

## Limit on Slope of Field-Bent Reinforcing Bars

**Q.** We placed some No. 6 vertical bars at a slight incline in the first lift of a wall placement. The protruding dowels are now too close to the wall forms for the next lift. When the horizontal bars are placed, we have little allowance for movement of the forms and we can't meet the clear cover tolerance. The contract documents permit cold bending of No. 6 bars, and we have approval from the Structural Engineer. We planned to bend the verticals with a hickey bar, but the Inspector told us we couldn't create a bar slope greater than 1 in 6 when doing this.

I've never heard of this rule and can't find it in any ACI documents. I thought all we had to do was meet a minimum bend diameter requirement. Is there a 1 in 6 slope requirement for field-bent bars?

**A** You'll find the 1 in 6 maximum slope requirement in Section 7.8 of "Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary."<sup>1</sup> But it doesn't apply to wall bars or to field bending, as shown by the following excerpts:

7.8 — Reinforcement details for columns

7.8.1 — Offset bars

Offset bent longitudinal bars shall conform to the following:

7.8.1.1 — Slope of inclined portion of an offset bar with axis of column shall not exceed 1 in 6.

7.8.1.4 — Offset bars shall be bent before placement in the forms.

As noted, the 1 in 6 slope applies only to offset bars in columns, and because the bars must be bent before placement in the forms, it is a bar fabrication requirement.

Section 7.3.2 of ACI 318-08 allows field bending of reinforcement partially embedded in concrete when permitted by the licensed design professional. And the Commentary, Section R7.3.2, indicates that

**Table 7.2—Minimum diameters of bend**

Bar size	Minimum diameter
No. 3 through No. 8	$6d_b$
No. 9, No. 10, and No. 11	$8d_b$
No. 14 and No. 18	$10d_b$

A615 Grade 40 and Grade 60 reinforcing bars can be cold bent and straightened up to 90 degrees at or near the minimum diameter specified in Table 7.2.

### Reference

1. ACI Committee 318, "Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary," American Concrete Institute, Farmington Hills, MI, 2008, 473 pp.

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*Editor's note: A humorous discussion of the possible origins of the term hickey bar can be found at [www.word-detective.com/2009/10/21/hickey-bar/](http://www.word-detective.com/2009/10/21/hickey-bar/).*

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