Connection Design Assistance Manual

Architectural Precast Concrete

Glass Fiber Reinforced Concrete

Cast Stone

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PART 1

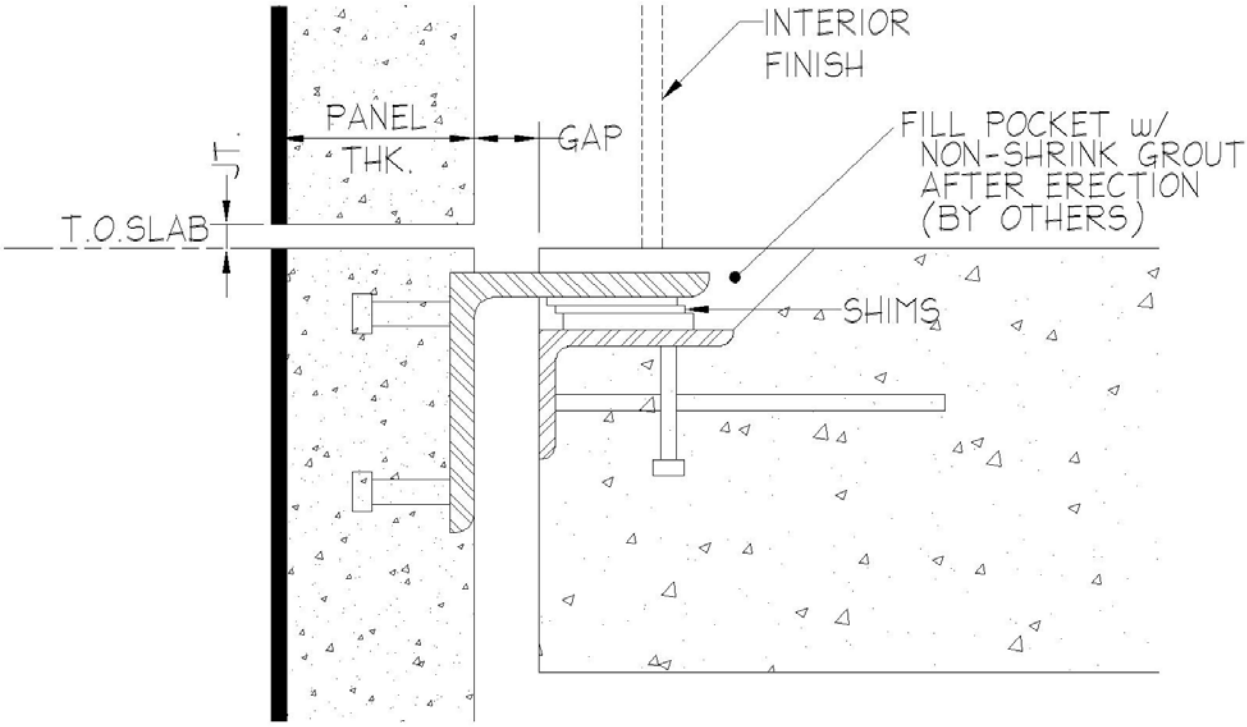
Architectural Precast Concrete

PART 1 - ARCHITECTUAL PRECAST CONCRETE

1.1 CONCRETE STRUCTURE

A. Type 1 - Load Bearing to Floor Slab

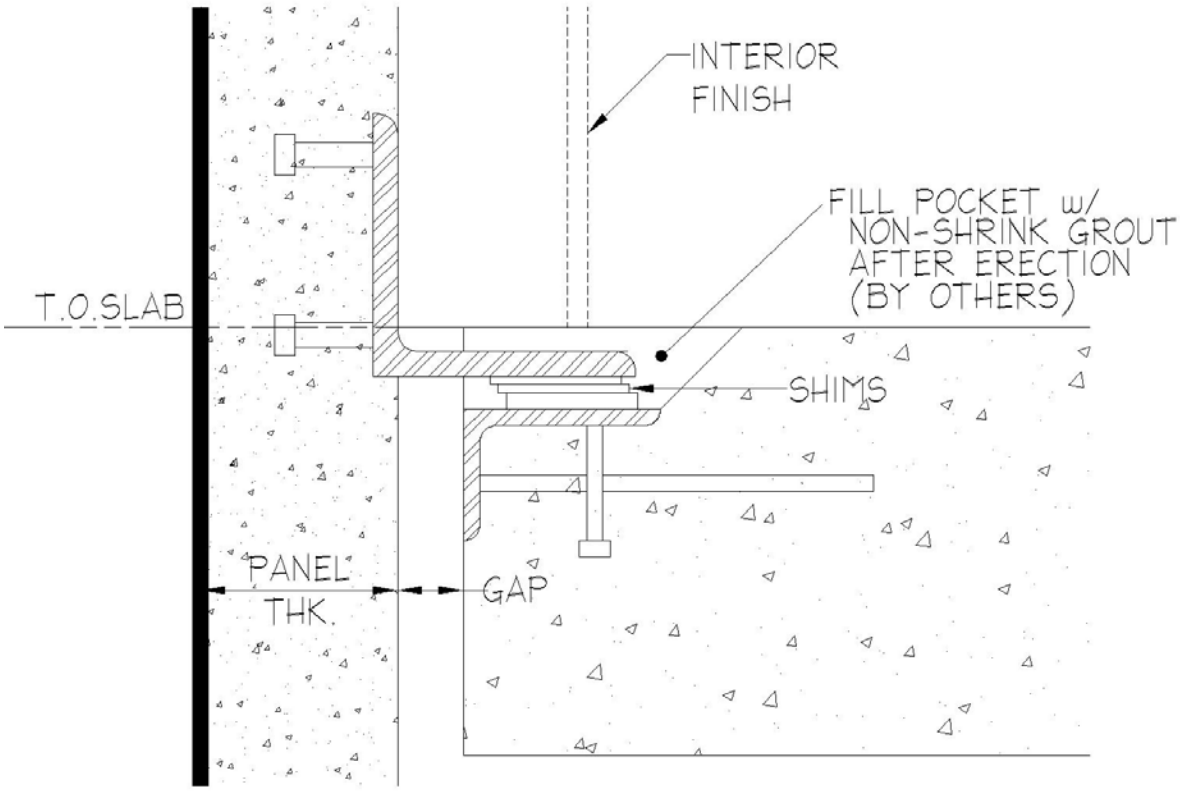
- Connection to concrete slab with precast panel terminating at top of slab.



Each illustrative connection is shown for concept only.
All connections must be engineered for project specific lateral and loading requirements.
All connections must be approved by a licenced engineerer.

B. Type 2 - Load Bearing to Floor Slab

- Top of panel terminates above floor line.
- Load bearing to concrete floor slab with recessed pocket.
- Embed recessed so not to interfere with interior finishes.



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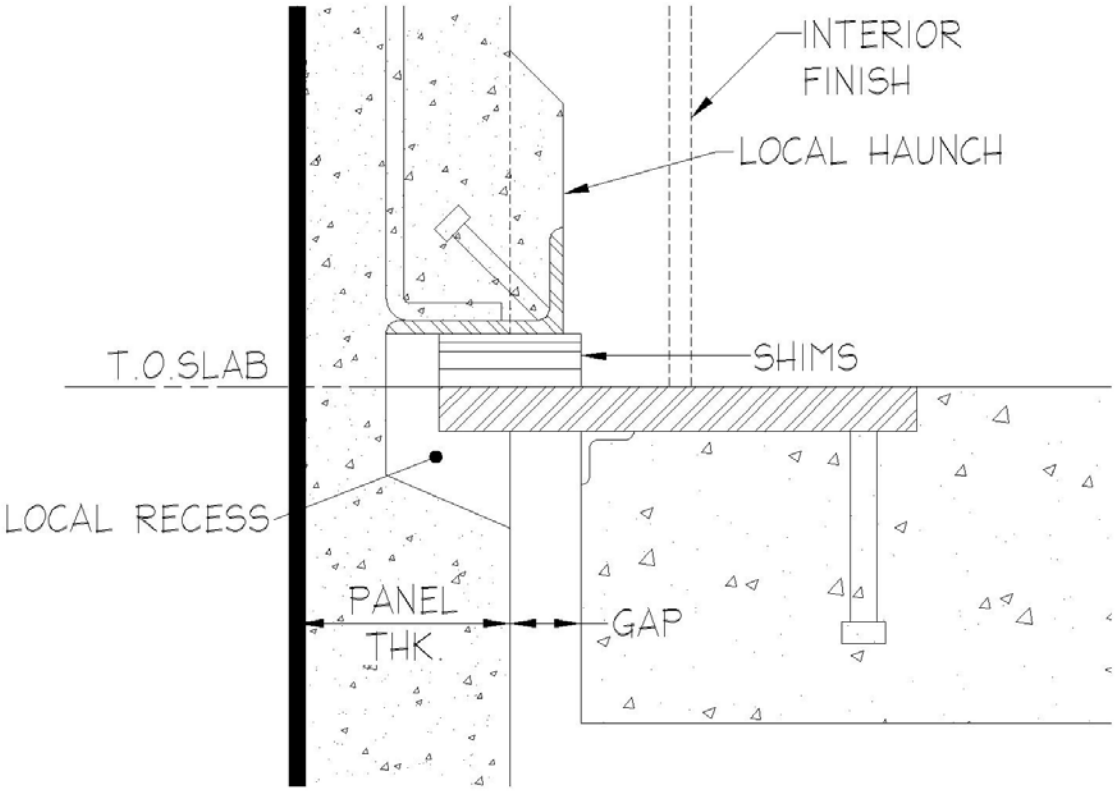
C. Type 3 - Load Bearing to Floor Slab

- Projecting bearing plate flush with top of slab.
- Ideal for minimum distance from edge of slab to interior finishes.



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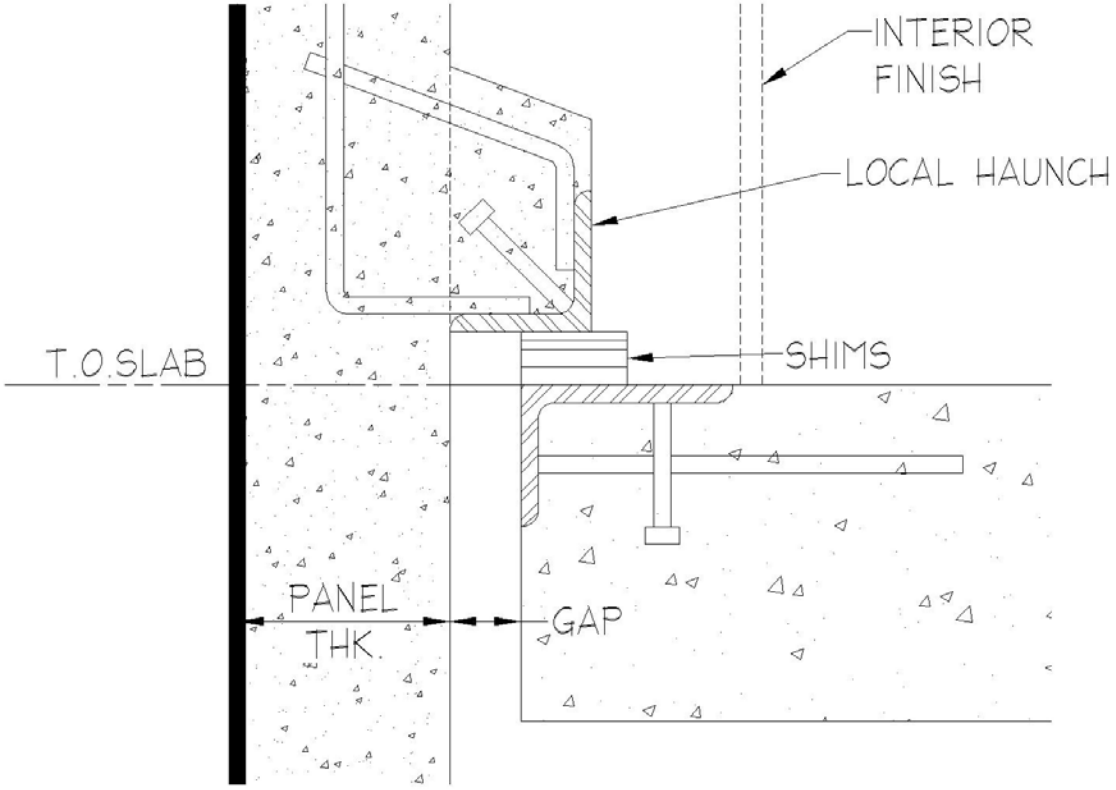
D. Type 4 - Load Bearing to Floor Slab

- Typical distance from edge of slab to interior finish.



