Just the **FAQ**s

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Tested shear wall.

Reinforcing Shear Walls in Seismic Zones

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Question

I have been told that horizontal joint reinforcement is not allowed by the 2011 Building Code

Requirements for Masonry Structures (TMS 402-11/ACI 530-11/ASCE 5-11) for shear reinforcement in high seismic zones. Where is this stated and why? Are there plans to change this to allow joint reinforcement?

Response

Use of joint reinforcement has been allowed for many years and will continue to be allowed as prescriptive reinforcement. Joint reinforcement provides the added benefits of improved crack restraint and satisfying prescriptive and horizontal reinforcement spacing requirements for all types of masonry shear walls.

Regarding shear reinforcement in high seismic zones, joint reinforcement can be used as primary shear reinforcement according to the MSJC code (TMS 402-11/ACI 530-11/ASCE 5-11) provided you use the chapter on **Allowable Stress Design**. However there are limits if you use the chapter on **Strength Design**. Section 3.1.8.3 restricts the yield strength of the joint reinforcement wire used as primary shear reinforcement to 60 ksi (414 MPa) or less. Things change in the chapter on Strength Design with the advent of the 2013 edition of the code. These include:

 Joint reinforcement consisting of ³/16inch (4.8-mm) diameter wires can have yield strengths up to 85 ksi (586 MPa) (Section 9.1.8.3.2) as primary shear reinforcement. Hot dipped galvanized ³/16-inch (4.8-mm) wire commonly has a yield strength of approximately 85 ksi (586 MPa).

- 2) For joint reinforcement used as the primary shear reinforcement, there will be limits on the diameter of wire and on the quantity and spacing of wire based in part on the Seismic Design Category (SDC). These lower limits are that the joint reinforcement wire must be at least 3/16-inch (4.8-mm) diameter wire and that the quantity and spacing of wire be at least:
 - a) two ³/16-inch (4.8-mm) wires per bed joint at 16-inch maximum spacing in partially grouted walls for SDC A and B;
 - b) two ³/₁₆-inch (4.8-mm) wires per bed joint at 8-inch maximum spacing in partially grouted walls for SDC C through F; and,
 - c) four ³⁄₁₆-inch (4.8-mm) wires per bed joint at 8-inch maximum spacing in fully grouted walls for SDC C through F.

Research has shown that 1) joint reinforcement can function as shear reinforcement if a sufficient quantity of joint reinforcement is provided to satisfy strength requirements and 2) that two $\frac{3}{16}$ -inch (4.8-mm) diameter longitudinal wires in each bed joint have sufficient strength and strain elongation capacity to act as primary

shear reinforcement and can perform equivalent to bond beams with deformed reinforcement at 48 inches (1.22 m) on center.

