Seismic Design Category A or B

- No minimum reinforcing requirements. Walls must be anchored to walls, floors or roofs providing lateral support. For Seismic Category B, shear walls may not be empirically designed and must meet minimum requirements for "ordinary plain" shear walls.

Seismic Design Category C

- Comply with requirements for Categories A and B plus the following requirements.
- Masonry elements which are *not* part of the lateral-force-resisting system must be reinforced in *either* the vertical or horizontal direction, depending on location of the lateral supporting elements.
  - Horizontal joint reinforcement with two longitudinal 9 gauge (W1.7) wires spaced 16" on center maximum, or two #3 or one #4 bar spaced 48" on center maximum. Must include horizontal reinforcement within 16" of the top and bottom of wall.
  - Vertical reinforcement of two #3 or one #4 bar 48" on center maximum and within 16" of ends of walls.
  - In addition to minimum reinforcing requirements, two #3 or one #4 bar on all sides of and adjacent to every opening larger than 16" in either direction, and extending 40 bar diameters or 24" minimum beyond the corners of the opening.
- For masonry elements which *are* part of the lateral-force-resisting system, shear walls must be reinforced in *both* the vertical and horizontal direction to comply with the minimum requirements for "ordinary reinforced" shear walls as follows:
  - Horizontal joint reinforcement with two longitudinal 9 gauge (W1.7) wires, spaced 16" on center, or two #3 or one #4 bar spaced not more than 10 ft. on center. Must include horizontal reinforcement at top and bottom of wall openings and extending 40 bar diameters or 24" minimum beyond the corners of the opening, within 16" of the tops of walls, and continuously at structurally connected roofs and floors.
  - Vertical reinforcement of two #3 or one #4 bar at corners, within 16" of each side of openings, within 8" of each side of movement joints, within 8" of ends of walls, and at 10 ft. on center maximum.