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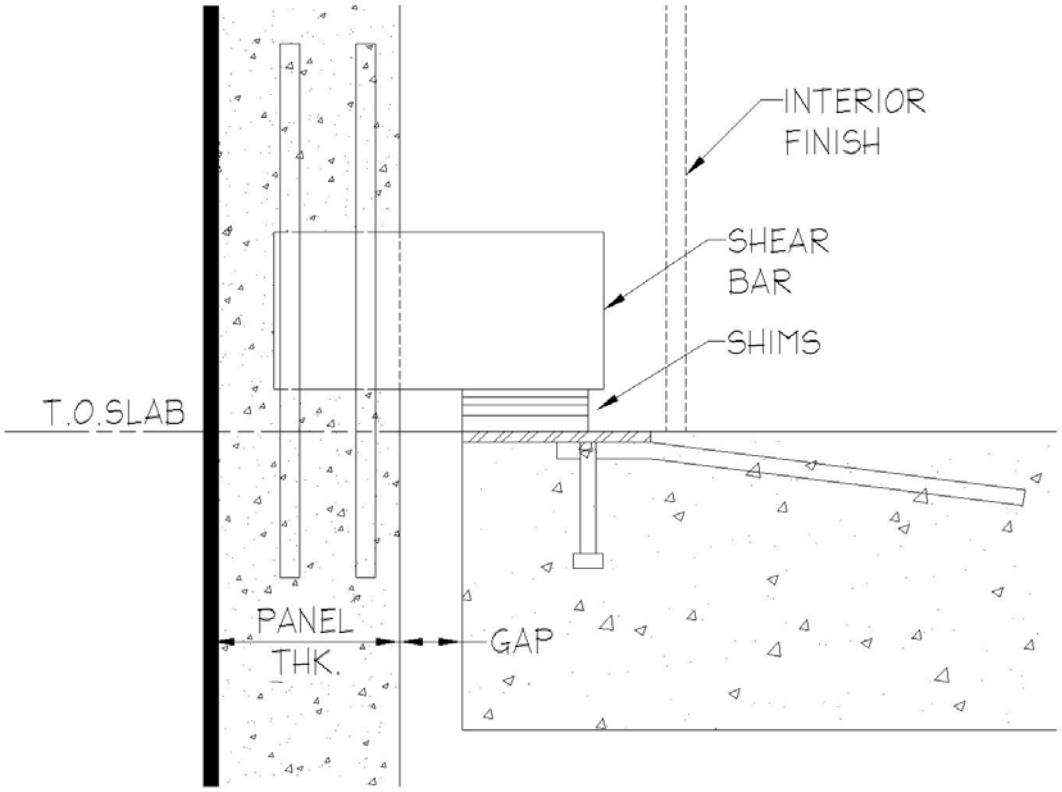
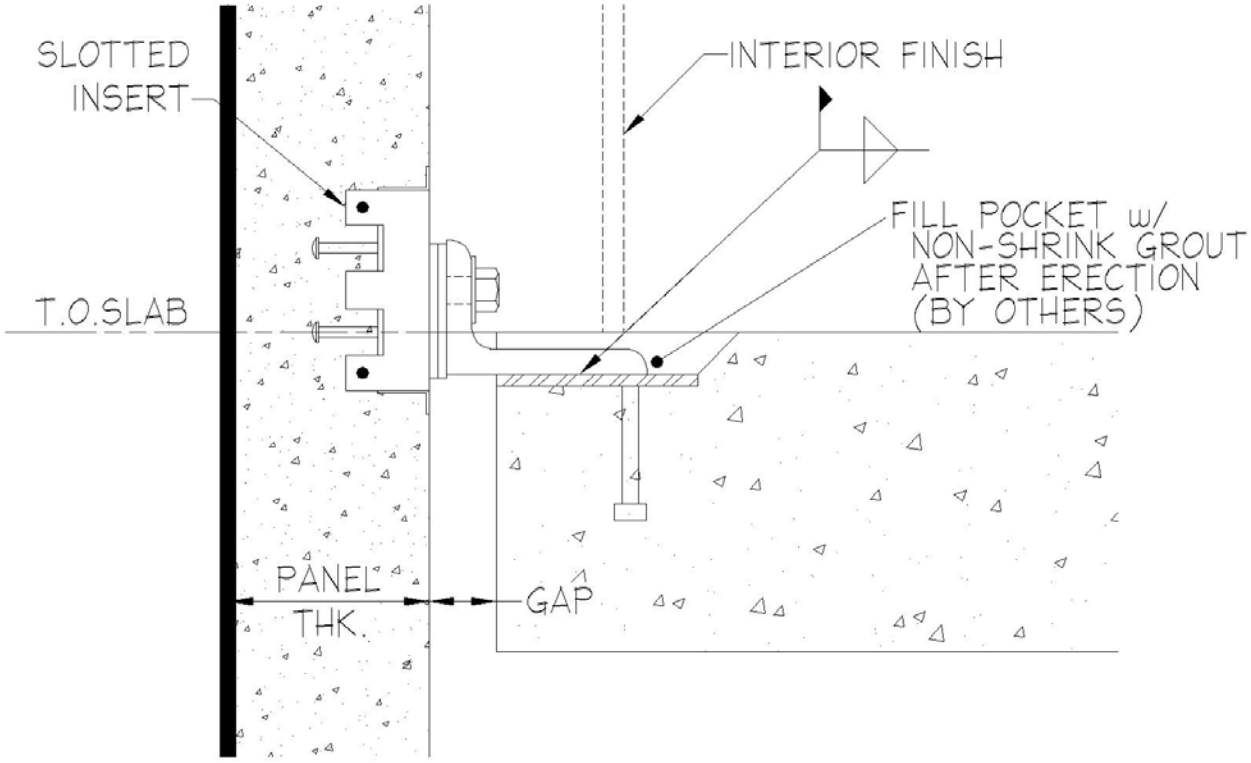
E. Type 5 - Load Bearing to Floor Slab

- Similar condition to concrete haunch (connection D).
- This connection may be more cost effective for the precast manufacturer.



F. Lateral Tieback to Top of Slab

- Slotted insert (vertical) permits deflection of slab.
- Fixed insert in panel may be used with slotted angle in lieu of slotted insert.



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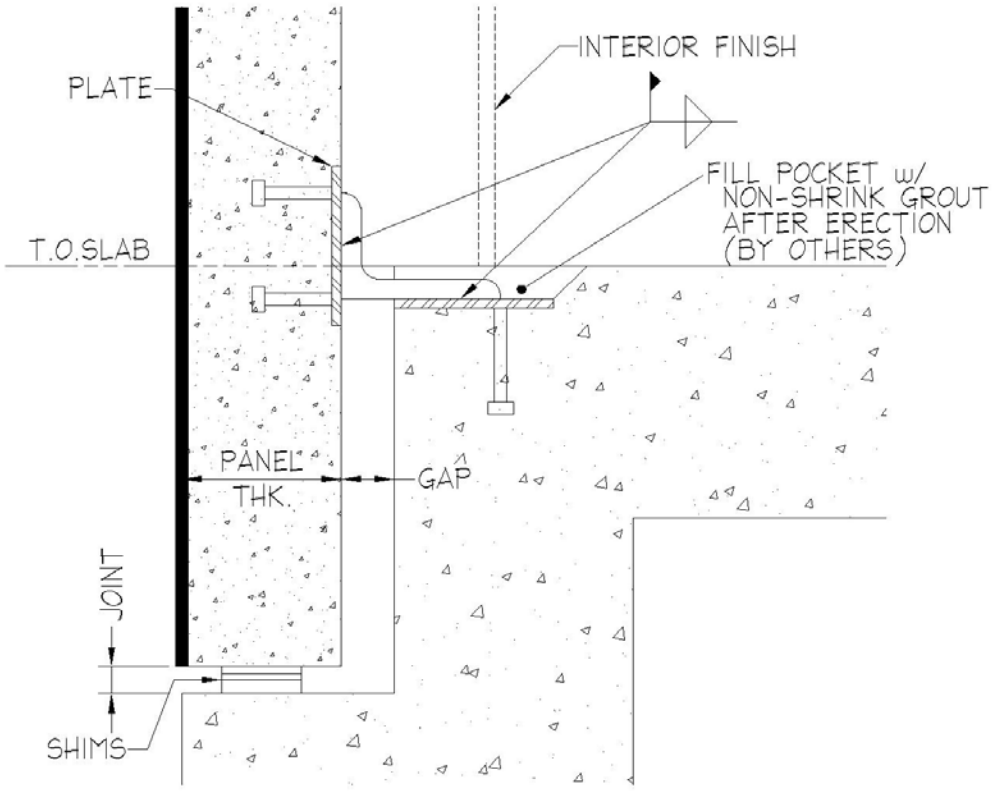
G. Load to Foundation or Curb

- With lateral tieback to structure.
- Tieback may be welded solid. Foundation will not deflect.
- Waterproofing and grout, if required, by others.



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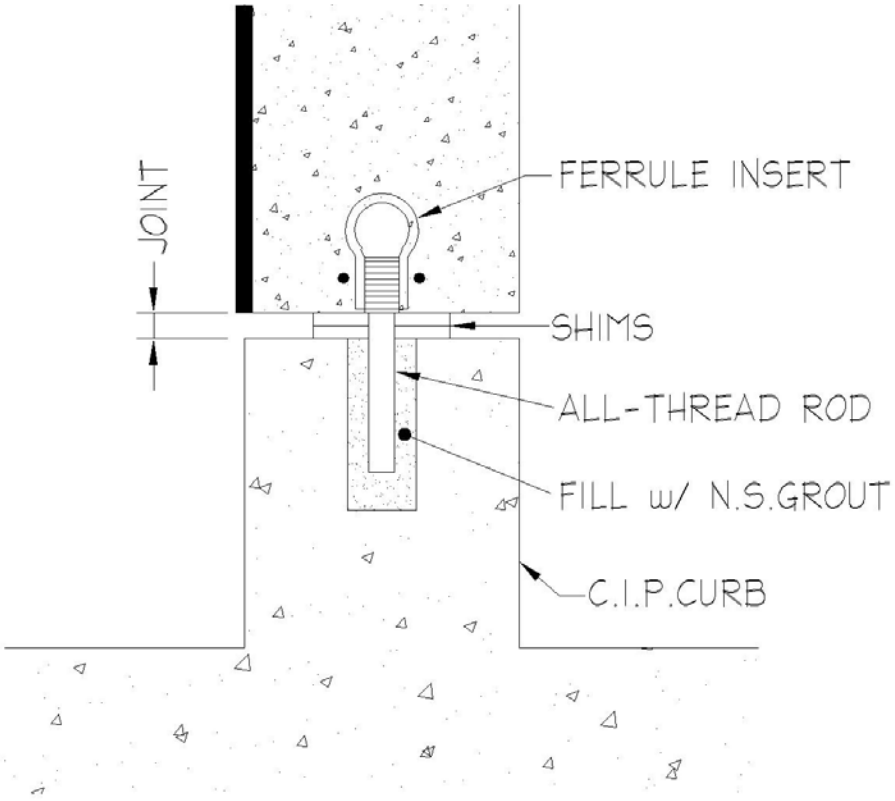
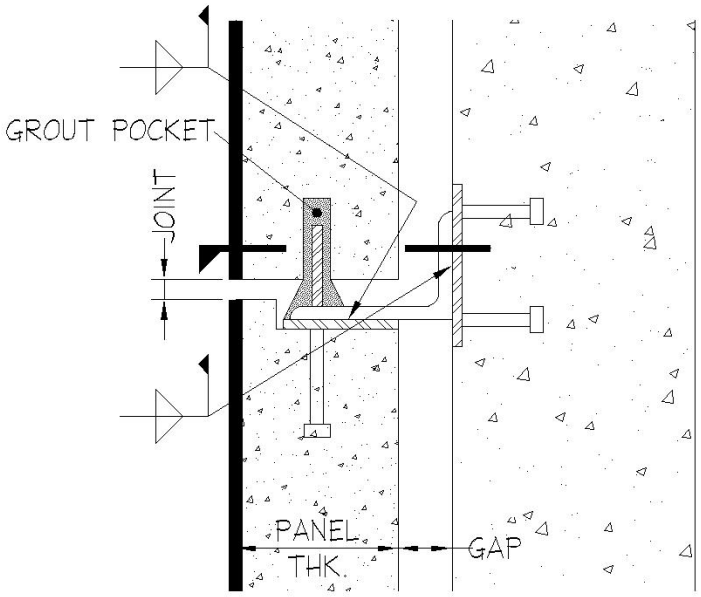
H. Load Bearing to Cast-in-Place Curb

- Shims shown beyond.

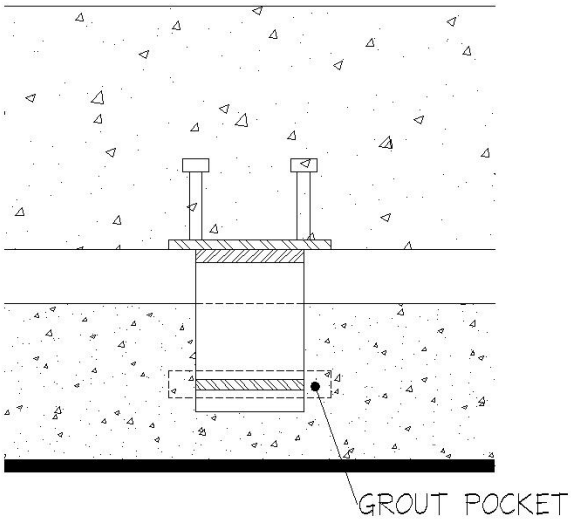


I. Load and Tieback to Shear Wall

- Access from precast panel face.
- Grout is damned in place to prevent leakage.
- Shear wall will not deflect, therefore, slotted connection not required.



SECTION



PLAN

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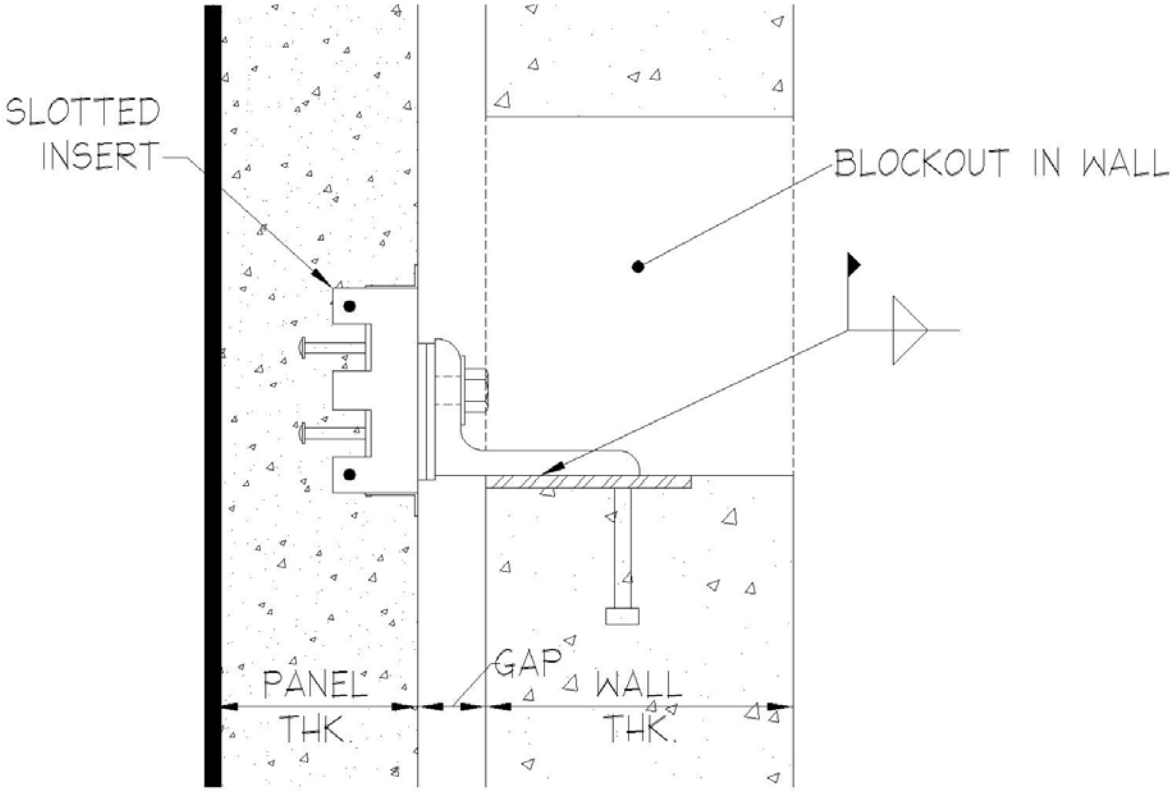
J. Lateral Tieback to Shear Wall

- Local blockout in shear wall for access from inside structure.
- Filling local blockout by others.
- Insert does not need to be slotted. Shear wall will not deflect.



