

Subject: Guidelines for props and bracing for centring work.

Keywords: Props, bracing, centring

Props and bracing used for centring is very arbitrary without any design or guideline. Very basic guidelines are given herein to ensure that the props / bracing used for centring is proper and safe.

1. These guidelines have been prepared in consultation with Mr. Surya Prakash of Satyavani Projects.
2. These are tentative guidelines and shall be revised after further consultation with other structural consultants and our senior engineers.
3. Props used for slabs must be MS Acrow props. The bottom/outer pipe of the prop must be longer than the inner pipe. Typical size of the pipes in the prop are 63mm x 3.2mm and 50mm x 3.2mm. The overlap must be atleast 500mm. The pin/stopper for connecting the prop must be 12mm (under any circumstances it cannot be less than 10mm rod).
4. Each prop can approximately bear a weight of 1300 kgs. However, for safety purposes assume a load bearing capacity of 1000 kgs.
5. Weight of concrete is 2500 kgs/m³ i.e., about 300 kgs/m² for about 125mm thick slabs used for residential projects and 750 kgs/m² for 300mm slabs used in commercial/lab space projects. For beams and caps for flat slabs the weight can be calculated (about 1500 kgs/m²). Assume about 200kgs weight of centring material per m².
6. Accordingly, props required per m² are:
 - a. Residential slabs - one prop for every 2.00 m².
 - b. Commercial /lab space slabs - one prop for every 1.00 m².
 - c. Beams – approximately 2 props for every 1.00 m.
 - d. Caps for flat slab – approximately 2 props for every 1.00 m².
7. The centre of gravity of most props which are not to plumb fall outside its base. Therefore, to prevent collapse the props have to be braced.
8. Primary bracing must be done using 40mm OD x 2.7mm round MS pipes or 40mm ID x 4mm round FRP pipes. These pipes must be tied to the props using clamps/couplers of appropriate size.
9. Additional bracing only where required must be done with tor steel of not less than 20mm dia. Such steel must be tied to the props with 4 runs of binding wire.
10. Guidelines for bracing:
 - a. Residential projects with slab height less than 12ft:
 - i. FRP pipe bracing at every 2mtrs must be provided in north-south direction. FRP pipe must be connected to props every 2 mtrs.
 - ii. FRP pipe bracing at every 4 mtrs must be provided in east-west direction and connected to props every 2 mtrs.
 - iii. FRP pipe must be connected to the outer pipe of the prop just below the pin/joint.
 - iv. Additional bracing using 20mm tor steel must be provided for all props on the periphery.
 - b. Residential projects with slab height above 12ft:
 - i. Above guidelines to be followed.
 - ii. Additionally bracing must be provided in a grid of 3mtrs x 3mtrs using FRP pipes or 20mm tor steel at mid level of the inner pipe of the prop.
 - c. Lab space/commercial projects with slab heights more than 4 mtrs and slab thickness more than 200mm:

- i. FRP pipe bracing connected to outer pipe at every 1mtr must be provided in north-south direction. FRP pipe must be connected to props every 1 mtr.
 - ii. FRP pipe bracing connected to outer pipe at every 3 mtrs must be provided in east-west direction and connected to props every 3 mtrs.
 - iii. FRP pipe must be connected to the outer pipe of the prop just below the pin/joint.
 - iv. FRP pipe bracing connected to inner pipe at mid level every 1mtr must be provided in north-south direction. FRP pipe must be connected to props every 1 mtr.
 - v. FRP pipe bracing connected to inner pipe at mid level every 3 mtrs must be provided in east-west direction and connected to props every 3 mtrs.
 - vi. Additional bracing using 20mm tor steel must be provided for all props on the periphery. Optionally additional bracing may be provided using 20mm tor steel at other places.
11. Bracing pipes and clamps shall be provided by builder as under:
 - a. 40mm x 4mm FRP pipe 6mtr long, costing Rs. 1,250/- per pipe.
 - b. Coupler costing Rs. 103/- per piece.
 - c. Approximate requirement for 100 m2 of commercial/lab space slabs is about 45 FRP pipes and 300 couplers.
 - d. Approximate requirement for 100 m2 of residential slabs is about 15 FRP pipes and 75 couplers.
 12. The FRP pipes and couplers shall be provided by builder to each contractor. Rs. 1/- per sft of plinth area for slabs shall be deducted as hire charges from the contractor. Contractor must give a signed acknowledgement of receipt of material and return the same on completion of work. Any loss or theft or damage shall be deducted from contractor as per rates given above.
 13. Project managers to carefully calculate requirement FRP pipes and couplers for enforcing the above. Requisitions may be sent immediately.
 14. QC must ensure that above procedure is properly followed before casting each slab.