

BBRS Official Interpretation No. 2013_02

Date: April 9, 2013

Subject: 8th Edition 780 CMR, Plain concrete foundation walls

Background/Discussion:

Concrete and masonry foundation walls for one- and two-family dwellings traditionally have been constructed without the use of steel reinforcing. There has not been a building code requirement in either the 6th or 7th editions, for steel reinforcing except at sites with large unbalanced backfill and/or clay type soil conditions. In these cases vertical reinforcing was required (7th edition Table 5404.1.1(2)) while there appears to be no requirement for horizontal reinforcing.

The 8th edition allows plain masonry foundation walls; see section R404.1.1 and Table R404.1.1(1).

However, the 8th edition is not clear on whether or not plain concrete foundation walls are allowed. The two code sections (R404.1.2.2 and Table R404.1.2(1)) which have conflicting language are reproduced below:

R404.1.2.2 Reinforcement for foundation walls. Concrete foundation walls shall be laterally supported at the top and bottom. Horizontal reinforcement shall be provided in accordance with Table R404.1.2(1). Vertical reinforcement shall be provided in accordance with Table R404.1.2(2), R404.1.2(3), R404.1.2(4), R404.1.2(5), R404.1.2(6), R404.1.2(7) or R404.1.2(8). Vertical reinforcement for flat *basement* walls retaining 4 feet (1219 mm) or more of unbalanced backfill is permitted to be determined in accordance with Table R404.1.2(9). For *basement* walls supporting above-grade concrete walls, vertical reinforcement shall be the greater of that required by Tables R404.1.2(2) through R404.1.2(8) or by Section R611.6 for the above-grade wall. In buildings assigned to Seismic Design Category D₀, D₁ or D₂, concrete foundation walls shall also comply with Section R404.1.4.2.

TABLE R404.1.2(1) MINIMUM HORIZONTAL REINFORCEMENT FOR CONCRETE BASEMENT WALLS^{a, b}

MAXIMUM UNSUPPORTED HEIGHT OF BASEMENT WALL (feet)	LOCATION OF HORIZONTAL REINFORCEMENT
≤ 8	One No. 4 bar within 12 inches of the top of the wall story and one No. 4 bar near mid-height of the wall story
> 8	One No. 4 bar within 12 inches of the top of the wall story and one No. 4 bar near third points in the wall story

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa.

- Horizontal reinforcement requirements are for reinforcing bars with a minimum yield strength of 40,000 psi and concrete with a minimum concrete compressive strength 2,500 psi.
- See Section R404.1.2.2 for minimum reinforcement required for foundation walls supporting above-grade concrete walls.

QUESTION 1

Is horizontal reinforcing required in basement concrete foundation walls for one- and two-family dwellings?

ANSWER 1

Yes. But only for those walls which are 'unsupported' at either the bottom or top of the wall per Table R404.1.2(1). A wall that is tied to the first floor frame diaphragm is considered to be 'supported'.

QUESTION 2

Is vertical reinforcing required in basement concrete foundation walls for one- and two-family dwellings?

ANSWER 2

Yes, in some cases. For traditional flat concrete basement walls see Tables R404.1.2(2,3,4, or 8). For example Table R404.1.2(8) contains maximum wall height, maximum unbalanced backfill height, soil class, and design lateral soil load (psf per foot of depth) as variables, and depending on these variables vertical reinforcing may or may not be required.