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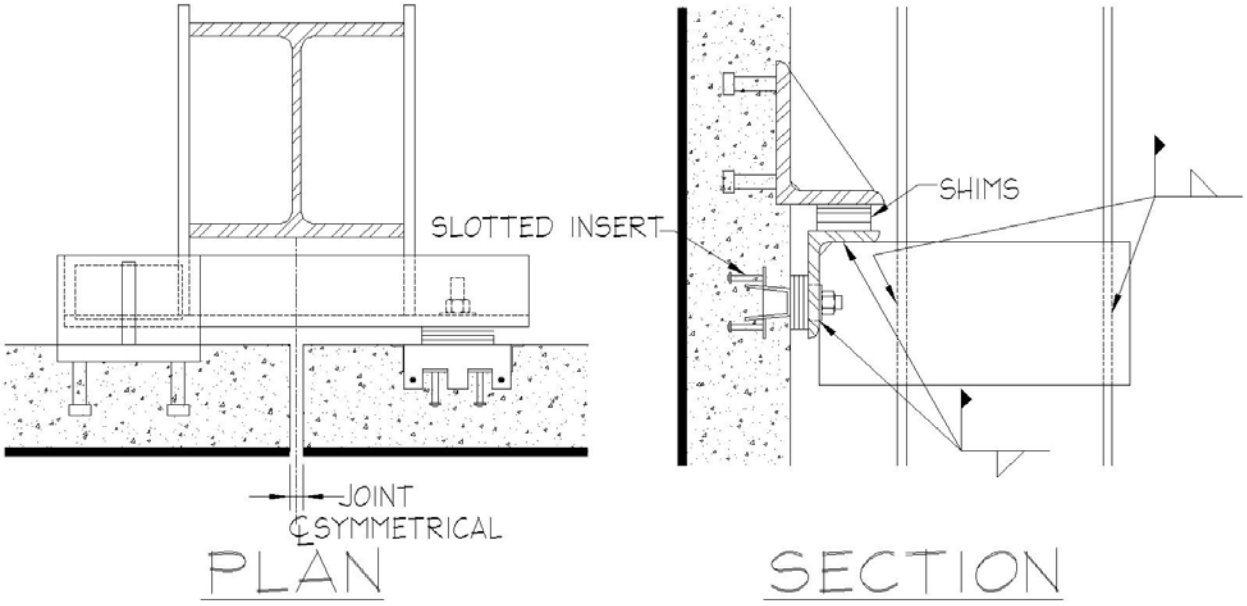
1.2 STEEL STRUCTURE

A. Load to Column

- The precast erector may weld the plates to the column or they may be welded in the shop by the steel fabricator.
- Note that the connection is symmetrical about the centerline of column. Each load-bearing angle receives a tie back connection.
- Angle with slots may be used in lieu of slotted inserts



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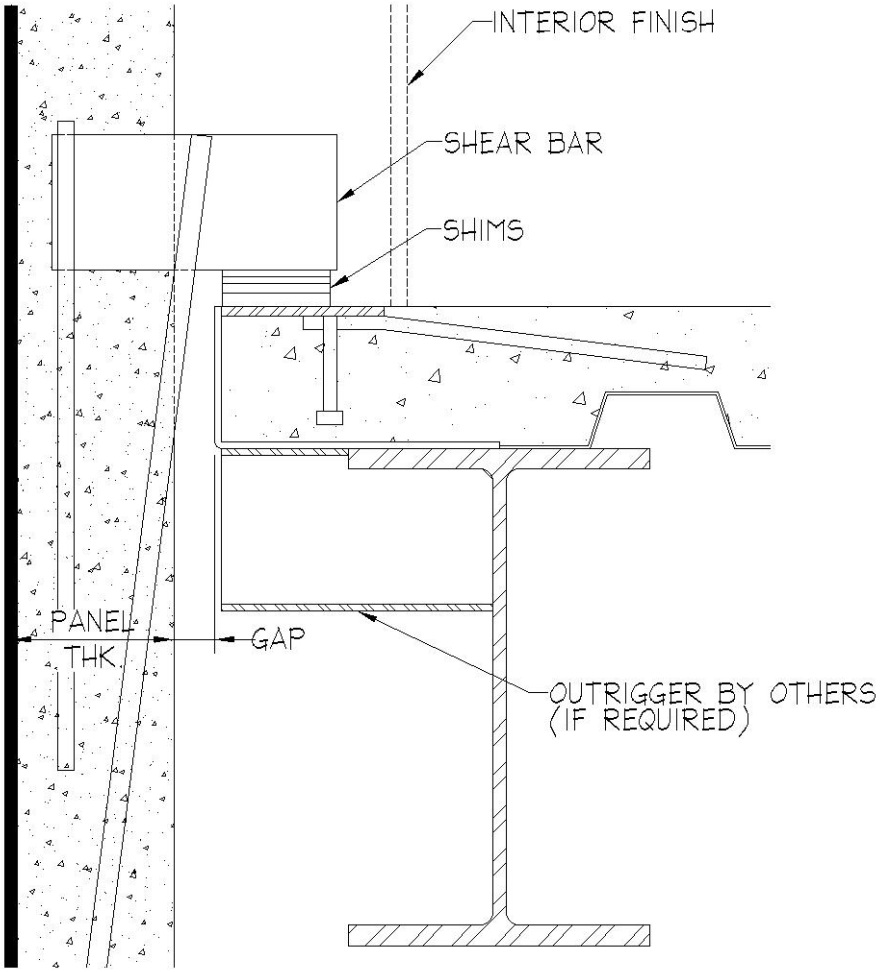
B. Load to Perimeter Beam

- Load to top of concrete deck.
- See connection 1.2, C for lateral tieback example. Slotted insert would run horizontal.



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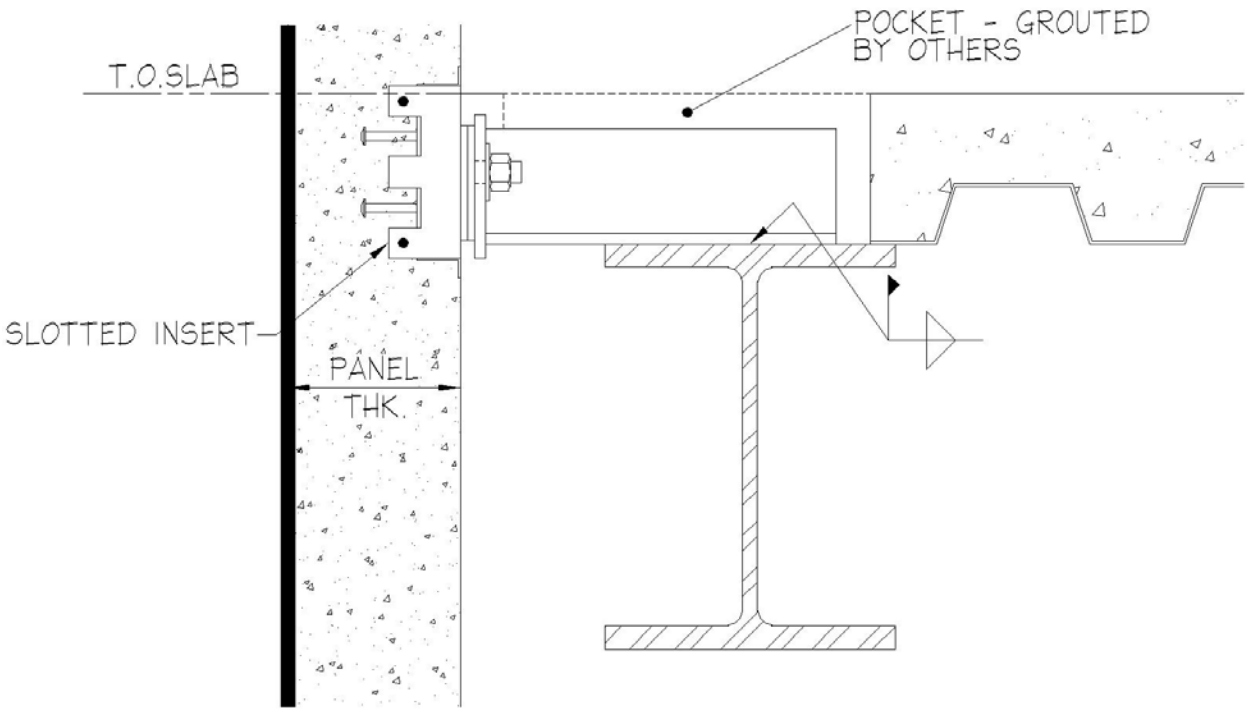
C. Tieback to Top of Beam



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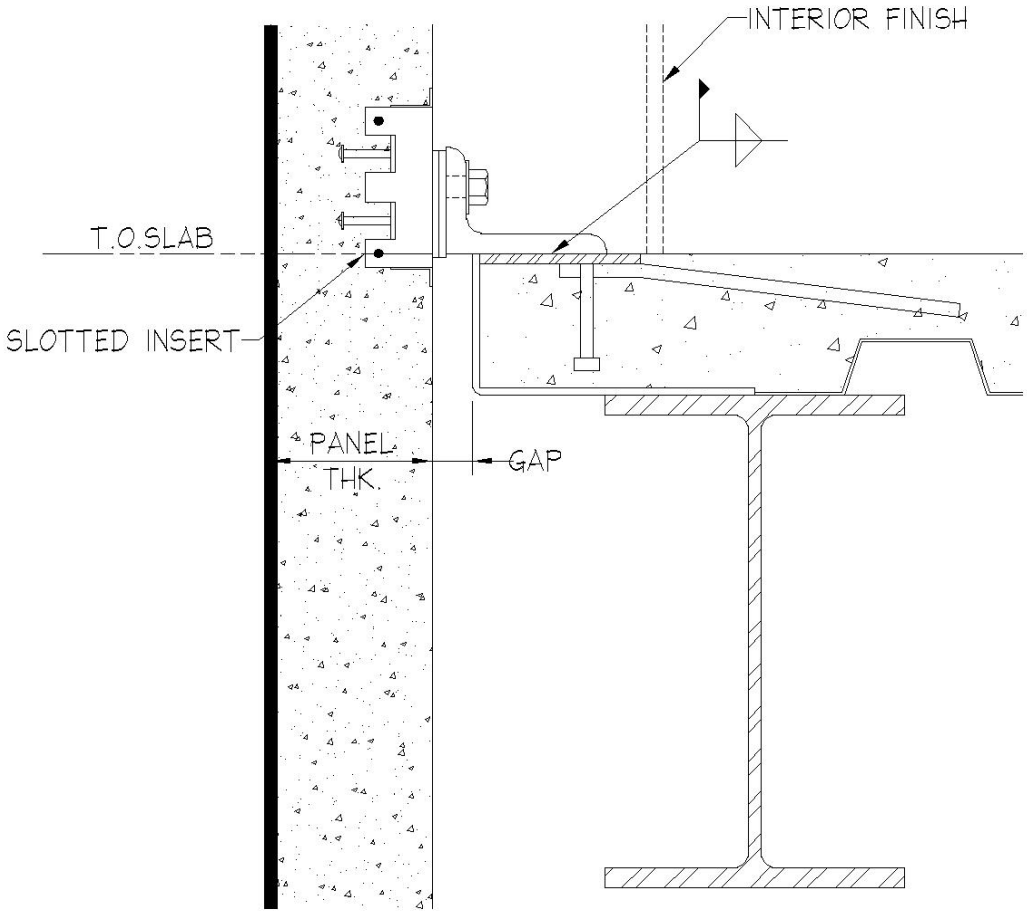
D. Tie Back Top of Concrete Deck

- Used between bearing points.



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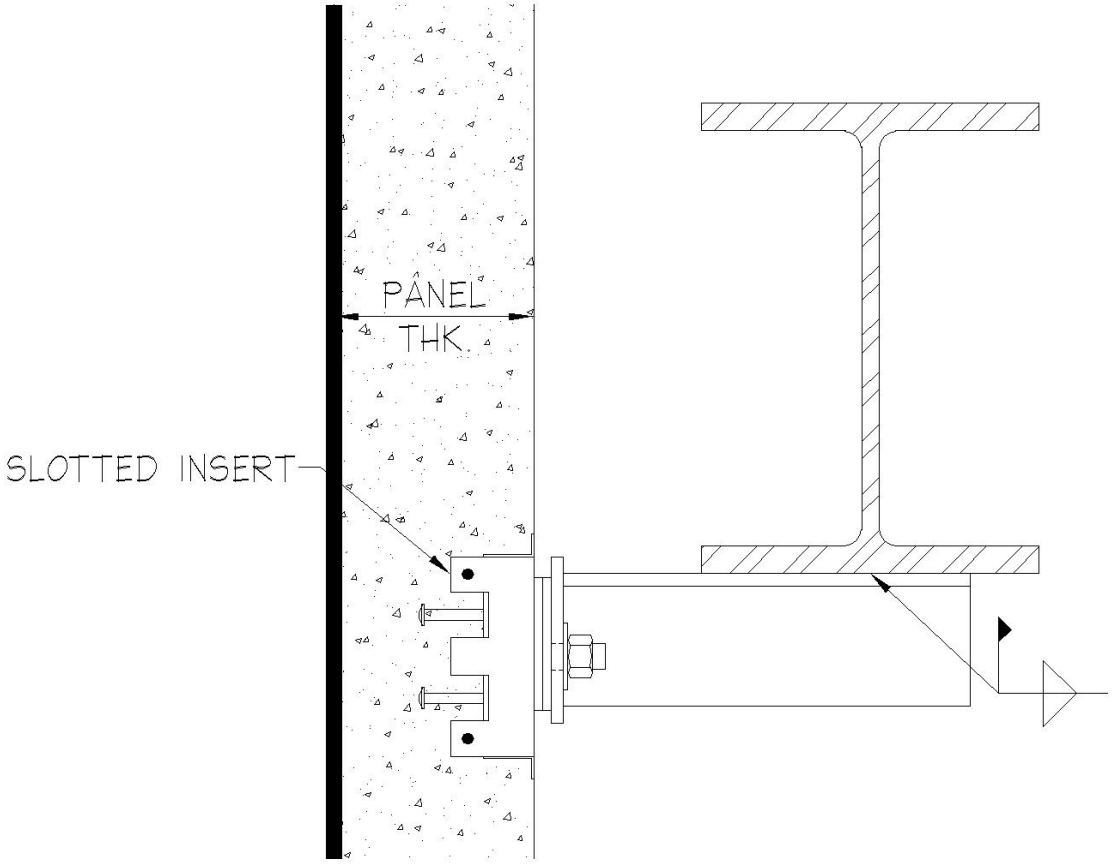
E. Tie Back to Underside of Beam

- Bracing of beam may be required to prevent twisting due to lateral loads.



