

8.3 – RECOMMENDED INDUSTRY PRACTICE FOR PLACING REINFORCING BARS

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RECOMMENDED INDUSTRY PRACTICE FOR PLACING REINFORCING BARS*

1. Introduction

These recommendations for placing reinforcing bars are partially based upon the ACI Building Code.

2. General

Reinforcing bars should be accurately placed in the positions shown on the placing drawings and adequately tied and supported before concrete is placed, and secured against displacement within the tolerances recommended in Section 8.

Welding of crossing bars (tack welding) should not be permitted for assembly of reinforcement unless authorized by the Architect/Engineer.

3. Surface Condition of Reinforcement

At the time of concrete placement, all reinforcing bars should be free of mud, oil, or other deleterious materials. Reinforcing bars with rust, mill scale, or a combination of both should be considered as satisfactory, provided the minimum dimensions, weight, and height of deformations of a hand-wire-brushed test specimen are not less than the applicable ASTM specification requirements.

4. Bending

Reinforcing bars should not be bent or straightened in a manner that will injure the material. Bars with kinks or improper bends should not be used. Except for realignment of #7 through #18 rebar up to about 30° bend and #3 through #6 rebar up to about a 45° bend, no bars partially embedded in concrete should be field bent, except as shown on the project drawings or permitted by the Architect/Engineer.

5. Spacing of Reinforcement

The clear distance between parallel reinforcing bars in a layer should not be less than the nominal diameter of the bars, nor 1 in. Clear distance should also not be less than one and one-third times the nominal maximum size of the coarse aggregate, except if in the judgement of the Architect/Engineer, workability and methods of consolidation are such that concrete can be placed without honeycomb or voids.

Where parallel reinforcement is placed in two or more layers, the bars in the upper layers should be placed directly above those in the bottom layer with the clear distance between layers not less than 1 in.

Groups of parallel reinforcing bars bundled in contact, assumed to act as a unit, not more than four in any one bundle may be used only when stirrups or ties enclose the bundle. Bars larger than #11 should not be

bundled in beams or girders. Individual bars in a bundle cut off within the span of flexural members should terminate at different points with at least 40 bar diameters stagger. Where spacing limitations and minimum clear cover are based on bar size, a unit of bundled bars should be treated as a single bar of a diameter derived from the equivalent total area.

In walls and slabs other than concrete joist construction, the principal reinforcement should not be spaced farther apart than three times the wall or slab thickness, nor more than 18 in.

In spirally reinforced and tied columns, the clear distance between longitudinal bars should not be less than one and one-half times the nominal bar diameter, nor 1½ in.

The clear distance limitation between bars should also apply to the clear distance between a contact lap splice and adjacent splices or bars.

6. Splices in Reinforcement**

6.1 General

Splicing of reinforcing bars should be either by lapping, mechanical connections, or by welding.

Splices of reinforcing bars should be made only as required or permitted on the project drawings or in the project specifications, or as authorized by the Architect/Engineer. All welding should conform to the current edition of "Structural Welding Code—Reinforcing Steel" (ANSI/AWS D1.4).

6.2 Lap Splices

Lap splices of #14 and #18 bars should not be used, except in compression only to #11 and smaller bars.

Lap splices of bundled bars should be based on the lap splice length recommended for individual bars of the same size as the bars spliced, and such individual splices within the bundle should not overlap each other. The length of lap should be increased 20 percent for a 3-bar bundle and 33 percent for a 4-bar bundle.

Bar laps placed in contact should be securely wired together in such a manner as to maintain the alignment of the bars and to provide minimum clearances.

Bars spliced by noncontact lap splices in flexural members should not be spaced transversely farther apart than one-fifth the required length of lap nor 6 in.

*For more complete recommendations on bar placement, see *Placing Reinforcing Bars* available from the Concrete Reinforcing Steel Institute.

**See *Reinforcement: Anchorages, Lap Splices and Connections* by the Concrete Reinforcing Steel Institute.