

CHAPTER 14—PLAIN CONCRETE

CODE

14.1—Scope

14.1.1 This chapter shall apply to the design of plain concrete members, including (a) and (b):

- (a) Members in building structures
- (b) Members in non-building structures such as arches, underground utility structures, gravity walls, and shielding walls

14.1.2 This chapter shall not govern the design of cast-in-place concrete piles and piers embedded in ground.

14.1.3 Plain concrete shall be permitted only in cases (a) through (d):

- (a) Members that are continuously supported by soil or supported by other structural members capable of providing continuous vertical support
- (b) Members for which arch action provides compression under all conditions of loading
- (c) Walls
- (d) Pedestals

14.1.4 Plain concrete shall be permitted for a structure assigned to Seismic Design Category (SDC) D, E, or F, only in cases (a) and (b):

- (a) Footings supporting cast-in-place reinforced concrete or reinforced masonry walls, provided the footings are reinforced longitudinally with at least two continuous reinforcing bars. Bars shall be at least No. 13 and have a total area of not less than 0.002 times the gross cross-sectional area of the footing. Continuity of reinforcement shall be provided at corners and intersections.
- (b) Foundation elements (i) through (iii) for detached one- and two-family dwellings not exceeding three stories and constructed with stud bearing walls:
 - (i) Footings supporting walls
 - (ii) Isolated footings supporting columns or pedestals
 - (iii) Foundation or basement walls not less than 190 mm thick and retaining no more than 1.2 m of unbalanced fill.

14.1.5 Plain concrete shall not be permitted for columns and pile caps.

COMMENTARY

R14.1—Scope

R14.1.2 Structural elements, such as cast-in-place plain concrete piles and piers in ground or other material sufficiently stiff to provide adequate lateral support to prevent buckling, are not covered by the Code. Such elements are covered by the general building code.

R14.1.3 Because the strength and structural integrity of structural plain concrete members is based solely on the member size, concrete strength, and other concrete properties, use of structural plain concrete should be limited to members:

- (a) That are primarily in a state of compression
- (b) That can tolerate random cracks without detriment to their structural integrity
- (c) For which ductility is not an essential feature of design

The tensile strength of concrete can be used in design of structural plain concrete members. Tensile stresses due to restraint from creep, shrinkage, or temperature effects are to be considered to avoid uncontrolled cracks or structural failure. For residential construction within the scope of **ACI 332M**, refer to **1.4.6**.

R14.1.5 Because plain concrete lacks the necessary ductility that columns should possess, and because a random crack in an unreinforced column will most likely endanger