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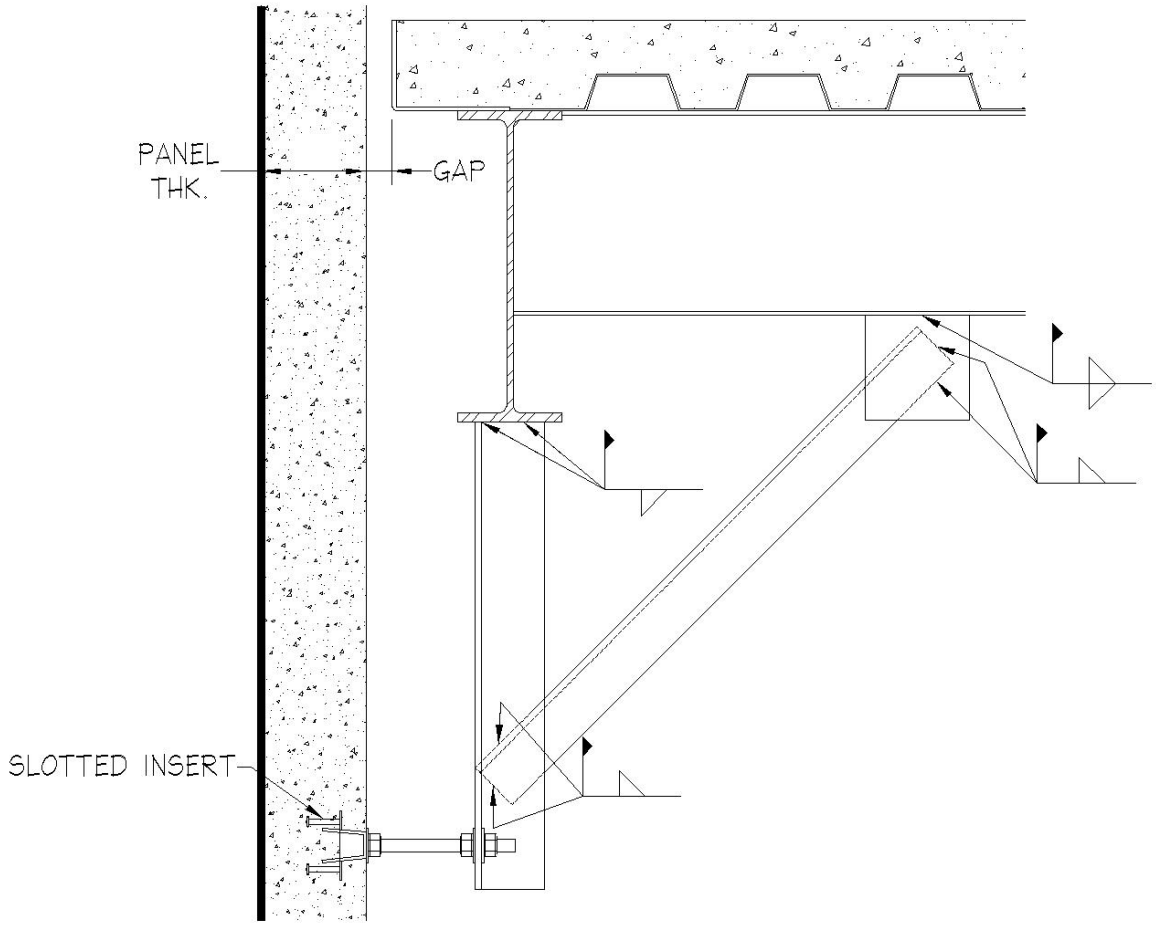
F. Lateral Connection Below Beam

- Connection falls below structure.
- May be used when more panel hangs below top of slab and lateral bracing is required.
- Field installed.



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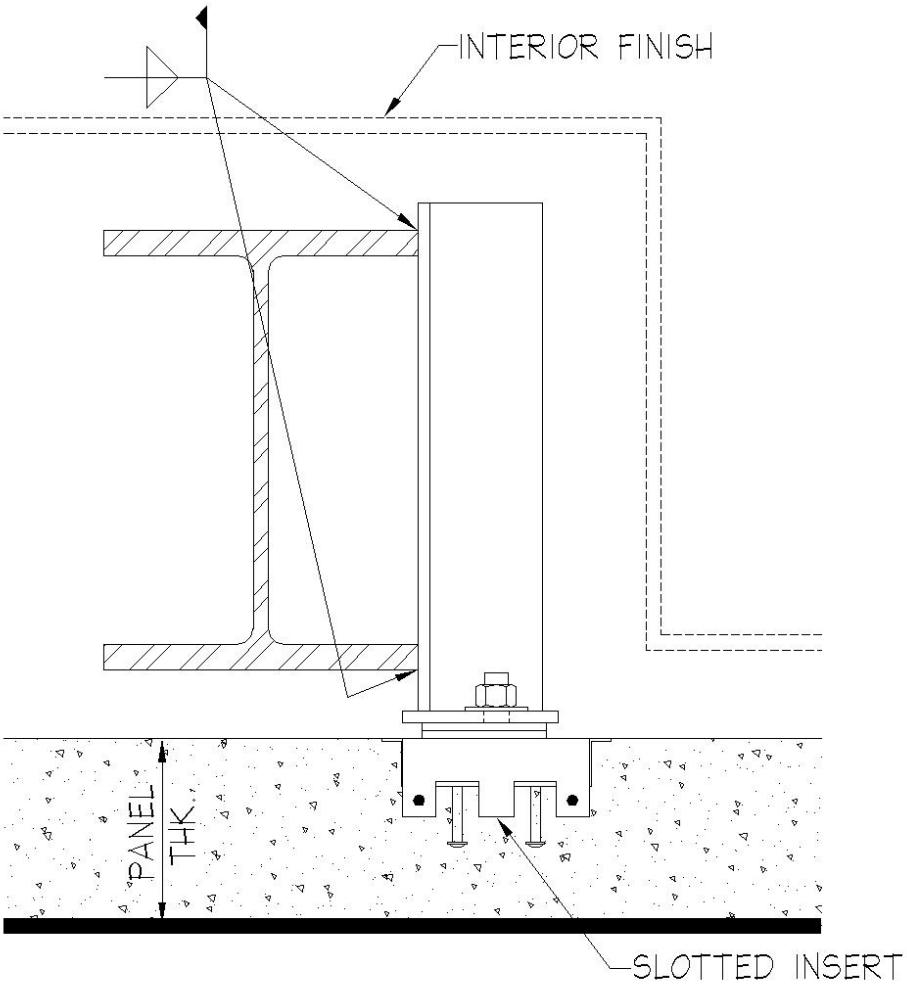
G. Tie back Connection to Column

- Angle shown. Plates or channels may be used when interior finish to column is reduced.



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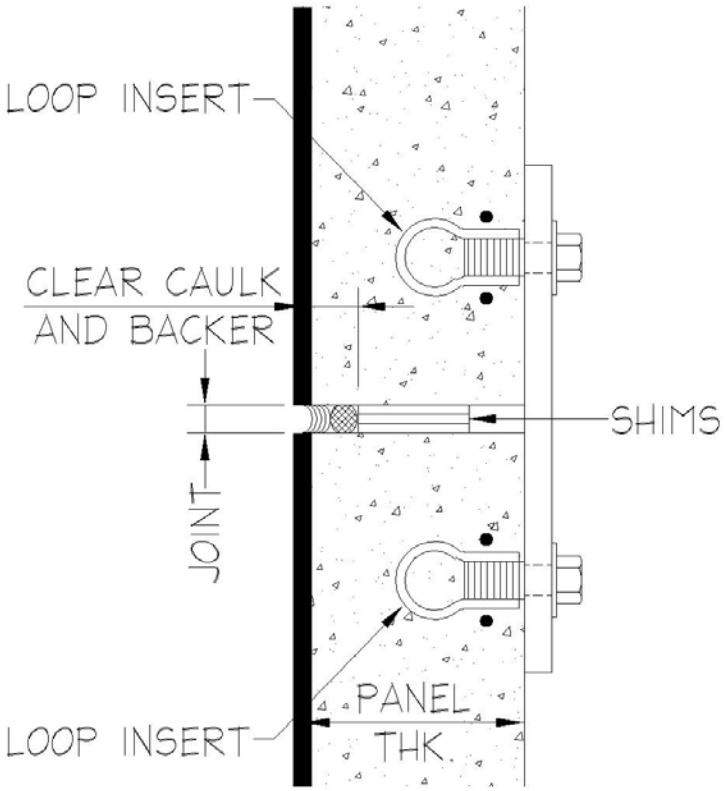
1.3 MISCELLANEOUS CONNECTIONS

A. Panel to Panel Stacked Load Bearing

- Vertical load is transferred to panel below via shims.



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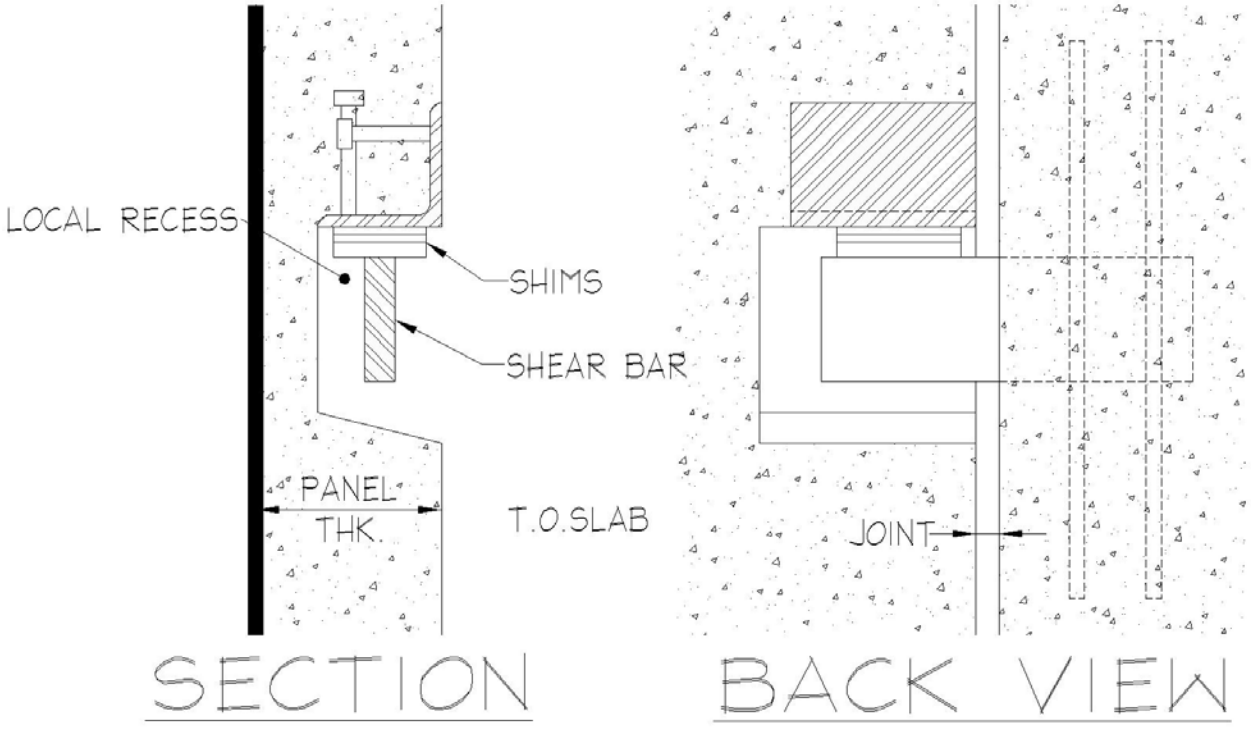
B. Panel to Panel Load Bearing

- Column on each side of opening carry load of spandrel.
- Ideal when bearing to structure beyond structural column location is required.
- Precast spandrel transfers vertical load to column.



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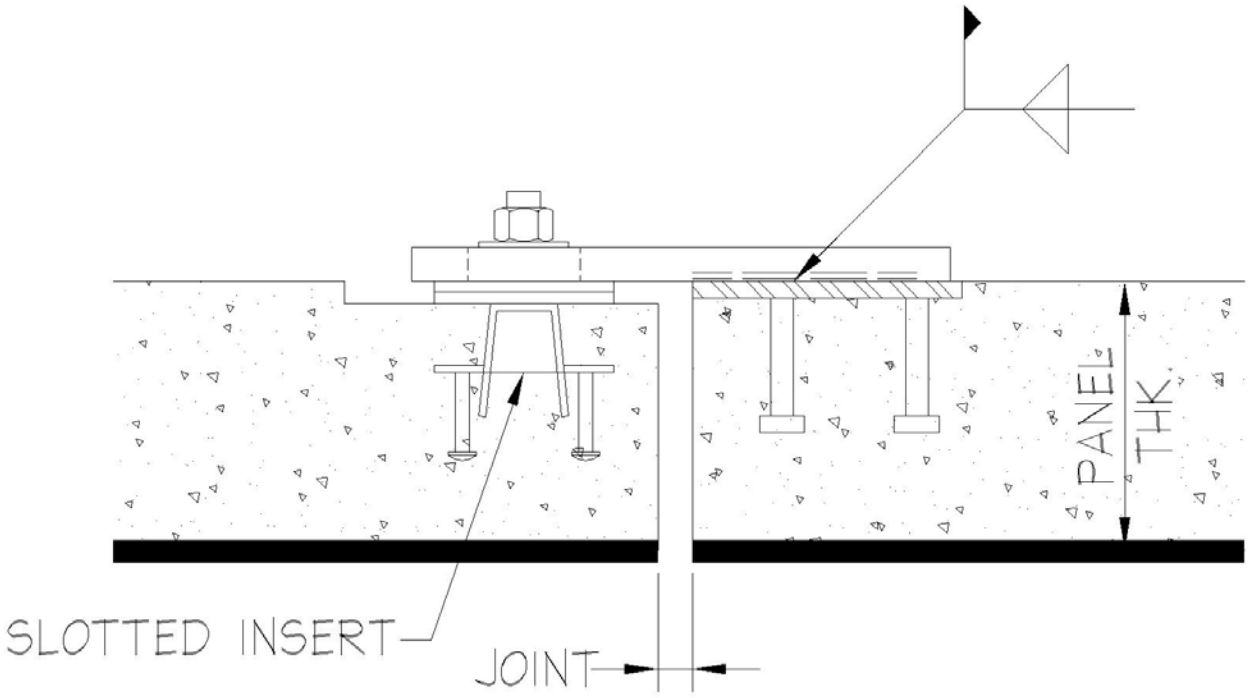
C. Panel to Panel – Non Load Bearing

- Access from backside.
- Slotted plates may also be used.



