

Connecting precast planks to concrete masonry walls

Four ways to detail structurally sound floor-wall connections

By Walter Laska

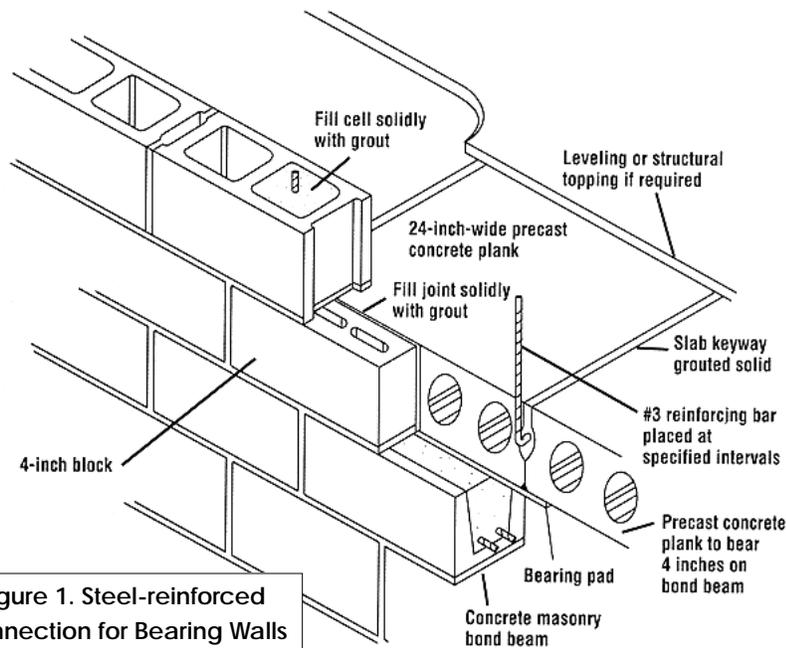


Figure 1. Steel-reinforced Connection for Bearing Walls

Combining walls of load-bearing masonry and floors of precast concrete plank can make for efficient, economical construction and solid, firesafe buildings. But the connections between them must be detailed carefully for the building to be structurally sound.

The wall-floor connections should provide the wall lateral bracing against wind loads. This connection also should assist in the transfer of shear stresses. In the case of bearing walls, they should transfer gravity loads to the foundation.

Structural considerations should always govern the design of floor and wall connections, but the designer should also consider constructibility. Simpler construction generally is less expensive.

Plank/bearing wall connections

A common way to anchor precast concrete plank into load-bearing concrete masonry walls is with reinforcing bars field-bent at a 90° angle (Figure 1). A structural engineer should determine the size and spacing of rebar needed to meet structural requirements.

One end of each reinforcing bar is placed into the keyway between planks in the floor slab. The other end points upward and fits into a concrete block cell in the next course. When the slab keyway and the block cell are fully grouted, a positive connection is formed.

If a structural concrete top-

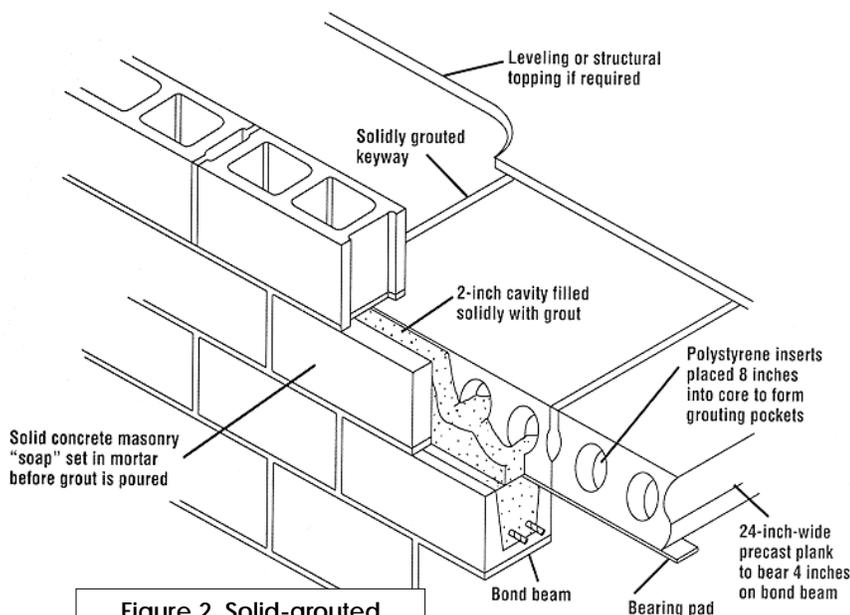


Figure 2. Solid-grouted Connection for Bearing Walls

ping is required, the steel reinforcing bars can be placed on top of the precast plank and turned upward into the block cells. Pouring the concrete topping and solidly grouting the block cells form a similar positive connection.

If lateral forces are small enough, an alternative connection may be feasible (Figure 2). With this detail, the masonry wall is bonded to the precast concrete planks by a solidly grouted joint. Plugging the cores of the precast concrete planks creates a continuous grout cavity. When the grout is poured, it flows into the grout pockets formed at the ends of the plank. When the grout cures, a positive key connection is formed between the planks and the concrete blocks. All precast planks should be in place and the grout fully set before wall construction continues.

