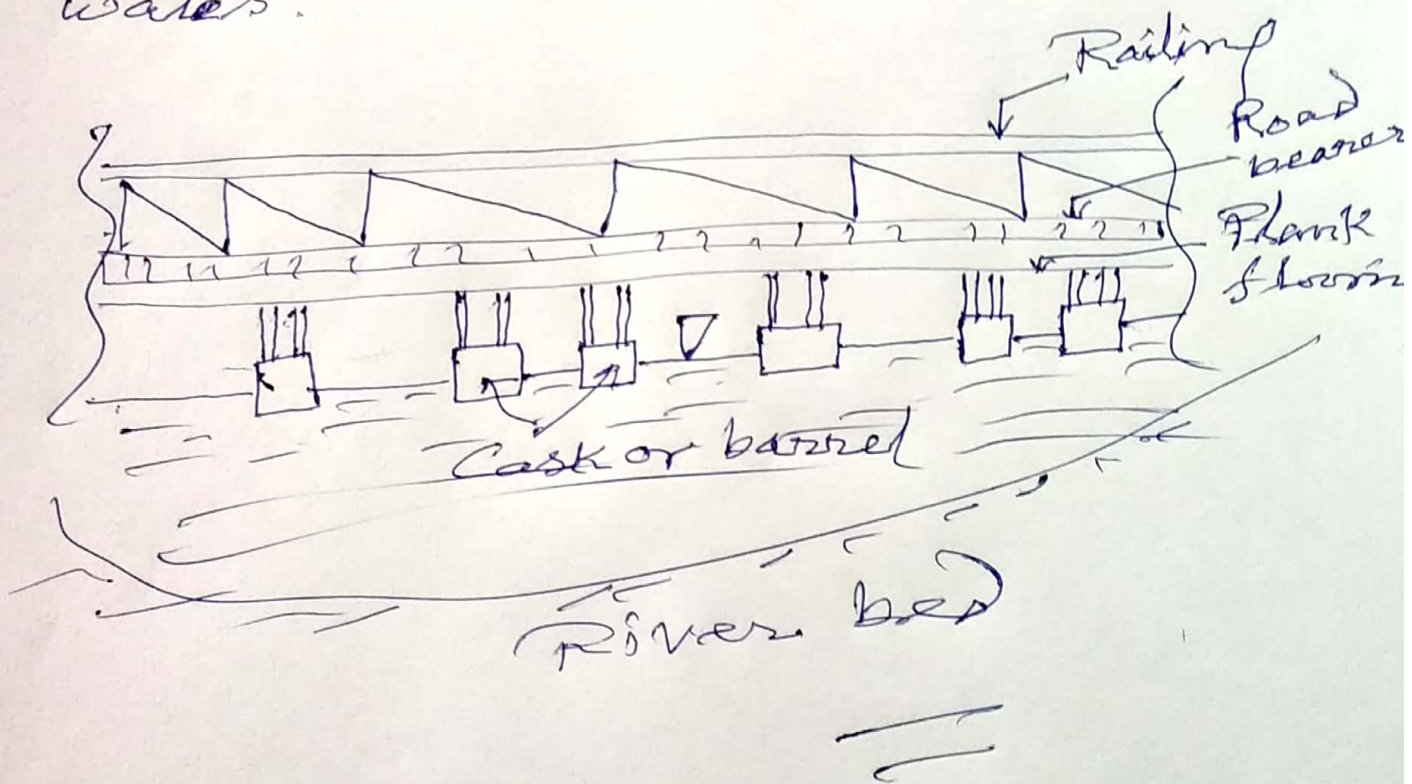
(ii) Pontoon Bridges



- Bridges supported on pontoons are similar in construction to that of boat bridges.
- It is superior to boat bridges.
- The difference is that pontoons are used in place of boats.
- The bridge superstructure is supported on cylindrical sheet-iron pontoons.
- The pontoons with trussing and are held together by double bottom beams to form the rafts.
- The bridge floor is then provided on such rafts, provided with longitudinal beams.
- The modern trend of constructing a pontoon bridge is to use inflatable rubber pontoons in place of metal barges.