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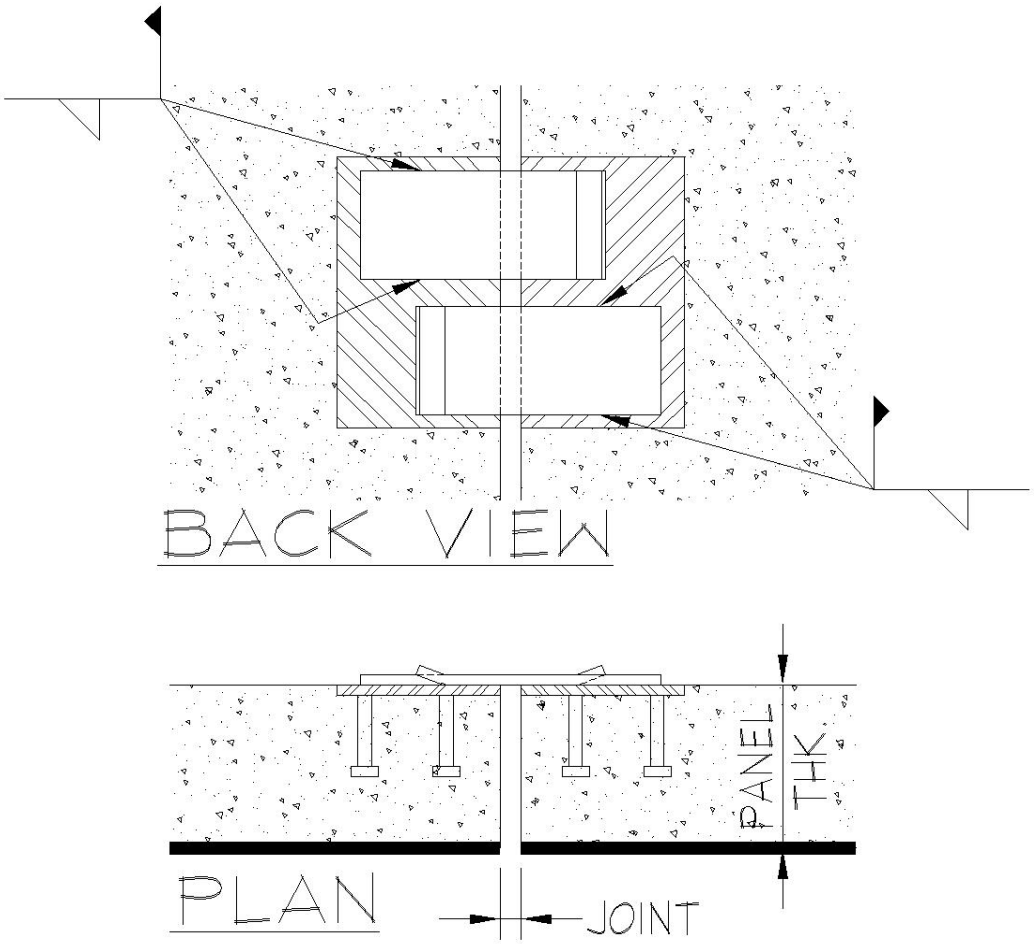
D. Panel to Panel – Non Load Bearing

- Slip connection for panel-to-panel alignment only.
- Ideal for above roofline when exposed to view.



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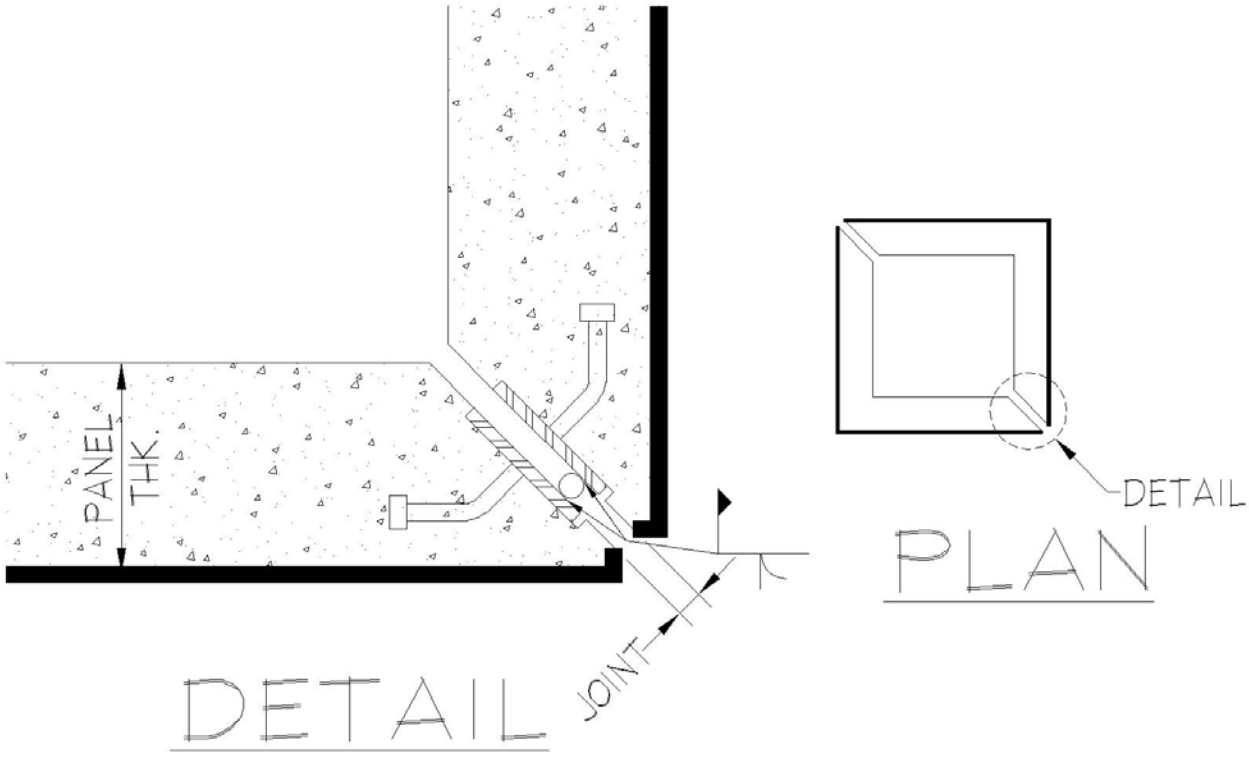
E. Type 1 - Column Enclosures Connection

- Access from front face.
- Steel rod is used to bridge plates for welding.



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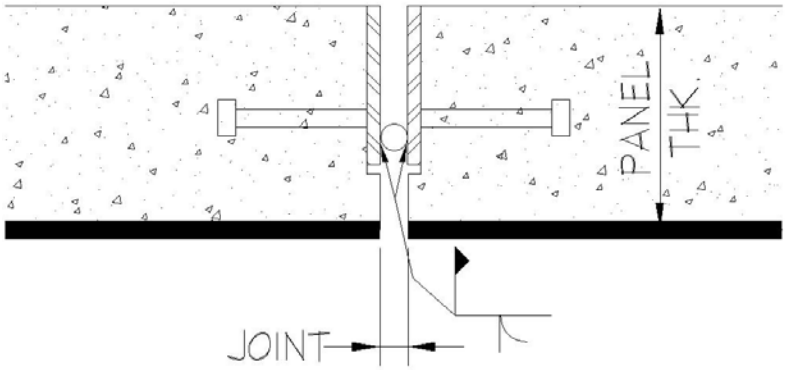
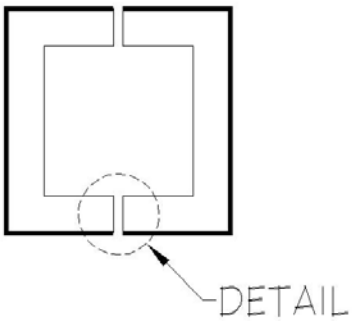
F. Type 2 - Column Enclosures Connection

- Access from front face.
- Steel rod is used to bridge plates for welding.



DETAIL



PLAN

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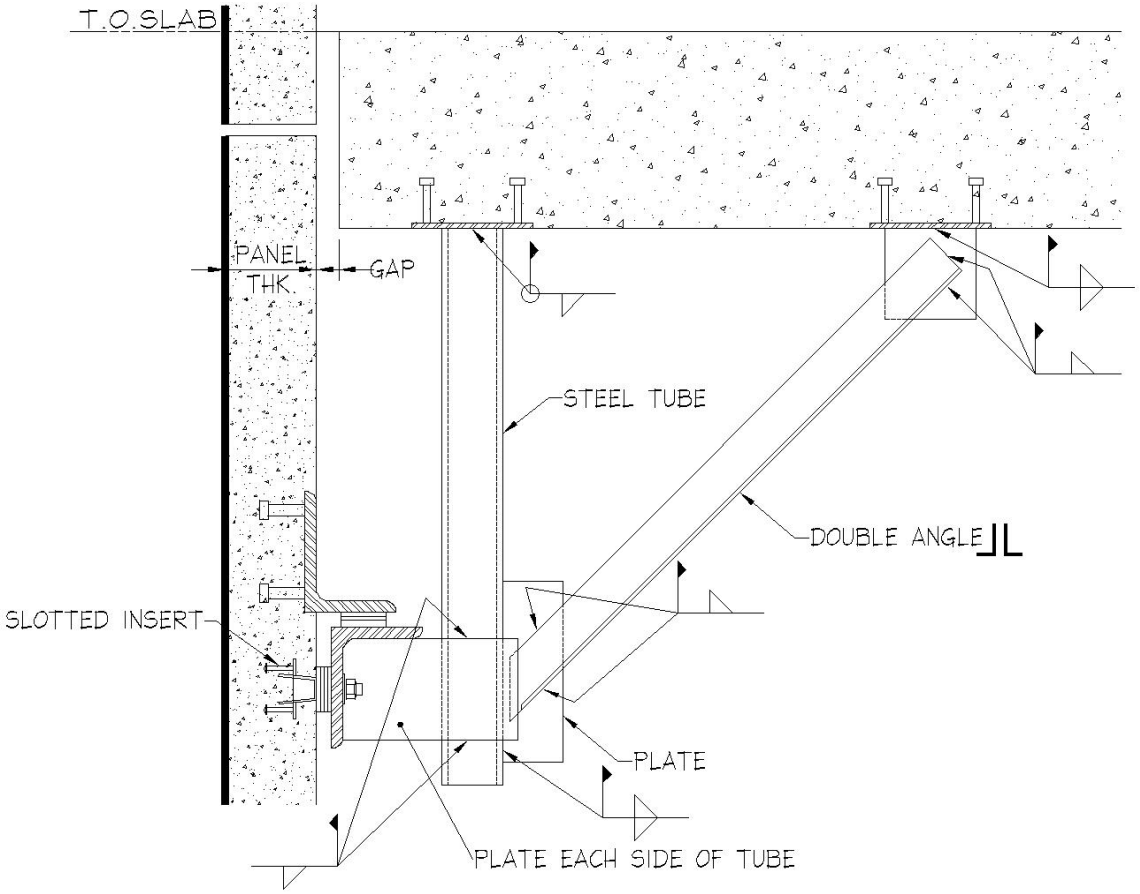
G. Load Bearing Below Structure

- Used primarily with excessive floor-to-floor heights.
- Concrete structure shown. Steel structure similar.



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PART 2

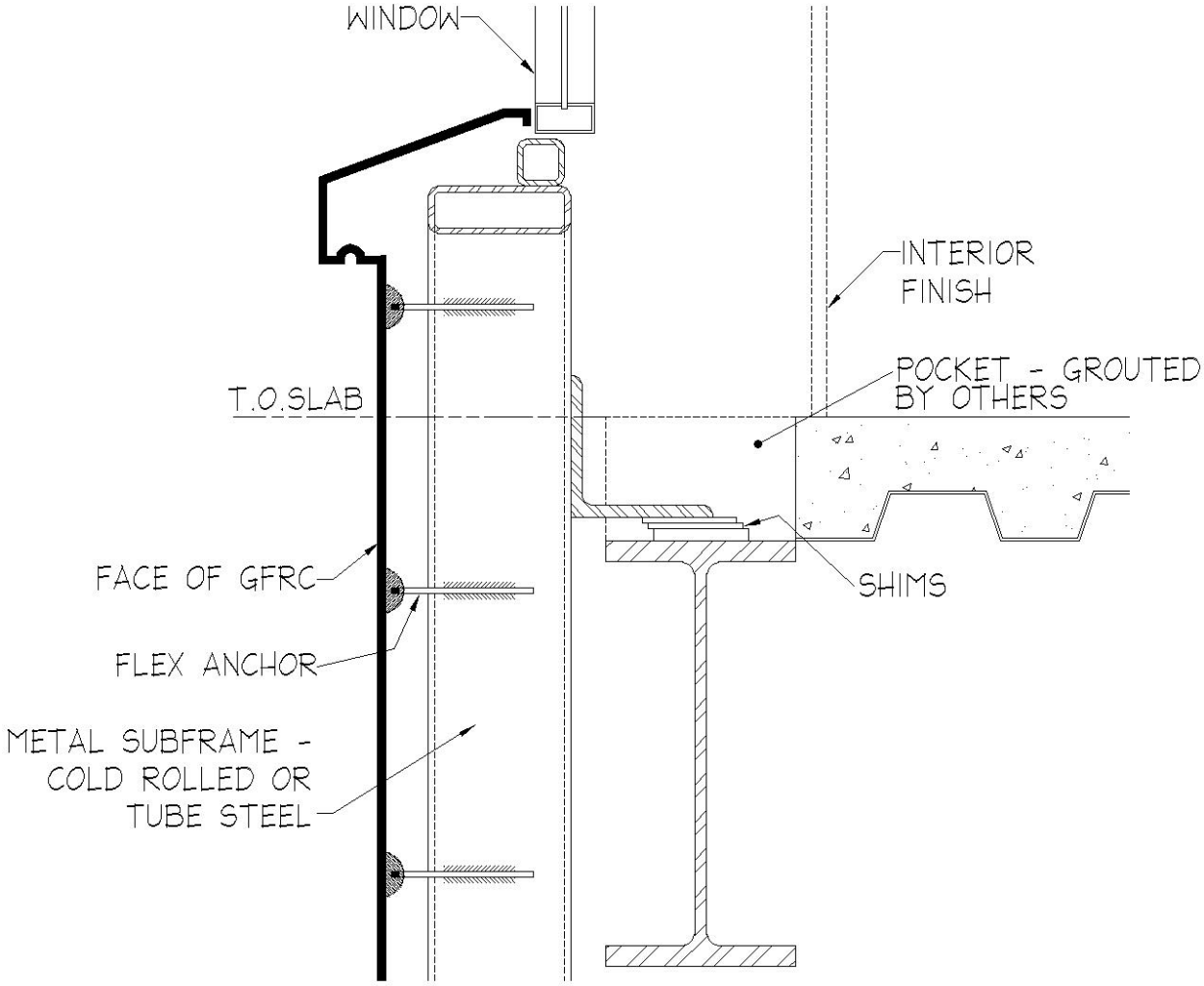
Glass Fiber Reinforced Concrete

PART 2 - GLASS FIBER REINFORCED CONCRETE (GFRC)

2.1 CONNECTIONS

A. Load to Top of Perimeter Beam

- Large window unit panelization.
- Bearing angle is pre-attached to subframe.
- Steel frame picks up window dead loads.