Because this detail relies on the bearing pad's frictional resistance to help transfer shear stresses, a structural engineer should determine when such a connection is adequate.

Nonload-bearing walls

For nonload-bearing walls (walls parallel to the floor planks) the most important consideration is to laterally brace the wall with the precast concrete plank floor system. One common method requires the plank adjacent to the wall to bear on the wall at least 3 inches (Figure 3). At designated intervals, holes are broken in the top of the concrete plank. Inserts are placed inside each hole to plug the plank core and form a grout pocket. A strap anchor is installed so that one end projects down into the grout pocket and the other end projects up into a concrete block cell. The block cell and the grout pocket in the plank are then grouted solid. This connection transfers shear stresses through the floor diaphragm to interior shear walls. It also provides lateral bracing for the wall.

If the adjacent precast con-

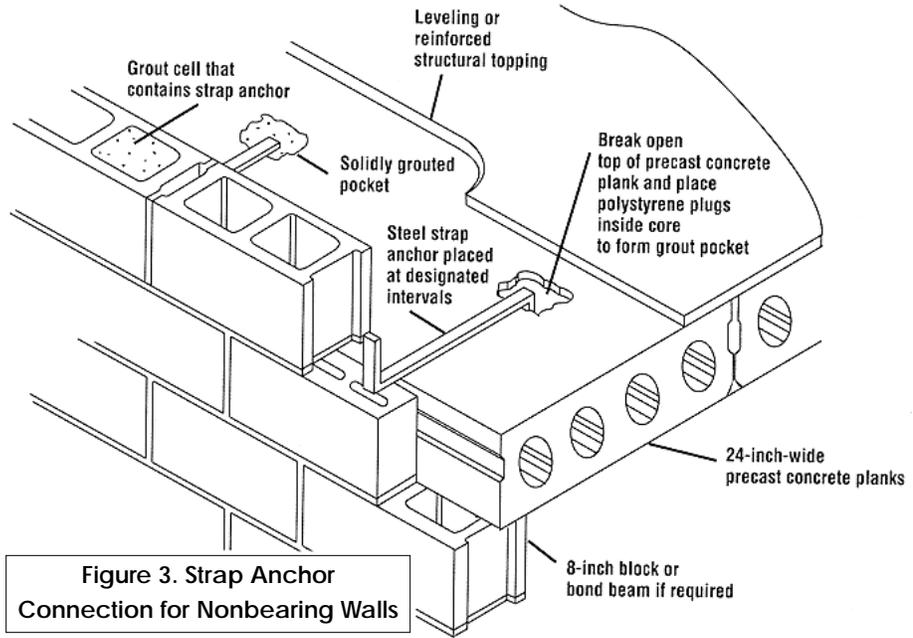


Figure 3. Strap Anchor Connection for Nonbearing Walls

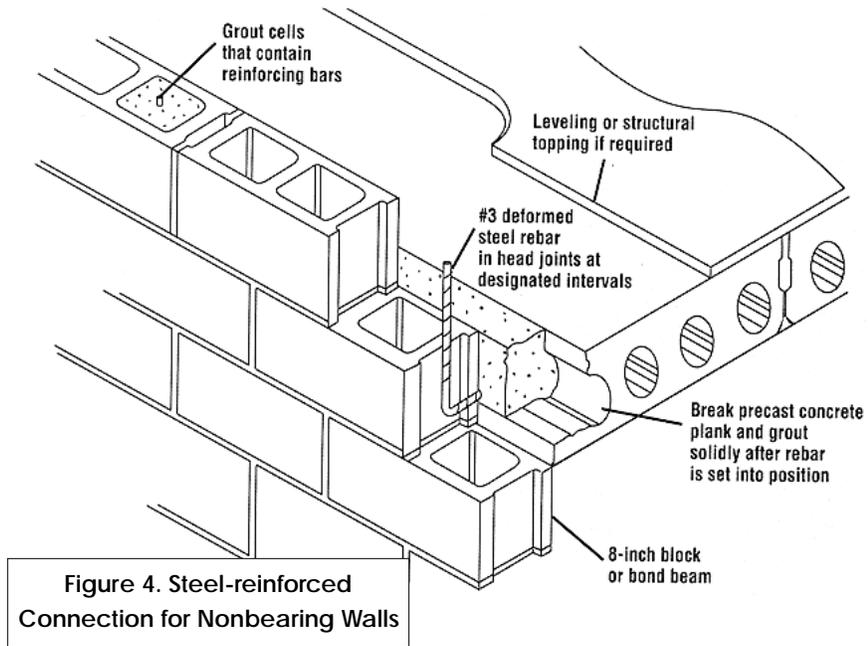


Figure 4. Steel-reinforced Connection for Nonbearing Walls

crete plank does not bear directly on the nonload-bearing masonry wall, consider using the connection shown in Figure 4. Break off the top of the precast plank above the core hole closest to the wall. At intervals determined by the structural engineer, place steel reinforcing bars bent at 90° into the core of the precast plank and into head joints of the masonry wall. Solidly grout the core of the plank. After the grout has cured, it forms a positive connec-

tion that meets all necessary structural requirements for the building. **A**

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