③ Raft Bridges -

- The Superstructure of a raft bridge is similar to that of a boat bridge.
- The Substructure consists of a floating piers made of barrels (casks) lashed together in lines of 5 or 7 by means of long spans, laid across to them at the top. These will act as girders.



Temporary Bridges or Low cost Bridges

The bridges which can be constructed as well as maintained at low cost and have short span of useful life are known as temporary bridges or Low cost bridges.

Timber Bridges -

"The bridges having their Superstructure and Substructure made of timber members are known as timber bridges"

Types of timber bridges -

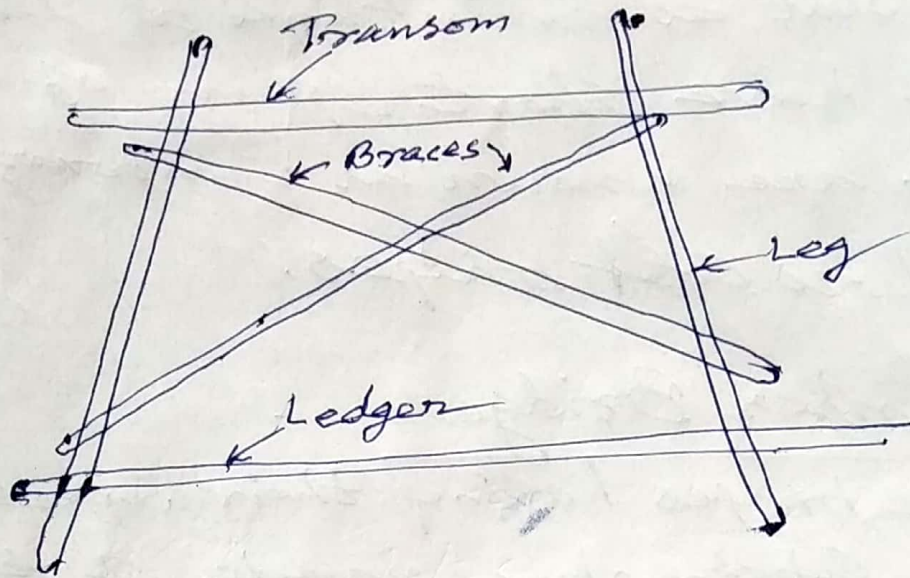
(a) Timber bridges with intermediate support -

- (i) Timber Trestle
- (ii) Pile ~~and~~ bents
- (iii) Cribs
- (iv) Crates.

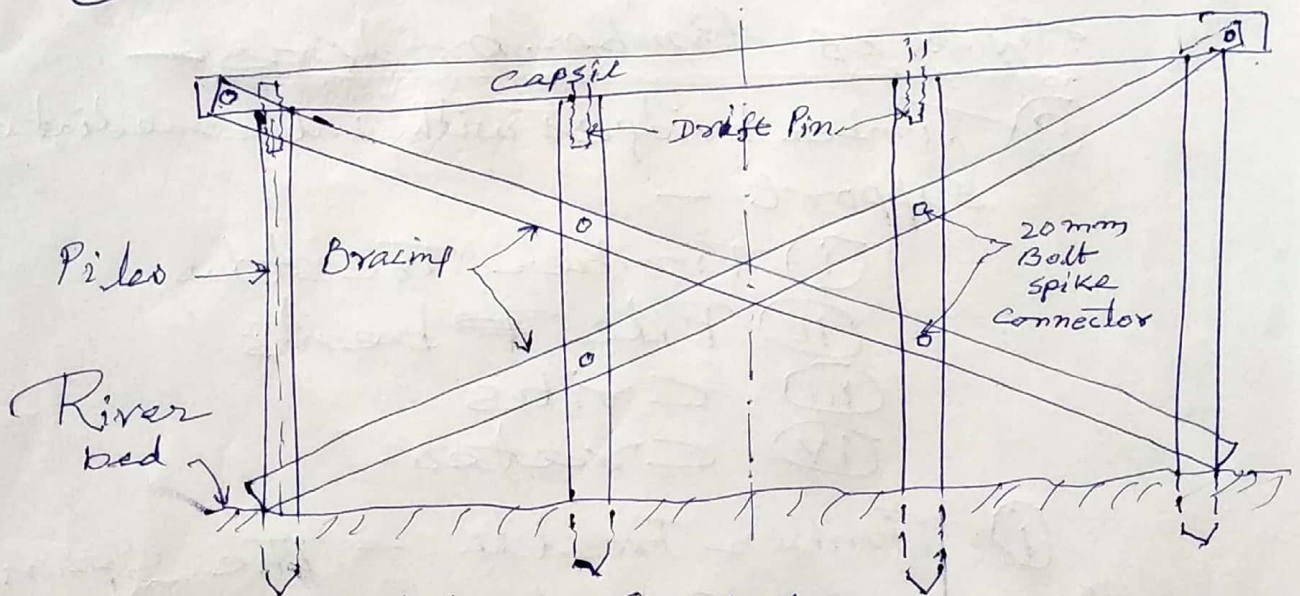
(i) Timber Trestle - The span length up to 8 metres are economical for timber two legged, three legged or four legged. Diagonal bracing are generally provided between them;

