



MASONRY INSIGHTS

written in conjunction with International Masonry Institute

Masonry -

What is a masonry jamb, and what needs to be considered for design?

A masonry jamb is the vertical element within a masonry wall adjacent to a wall opening that distributes vertical and horizontal forces down to the wall below or foundation. Located adjacent to the wall opening, a jamb provides continuity between the wall above an opening and the wall adjacent to an opening. Structurally, a masonry jamb resists compression forces in the wall, as well as any horizontal thrust and shear forces. A reinforced jamb, along with a reinforced lintel, serves to prevent cracks that may develop at the top corners of the wall openings. In the out-of-plane direction, a reinforced masonry jamb is a stiff element that distributes out-of-plane loading throughout the wall and transfers to diaphragms and the wall below or foundation, functioning similar to a collector element. Architecturally, a masonry jamb provides a solid edge for attachment of door and window framing.

A jamb is defined as a 'pier' in the TMS 402-13 Code as "a reinforced, vertically spanning portion of a wall next to an opening, designed using strength design, and subject to dimensional limitations". Below is a summary of code requirements and dimensional limitations for piers:

1. Nominal compressive strength per TMS 402-13 Section 9.3.4.1
2. Minimum one vertical bar at each end cell per TMS 402-13 Section 9.3.4.3.2.a
3. Minimum area of longitudinal reinforcement: $A_{s,min} = 0.007bd$ per TMS 402-13 Section 9.3.4.3.2.b
4. Limitations for a pier per TMS 402-13 Section 9.3.4.3.3:
 - a. Maximum factored axial compression force = $0.3 \cdot A_n \cdot f'_m$
 - b. Maximum pier thickness is 16 inches
 - c. Distance between lateral supports shall not exceed 25 times pier thickness. Otherwise, provisions per TMS 402-13 Section 9.3.5 shall be met.
 - d. If $P_u > 0.05 f'_m A_g$, $(3 \cdot \text{pier thickness}) < \text{pier length} < (6 \cdot \text{pier thickness})$.
 - e. If $P_u < 0.05 f'_m A_g$, pier length = pier thickness
 - f. Clear height of pier shall not exceed $5 \cdot \text{nominal length}$

If the pier cannot be designed within these limitations, the element shall be considered as a column per TMS 402.

The width of the jamb should be large enough to allow for arching action to occur above the wall opening, and for load to distribute to the adjacent wall segments. Carefully consider the location of control joints, so as to allow for adequate jamb width to achieve proper load distribution, and resistance to thrust loads due to arching action. Lintel flexural reinforcement must be adequately developed beyond the edge of the opening as well. A recommended jamb width is 24 inches minimum. For small openings, a narrower jamb may be achieved if it is determined that loads above the openings are properly distributed to surrounding wall segments and lintel reinforcement is adequately developed.

