

### **Fixing of Reinforcement for Concrete Works**

Displaced reinforcement has been a major contributing factor for the undue corrosion of steel and spalling of concrete, which in some cases has led to the collapse of structural elements causing casualties. This Practice Note gives guidance on good practice in fixing reinforcement to achieve safe and durable reinforced concrete structures.

#### **Fixing of Reinforcement**

2. Bar reinforcement and fabric reinforcement from each batch should not be fixed until testing of the batch has been completed (Practice Note for Authorized Persons and Registered Structural Engineers 122 refers).
3. Loose rust, excessive flaky rust or mill-scale on reinforcement must be removed by wire-brushing. Badly corroded, damaged or scaling steel should NOT be used.
4. Sufficient number of spacers, chairs and such other supports as may be necessary should be provided to maintain the reinforcement in the correct location as shown in the approved plans and to maintain the specified minimum cover at all positions. Spacers and chairs should be placed at a maximum spacing of 1.5 m. However, in the case of 20 mm diameter or smaller bars the spacing of chairs and spacers should be suitably reduced to avoid sagging.
5. Spacers for reinforcement should be constructed of concrete or of a proprietary plastic or concrete type. They should be as small as practicable and should be capable of supporting the weight of reinforcement and construction loads without breaking, deforming or overturning. The strength and durability of spacers should be not less than that of the surrounding concrete.
6. Sufficient number of intersecting and lapping bars should be tied by tying wire, tying devices or clips to prevent movement of the reinforcement. The ends of tying wire, tying devices and clips should not encroach into the cover to reinforcement.
7. Reinforcement should not be contaminated or displaced as a result of access (e.g. persons walking or transporting concrete laden wheelbarrows) over the reinforcement. Access should be obtained by using planks and ladders or other methods which are independently supported and well clear of the completed reinforcement. Care should be taken to avoid the displacement of reinforcement or spacers during subsequent trades (e.g. laying conduits for electric cables in floor slabs). In the case of cantilevered projecting structures, it is crucial to ensure that the completed top reinforcement would not deflect/displace due to access or other construction loads. This can be achieved by providing extra chairs and ties to the reinforcement in such elements.

8. Laps and joints in reinforcement should be located only at the specified positions. Reinforcement connectors should be fixed in accordance with the manufacturer's recommendations and using equipment recommended by the manufacturer.

9. Reinforcement which is free-standing should be secured in position and braced to prevent movement due to wind and other loads. Prefabricated reinforcement cages should be adequately supported and braced before lifting.

### **Supervision and Inspection**

10. The registered contractor should provide continuous supervision, to ensure that the fixing of reinforcement is carried out in accordance with the approved plans, the recommendations given in this Practice Note are followed and no displacement of reinforcement takes place during placement and compaction of concrete. The authorized person/registered structural engineer should provide adequate quality supervision in this respect.

11. The registered contractor should inform the authorized person/registered structural engineer to inspect all reinforcement after fixing and well in advance of concreting to allow for any necessary rectification. In the case of walls, columns etc., the inspection should be arranged before the complete erection of formwork to avoid difficult access to the reinforcement. The Contractor should also take adequate measures to ensure that the reinforcement remains in the approved conditions until concreting has been completed.

12. A similar practice note has been issued to registered contractors.

  
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