- Trestles are used as piers of timber bridges when the bed of stream is sufficiently hard and

Depth of water as well as its velocity are not more.



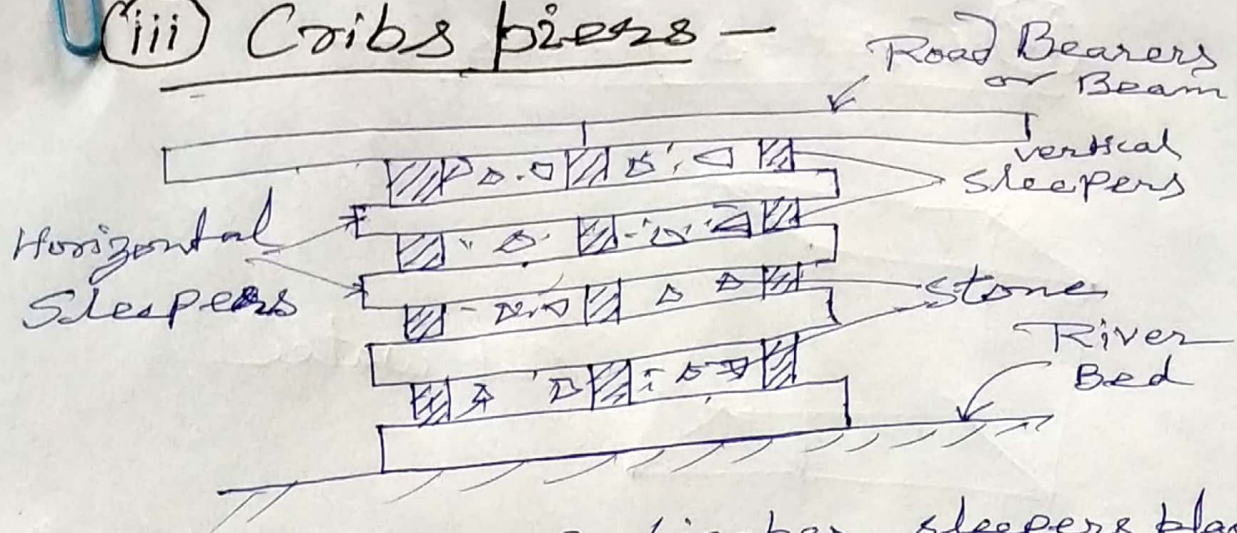
(ii) Pile bents —



A typical pile bent having four piles driven vertically in a line are shown in figure. Levelled tops of sufficiently driven piles are provided with a capsit by driving drift pins.

The piles are generally provided with diagonal bracings. They form stable and strong piers.

(iii) Cribs piers -



- It is made of timber sleepers placed in layers in such a manner that each layer is transverse to the layer below as shown in figure.
- The sleepers are fastened together either by spikes. ~~it is rectangular or~~
- The bottom of the crib is planked to form a tray. This tray is then floated to bridge site, and filled with stones to make it sufficiently heavy for stability in running water.
- It is mostly used as piers for timber bridges to be designed for temporary deviation ~~for~~ of railway track or for taking heavy loads.