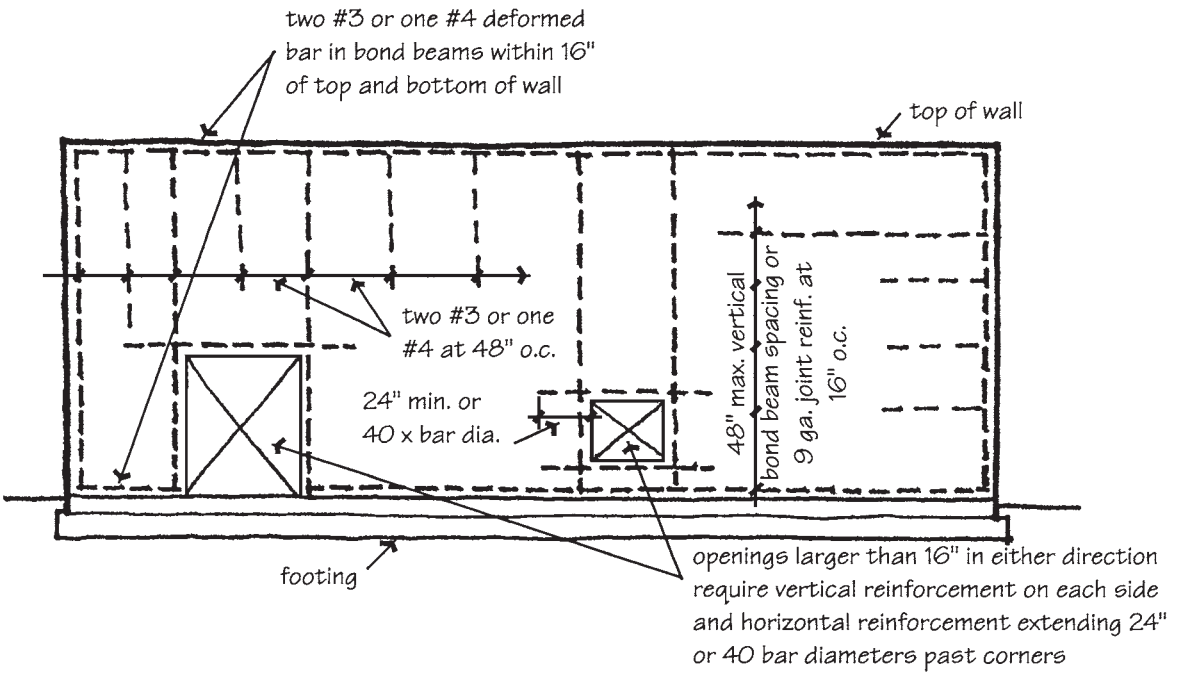
Seismic Design Category D

- Comply with requirements for Category C plus the following requirements.
- Masonry elements which *are* part of the lateral-force-resisting system must be reinforced in *both* the vertical and horizontal direction. The sum of the cross-sectional area of horizontal and vertical reinforcement must be at least 0.002 times the gross cross-sectional area of the wall, with 0.0007 minimum in each direction. Reinforcement must be evenly distributed. Maximum spacing of reinforcement is 48" for other than stack bond masonry. For stack bond masonry, units must be solid, solidly grouted hollow open-end units, or solidly grouted hollow units with full head joints, and reinforcement spaced a maximum of 24" on center.
- Shear walls must comply with the minimum requirements for "special reinforced" shear walls. Reinforcement spacing must be the smaller of one-third the height or length of the shear wall or 48" on center. Minimum cross-sectional area of vertical reinforcement must be one-third of the required shear wall reinforcement. Shear reinforcement must be anchored around vertical reinforcing bars with standard hook. Hooks for lateral tie anchorage shall be either 135° or 180° standard hooks. Columns must have lateral ties at 8" on center, minimum 3/8" diameter embedded in grout.

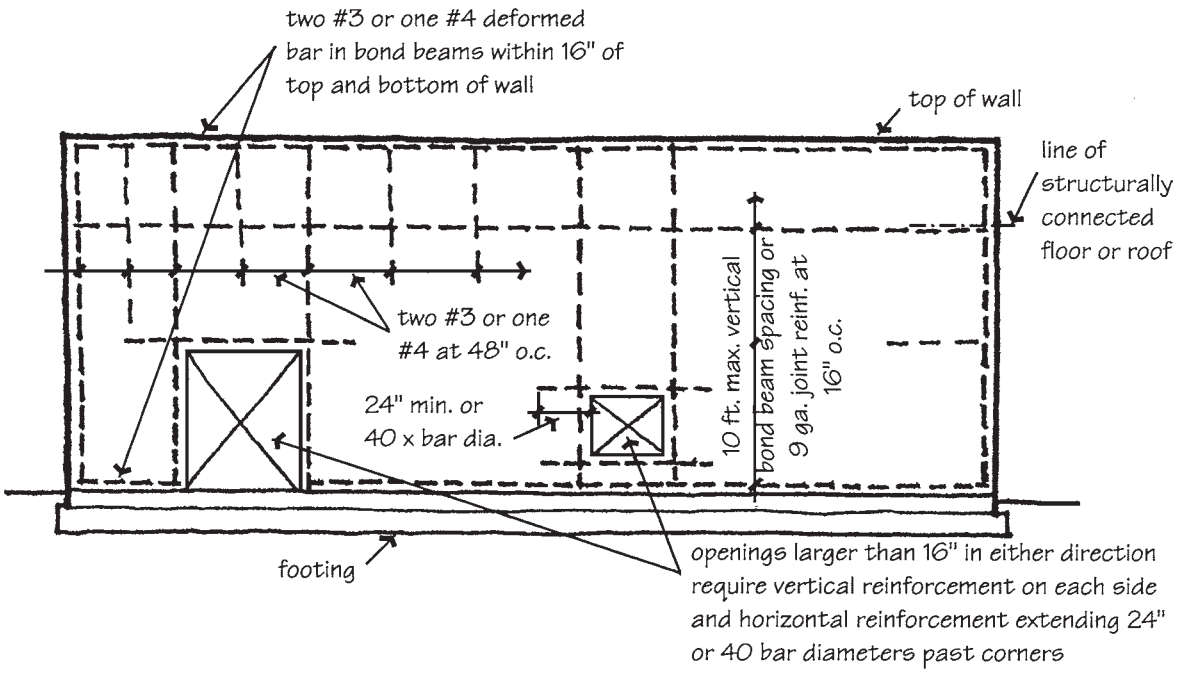
Seismic Design Category E or F

- Comply with requirements for Category D plus the following requirements.
- For stack bond walls which are *not* part of the lateral-force-resisting system, solid units or solidly grouted hollow open-end units, horizontal reinforcement with a cross-sectional area at least 0.0015 times the gross cross-sectional area of the masonry, maximum spacing 24" on center.
- For stack bond walls which *are* part of the lateral-force-resisting system, solid units or solidly grouted open-end units, horizontal reinforcement with a cross-sectional area at least 0.0025 times the gross cross-sectional area of the masonry, maximum spacing 16" on center.

Figure 12-34 Prescriptive masonry reinforcing requirements. (*Based on MSJC,* Building Code Requirements for Masonry Structures, *ACI 530/ASCE 5/TMS 402-02*)



MASONRY ELEMENTS WHICH *ARE NOT* PART OF THE LATERAL-FORCE-RESISTING SYSTEM
reinforcement required in *either* the vertical or horizontal direction



MASONRY ELEMENTS WHICH *ARE* PART OF THE LATERAL-FORCE-RESISTING SYSTEM
reinforcement required in *both* the vertical or horizontal direction

Figure 12-35 Minimum reinforcement required in Seismic Design Category C. (*Based on MSJC* Building Code Requirements for Masonry Structures, *ACI 530/ASCE 5/TMS 402-02.*)