Spancrete® and Structural Steel Is a Proven System

Spancrete® hollowcore plank floors and roofs combined with structural steel frames provide a building system which has been commonly used since 1960.

THE SYSTEM IS ECONOMICAL, EASY TO DESIGN AND FAST TO ERECT.

Hollowcore plank to steel connection detail practices vary from region to region. Each hollowcore producer also has its own connection preferences. Shown here are a variety of plank and steel details from the PCI hollowcore design manual, with descriptions of design, fabrication and erection considerations. *Your Spancrete producer should be consulted prior to detail selection.*

The following are items of which the architect, engineer and general contractor should be aware when designing or building a plank and steel structure.

1. Spancrete shop drawings will be prepared from the architectural/structural contract drawings. It is the responsibility of the General Contractor to coordinate, review and approve both the plank and structural steel shop drawings.
2. A steel frame/plank system requires that the plank be threaded through the steel beams. The steel erector normally installs a maximum of two levels of steel at a time to facilitate plank erection. The erection plan must be coordinated by the General Contractor.
3. Proper bracing of the structure prior to plank erection is the responsibility of the General Contractor and steel erector. A bracing plan must be designed so that it does not interfere with plank erection.
4. The structural engineer of record must review and approve the erection plan. It is this engineer’s responsibility to determine the connections and grouting required to safely proceed with the next construction sequence.
5. Plank will be notched either in the plant or in the field to fit around columns. The space between the notch and column requires forming and concrete fill. This work is typically completed by other trades and is not the plank erector's responsibility.

Ask for a set of Spancrete® hollowcore "Research Notes" for detailed engineering data such as diaphragm action, weld plates, load distribution and other characteristics.

There is general agreement among structural engineers that prestressed members including plank should not have bottom plates welded at both ends because of other induced loads that could cause weld plate failure. One welded plate per plank at opposite ends is typically recommended.

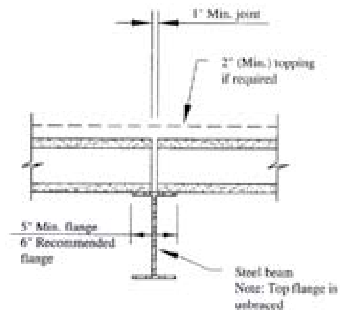

Fig. 5.5.1

Design Considerations:
- Top beam flange should be considered unbraced

Fabrication Considerations:
- Clean and simple for slabs
- Beam flange width must be sufficient for slab bearing length

Erection Considerations:
- Unsymmetrical loading may cause beam instability

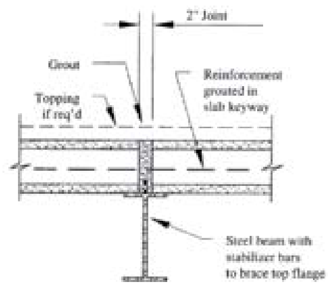

Fig. 5.5.2

Design Considerations:
- Can transfer internal diaphragm forces
- Provides lateral brace for steel beam

Fabrication Considerations:
- Slab layout must align slab joints
- Stabilizer bars might be field or shop installed depending on local regulations or agreements
- Beam flange width must be sufficient for minimum slab bearing

Erection Considerations:
- Grouting of slabs must include the butt joint
- Steel erection may require that stabilizer bars be field installed
- Steel beam will not be laterally braced until grout cures
- Unsymmetrical loading may cause beam instability

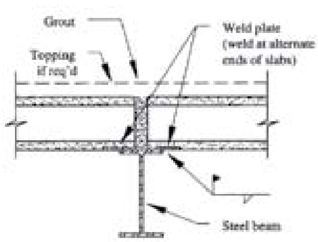

Fig. 5.5.3

Design Considerations:
- Can transfer internal diaphragm forces
- Provides lateral brace for steel beam
- Will develop volume change restraint forces that must be considered in design of connection

Fabrication Considerations:
- Slab manufacturing system must allow for installation of bottom weld anchors

Erection Considerations:
- Welding of slabs to beam should be done as erection proceeds to laterally brace beams

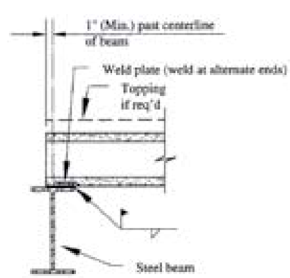

Fig. 5.5.4

Design Considerations:
- Can transfer diaphragm shear
- Provides lateral brace for steel beam
- Potential torsion on steel beam should be considered
- Will develop volume change restraint forces that must be considered in design of connection

Fabrication Considerations:
- Slab manufacturing system must allow for installation of bottom weld anchors

Erection Considerations:
- Welding of slabs to beam should be done as erection proceeds to brace beams
- Spacer may be required to make weld

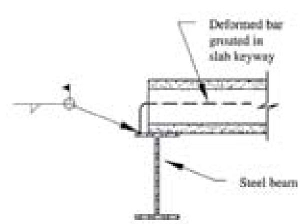

Fig. 5.5.5

Design Considerations:
- Can transfer diaphragm shear
- Provides lateral brace for steel beam