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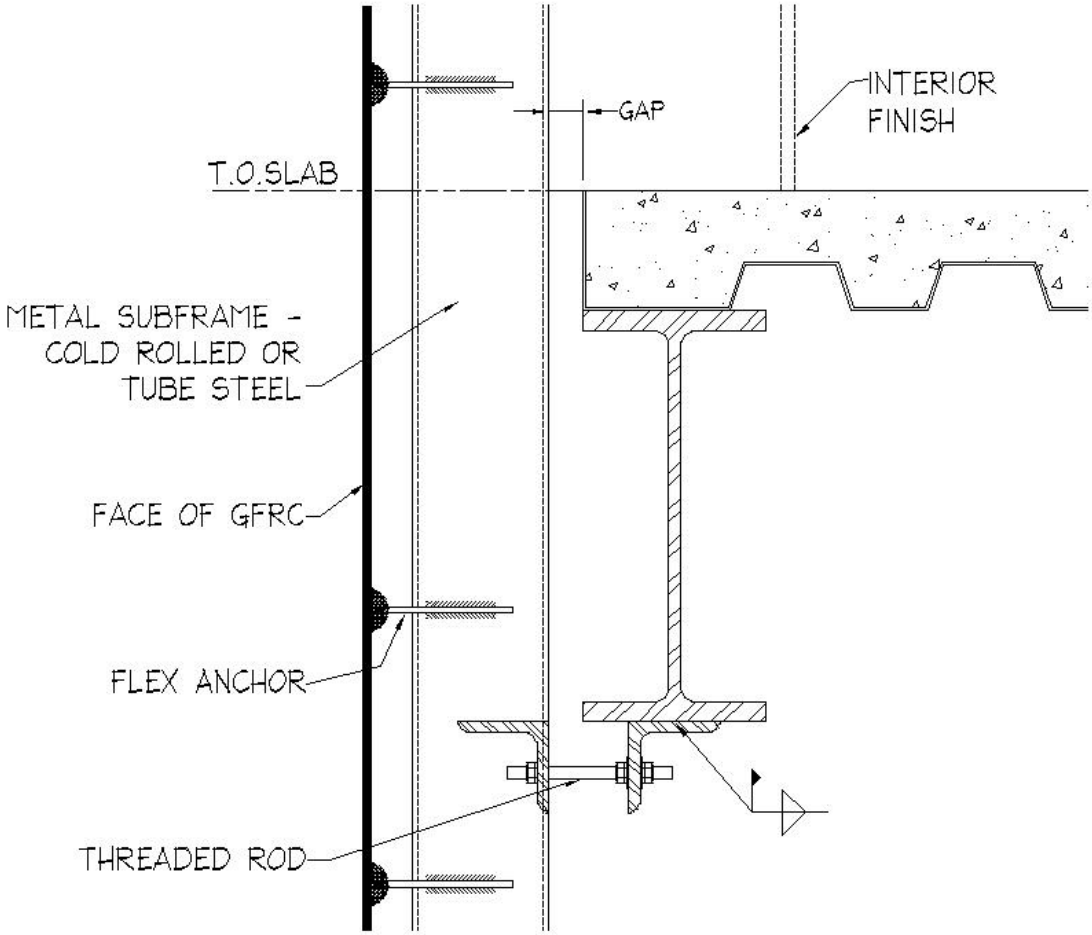
B. Tie Back to Underside of Steel Beam

- Large panel configuration.
- Clips to metal subframe are pre-attached.



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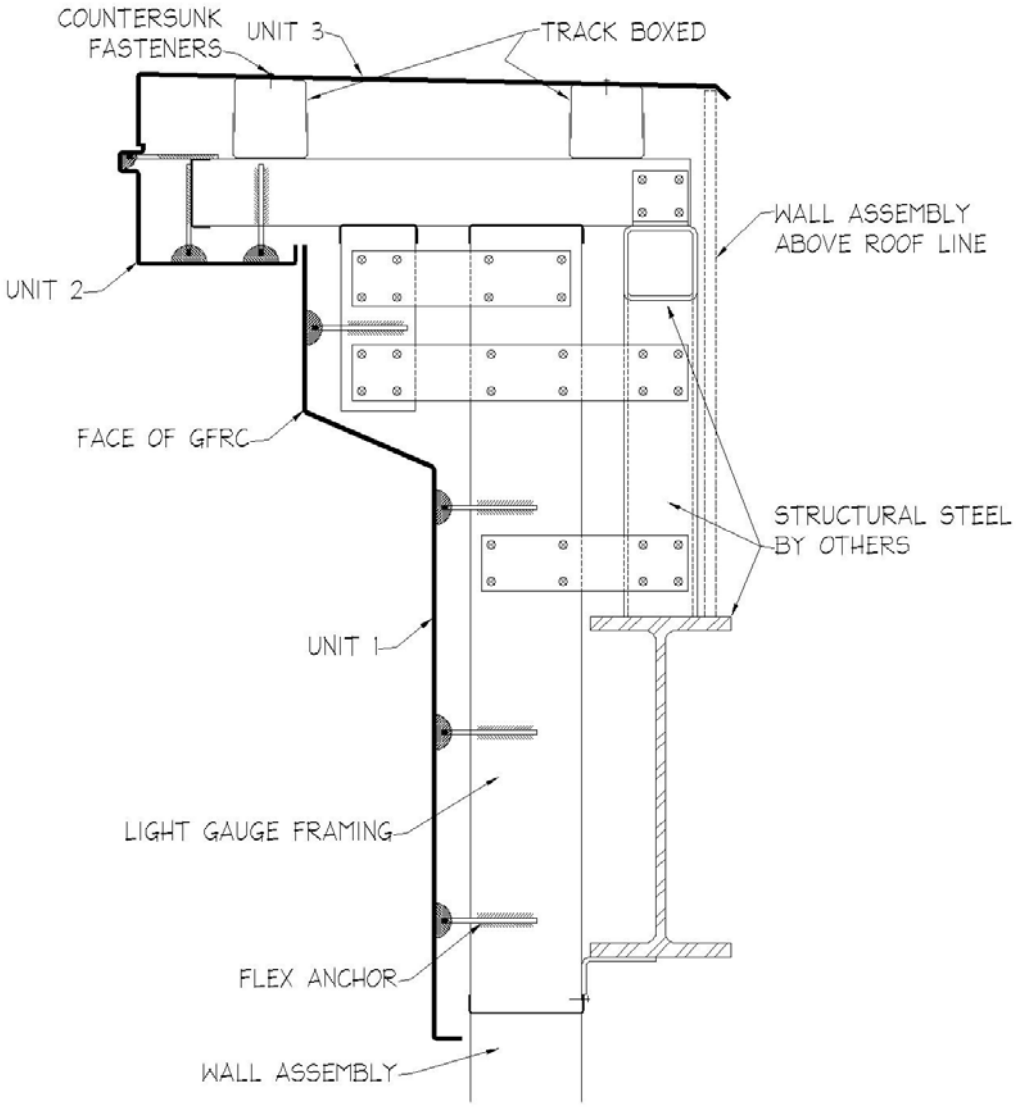
C. Roof Cornice

- Several units form cornice.
- Light gauge framing.
- The erector caulks field-installed fasteners.



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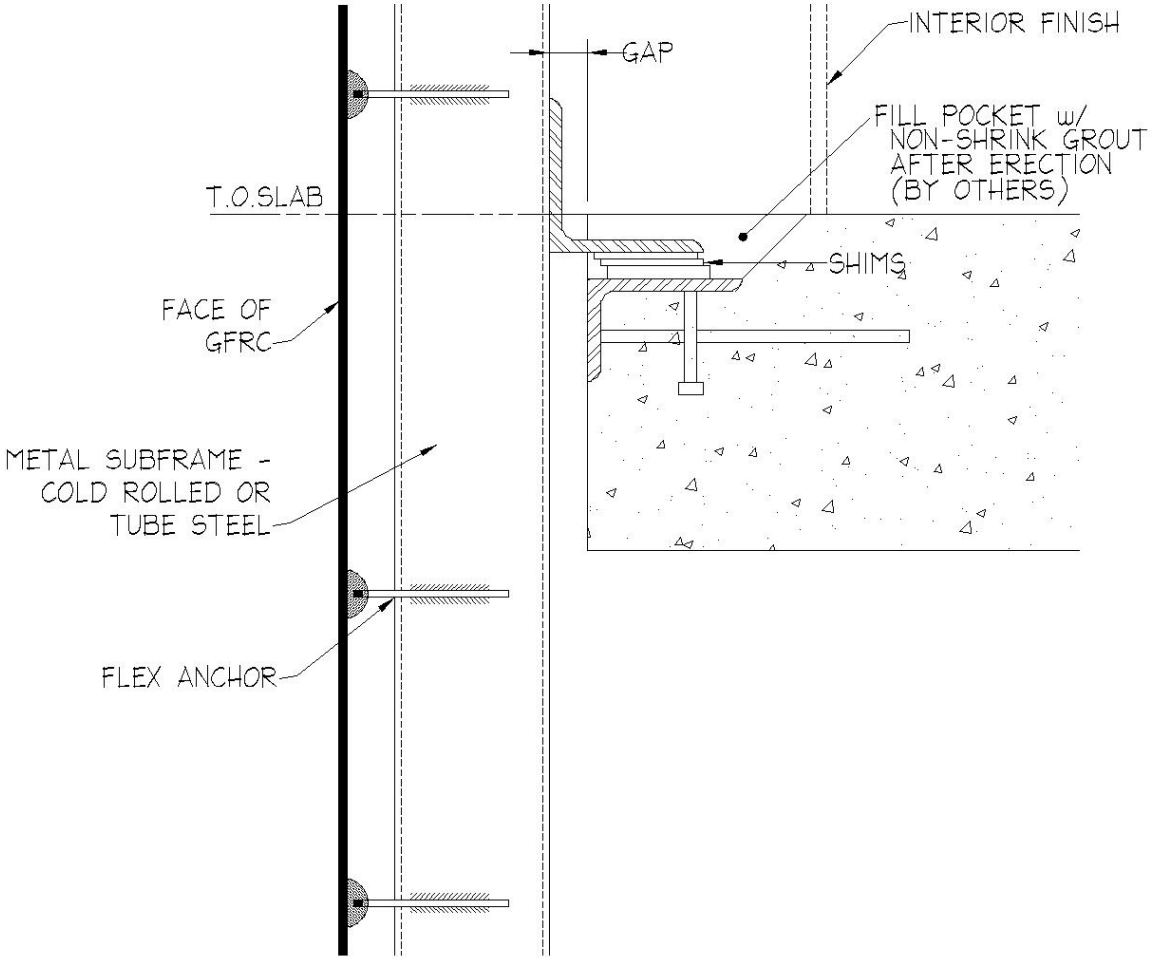
D. Load Bearing to Concrete Floor Slab

- Bearing angle in recessed pocket.
- Angle shop applied to subframe.



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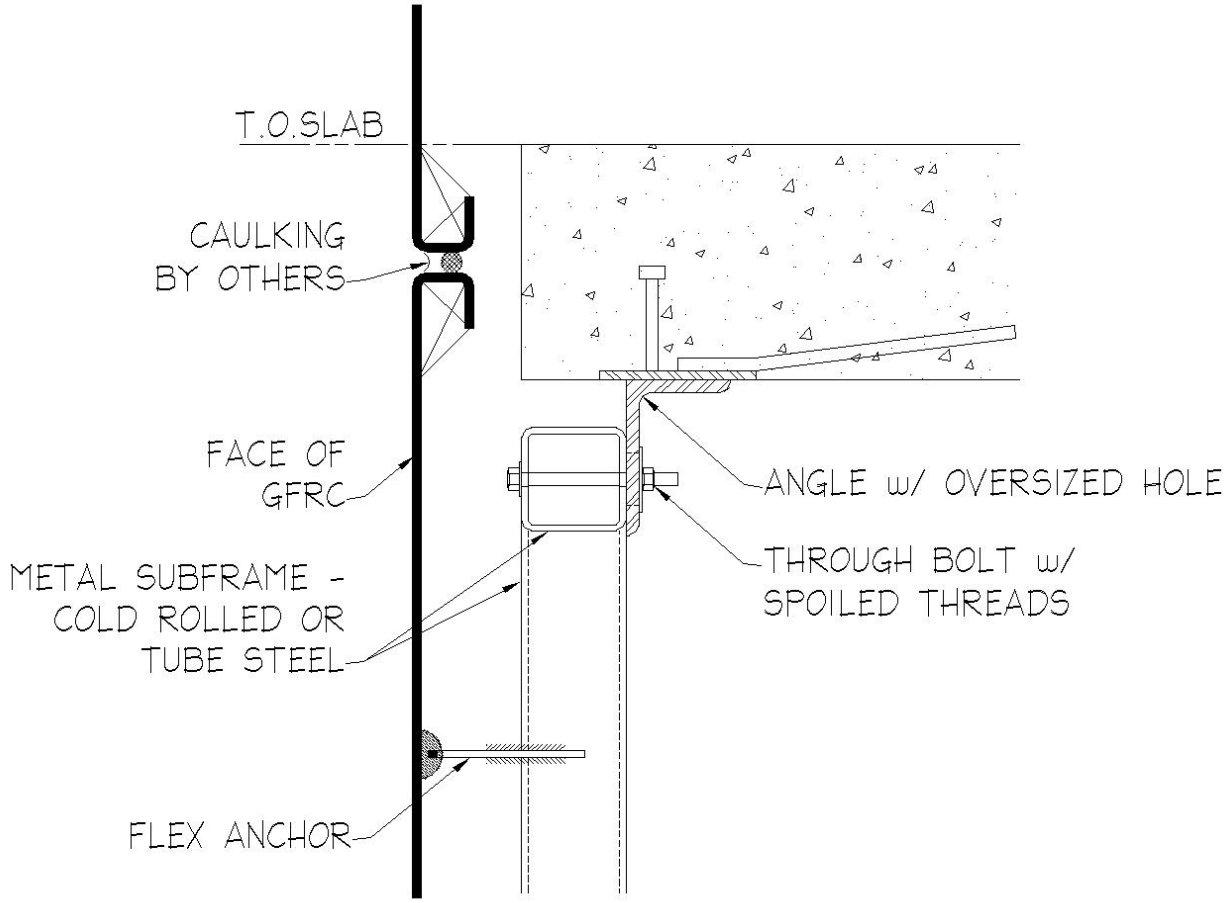
E. Lateral Tieback to Underside of Concrete Slab

- Angel allows for deflection of slab.