Fabrication Considerations:
- Clean and simple

Erection Considerations:
- Welding of bars must be coordinated with slab erection for alignment
- Depending on forces to be transferred, concrete may have to be cast along edge
- Beam will not be braced until keyway grout cures

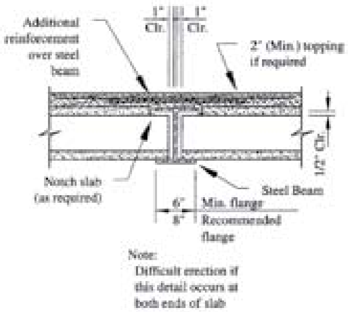

Fig. 5.5.6

Design Considerations:

- Internal diaphragm forces can be transferred only through topping
- Provides lateral brace for steel beam
- Consider potential torsion on beam during slab erection

Fabrication Considerations:

- Beam flange width must be sufficient for minimum slab bearing
- Slab notching will require a hand operation in field or, preferably, in plant

Erection Considerations:

- Slab erection will be very difficult with this detail on both slab ends. Slabs must be slid into beams possibly through access holes in flanges
- Beams will not be braced during slab erection

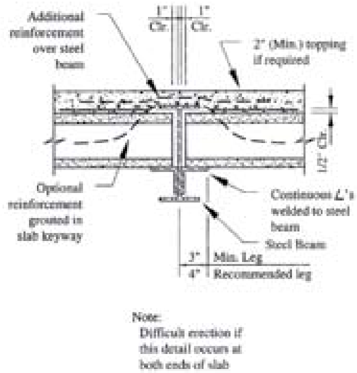

Fig. 5.5.7

Design Considerations:

- Internal diaphragm forces can be transferred only through topping
- Provides lateral brace for steel beam
- Consider potential torsion on beam during slab erection

Fabrication Considerations:

- Angle legs must be sufficient for minimum slab bearing
- Beam depth must be sufficient for clearance under top flange

Erection Considerations:

- Slab erection will be very difficult with this detail on both slab ends. Slabs must be slid into beams possibly through access holes in flanges
- Beams will not be braced during slab erection

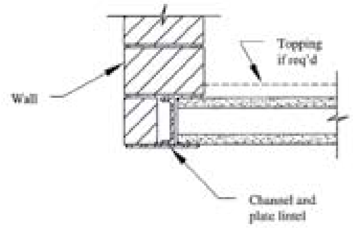

Fig. 5.5.8

Design Considerations:

- Torsion design must consider erection tolerance
- Lintel must be securely anchored at span ends
- Connection to slab may be required to brace lintel

Fabrication Considerations:

- Clean and simple

Erection Considerations:

- Watch for stability of lintel prior to slab erection

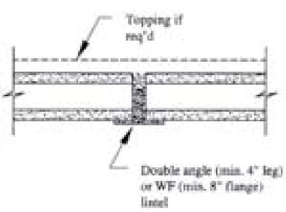

Fig. 5.5.9

Design Considerations:

- Butt joint must be grouted to brace vertical angle legs
- Lintel must be securely anchored at span ends

Fabrication Considerations:

- Clean and simple

Erection Considerations:

- Lintel must be securely anchored prior to setting slabs

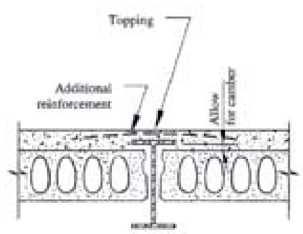

Fig. 5.5.10

Design Considerations:

- Clearance must be allowed for slab camber
- Beam will not be braced until topping is cast

Fabrication Considerations:

- Camber must be monitored to stay within clearance

Erection Considerations:

- Erection may be very difficult if slab support beams are also raised

Check with your Spancrete® hollowcore producer regarding minimum plank bearing requirements. In many regions the minimum is 3 inches while in others it is 2-1/2 inches.

These details are as shown in the "Manual for the Design of Hollowcore Slabs," Second Edition, published by PCI. Many of the details shown here perform similar functions.

Consult your local Spancrete producer regarding his standards and preferences.

Spancrete Manufacturers Association Providing Quality Worldwide

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South Bethlehem, New York

Oldcastle Precast, Inc.
Manchester, New York

Conewago Precast Building Systems
Div. of Conewago Building Systems, LLC.
Hanover, Pennsylvania

MIDWEST
Spancrete, Inc.
Green Bay, Wisconsin

Spancrete Industries, Inc.
Waukesha, Wisconsin

Hanson Structural Precast Midwest, Inc.
Maple Grove, Minnesota

Spancrete of Illinois, Inc.
Arlington Heights, Illinois

WEST
Hanson Structural Precast Pacific, Inc.
Irwindale, California

KIE-CON
Div. of Kiewitt Pacific Co.
Antioch, California

Owell Precast
Sandy, Utah

SOUTHWEST
Gate Concrete Products Co.
Pearland, Texas

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