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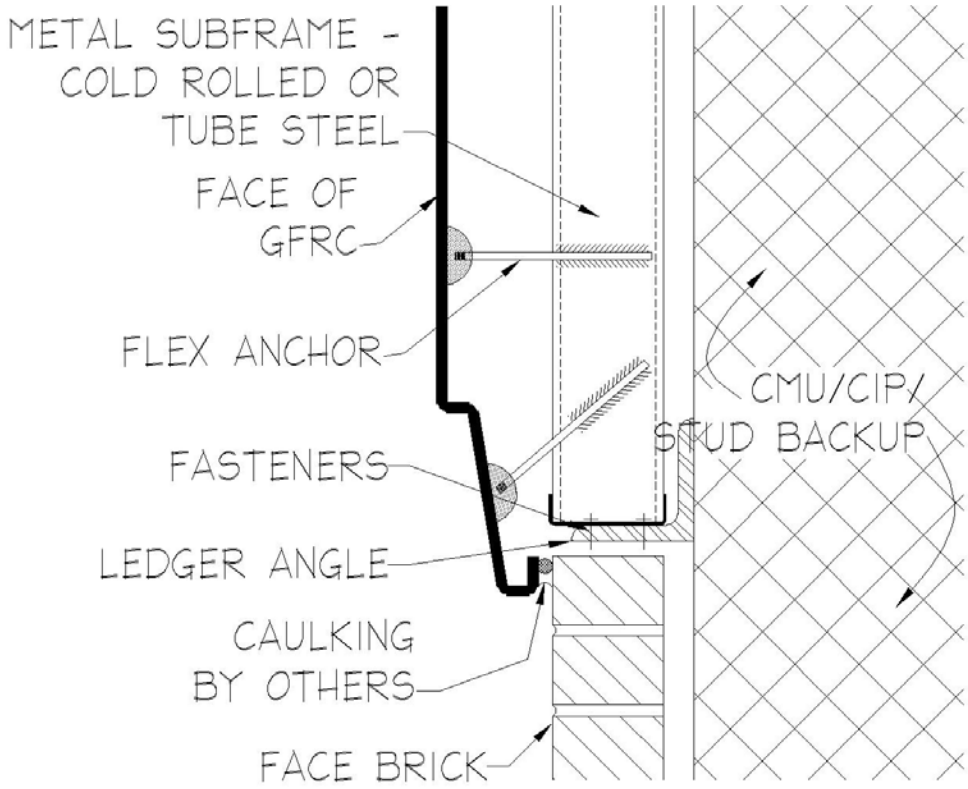
F. Accent Banding



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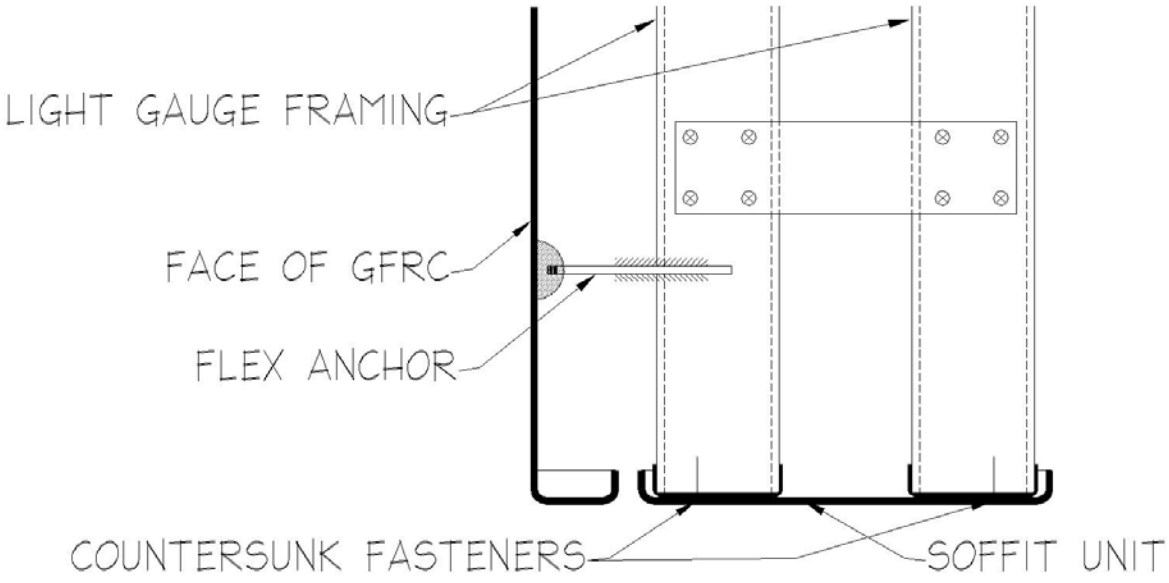
G. Soffit

- Erector counter sinks and caulks exposed fasteners.



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PART 3

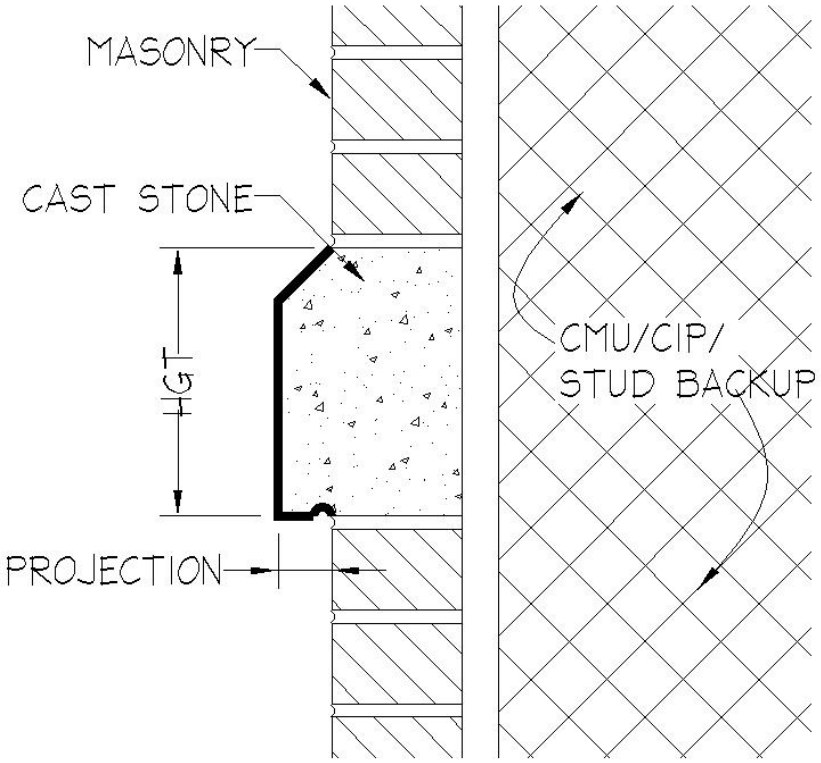
Cast
Stone

PART 3 - CAST STONE

3.1 CONNECTIONS

A. Accent Banding Without Mechanical Fasteners

- Laid in place with mortar.



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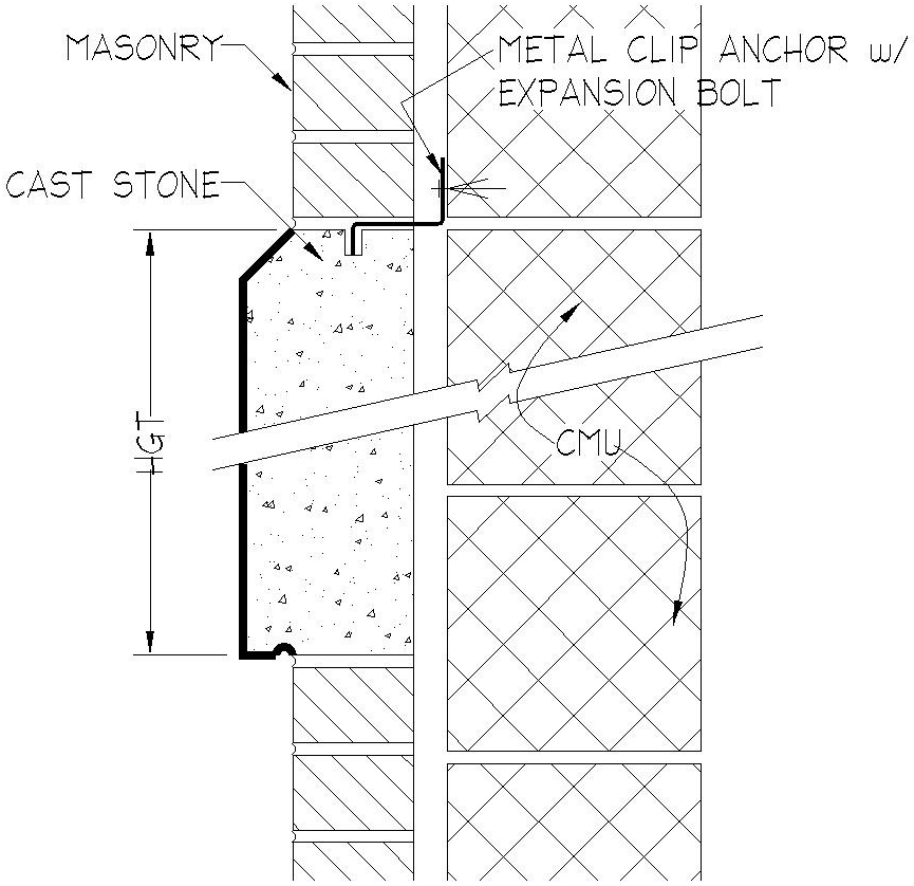
B. Accent Banding With Mechanical Fasteners

- Larger units mortared in place and tied back to structure.



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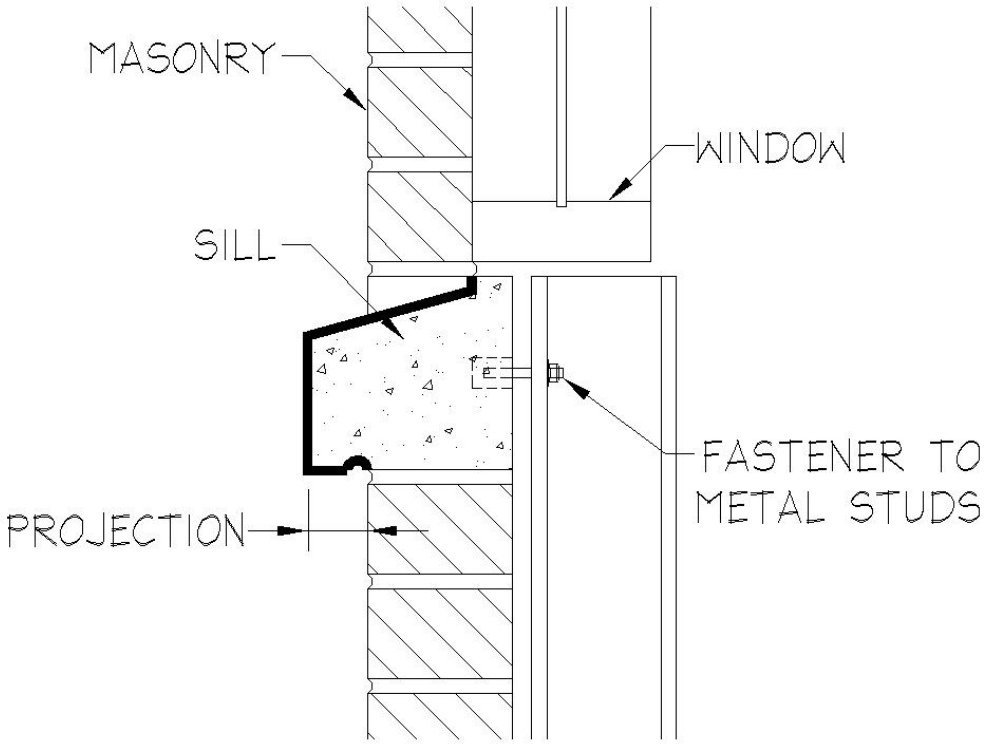
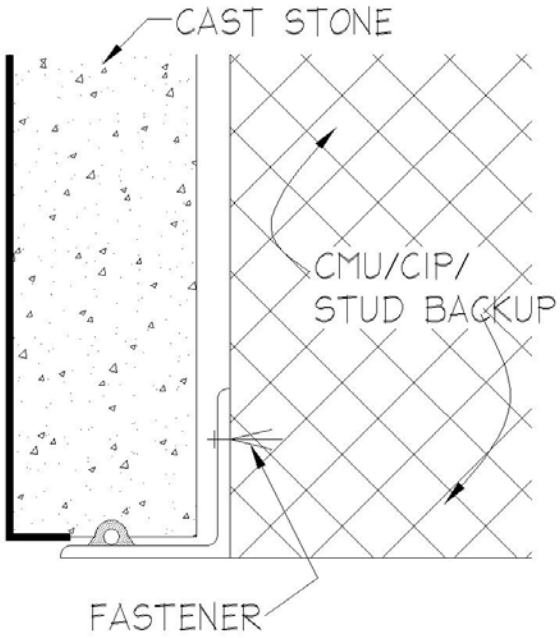
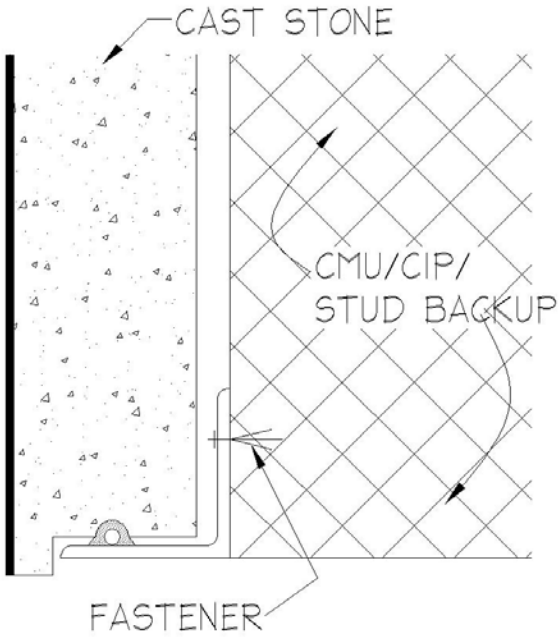
C. Window Sill



D. Window Lintels

- Using relieving angels.





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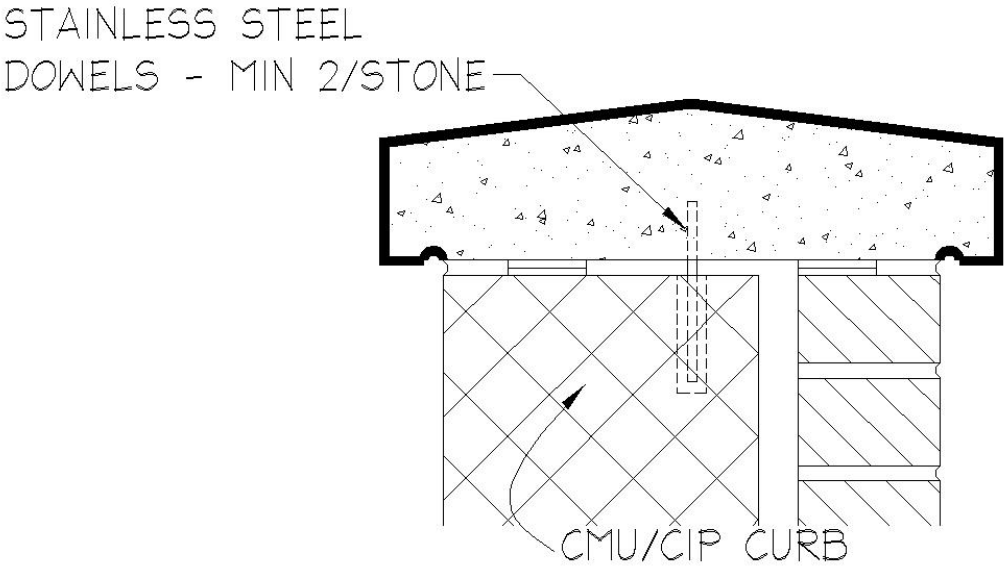
E. Doweled Coping

- Similar detail using masonry exposed both sides.



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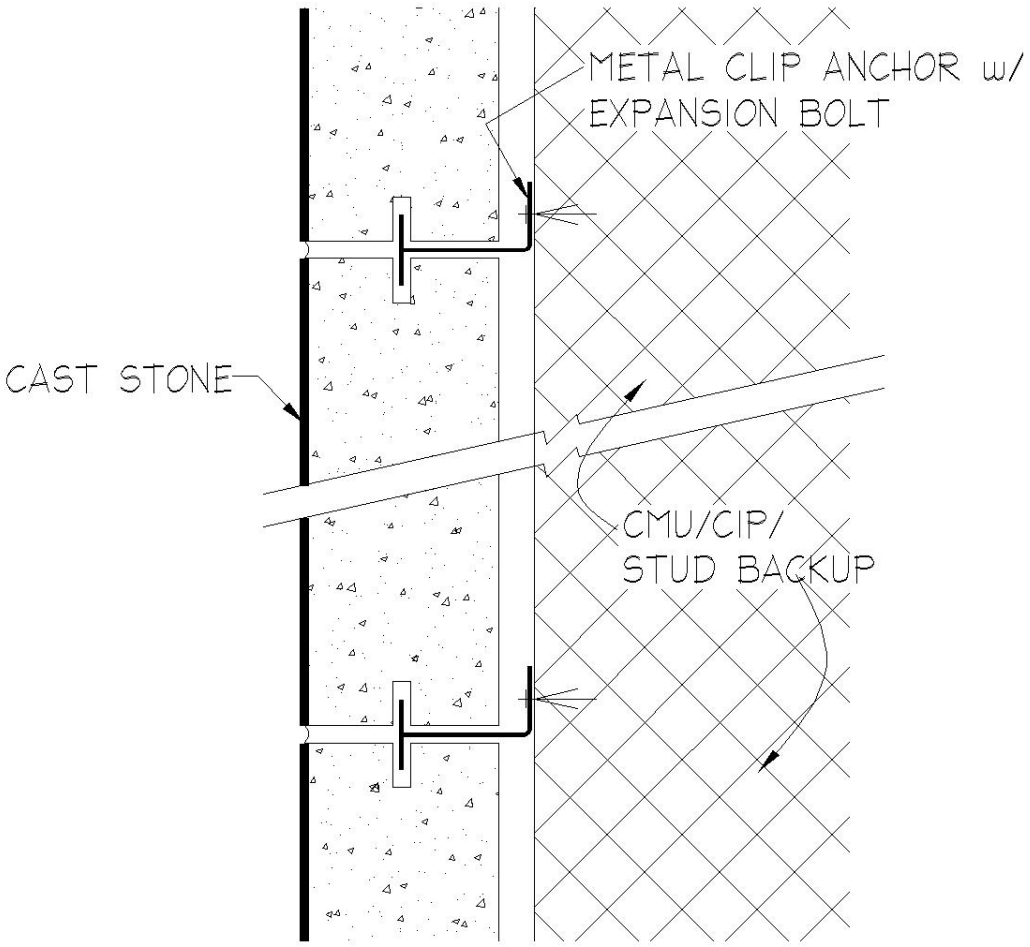
F. Multiple Units with Mechanical Fasteners

- Units are stacked and set with mortar.



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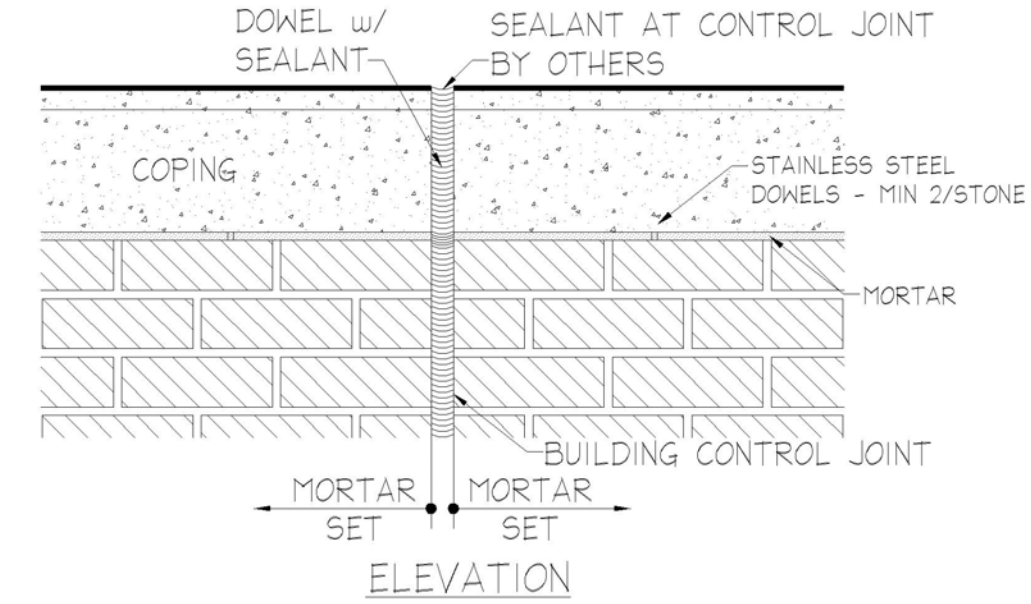
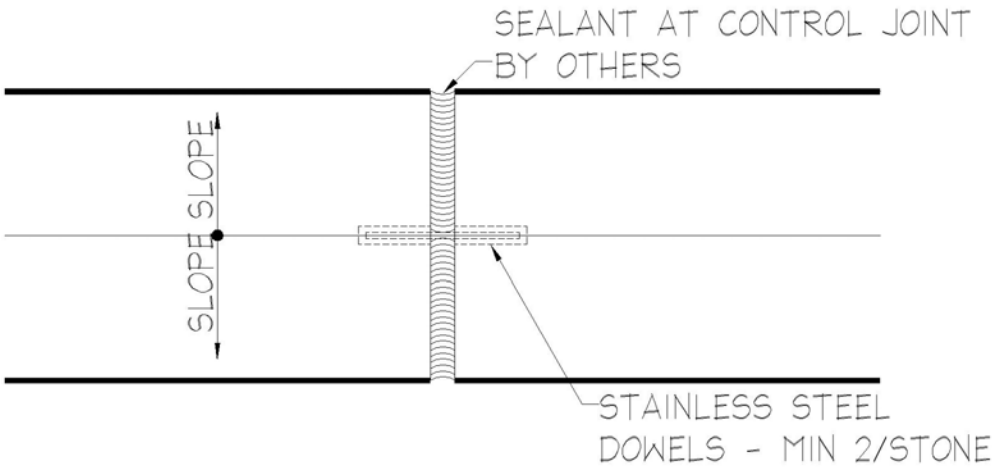
G. Parapet - Control Joints

- Control joints are caulked by others with sealant.



ELEVATION

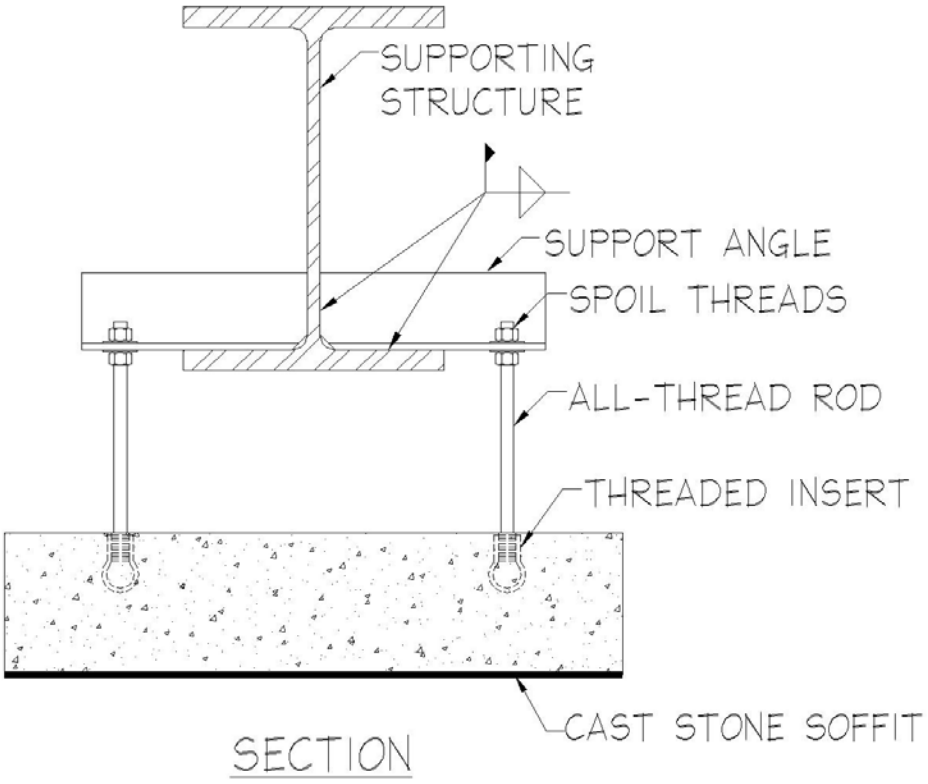


TOP VIEW

Each illustrative connection is shown for concept only.
All connections must be engineered for project specific lateral and loading requirements.
All connections must be approved by a licenced engineerer.

H. Soffits

- Supported from steel structure.



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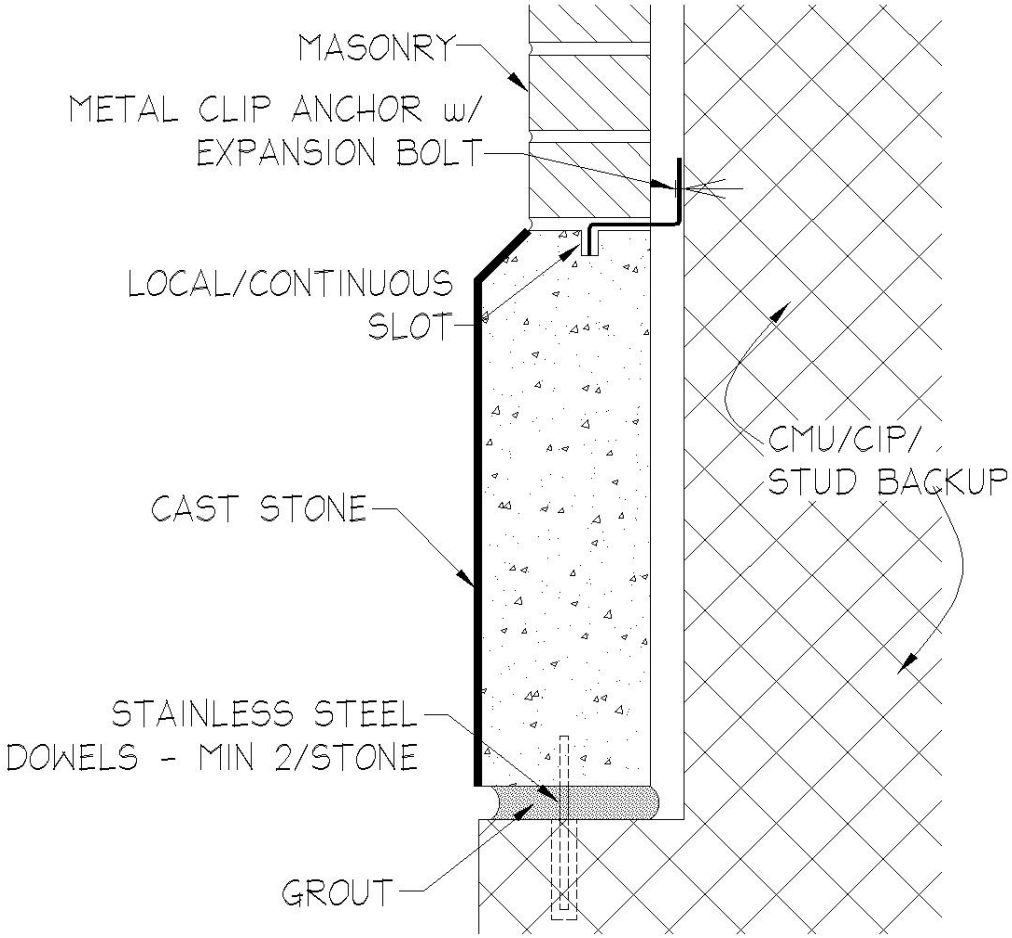
I. Watertable

- Doweled, grouted and mechanically fastened.



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