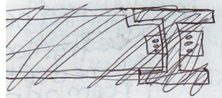
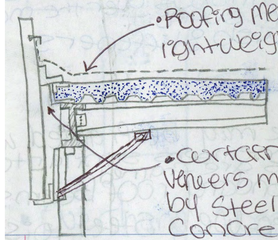
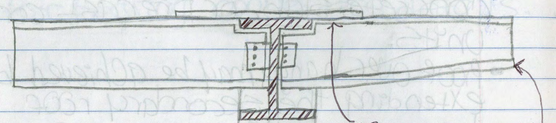
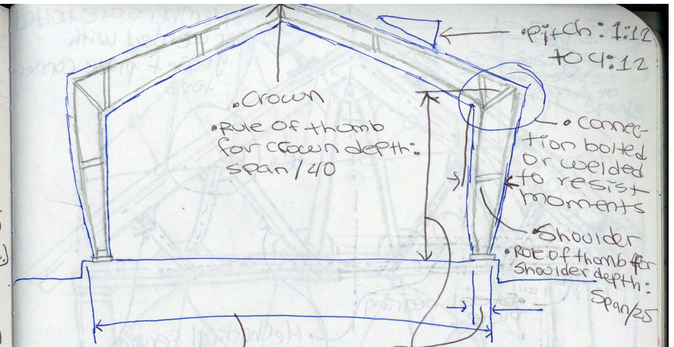




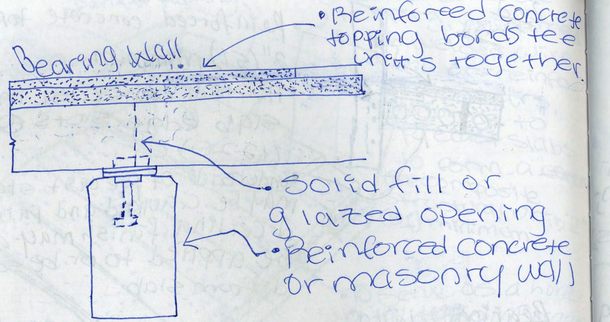


•Ends of beams may be tapered or lightened with cutouts.



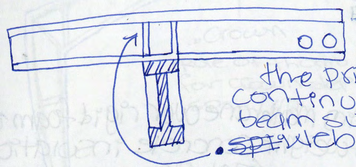
•Steel frames may be left exposed in unprotected noncombustible construction.
•Some building codes reduce the fire-protection requirements for steel roof structures 25' (7620) or more above the floor.

-Rigid frames consist of two columns and a beam or girder that are rigidly connected at their joints.



- Overhang possible
- consult a structural engineer for bearing connection details.

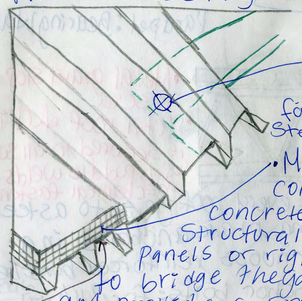
Structural Steel Roof Framing



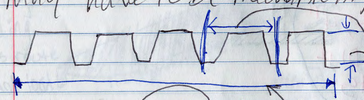
A flat roof structure may be framed with structural steel members similar to the way steel floors are framed.

- A primary and secondary roof beams may support open-web steel joists, metal roof decking, a site cast concrete slab, or precast concrete units.
- Roof overhangs may be achieved by extending the secondary roof beams over ~~the~~ their supports or by recessing the exterior wall construction.

Metal Roof Decking



- The decking panels are puddle-welded or mechanically fastened to the supporting steel joists or beams.
- Metal roof decking is commonly used without a concrete topping, requiring structural wood or cementitious panels or rigid foam insulation panels to bridge the gaps in the corrugation and provide a smooth, firm surface for the thermal insulation and membrane roofing.
- To provide maximum surface area for the effective adhesion of rigid foam insulation, the top flange should be wide and flat. If the decking has stiffening grooves, the insulation layer may have to be mechanically fastened.

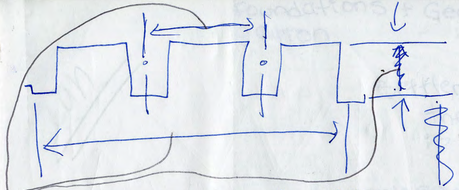


Ribbed Roof Decking

- 6" (150)
- 1-½" (38) depth
- Spans 4' to 9' (1220 to 2745)
- 24", 30", 36" (610, 760, 915)

Ribbed Roof Decking

- 8" (205)
- 3" and 4-½" (75 and 115) depths spans 8' to 16' (2440 to 4875)
- 12", 24" (305, 610)



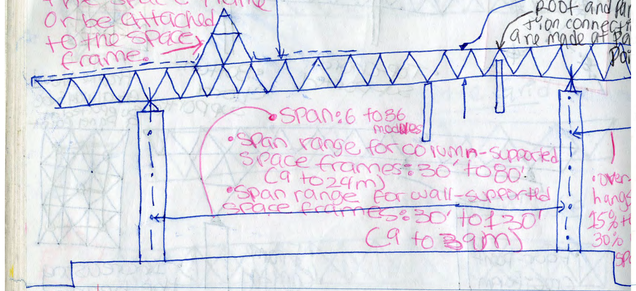
Cellular Roof Decking

- 6" (150)
- 3" (75) depth spans 10' to 20' (3050 to 6095)
- 24" (610)

- ~~Also~~ Acoustic roof decking used as a sound-absorbing ceiling contains glass fiber between the perforated webs of ribbed decking or in the perforated cells of cellular decking.
- Decking profiles vary.

Glazing may occur within the panels of the space frame or be attached to the space frame.

- Wood panel sheathing, metal roof decking, or cementitious roof pla
- Slope or camber frame for drainag minimum of 1/4" per foot (1:50) recom
- Depth range: span/12 to span/20

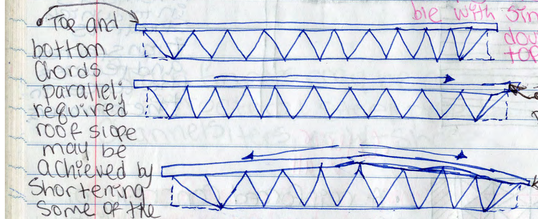


- Roof and pla tion connect are made of pa

- Span: 6 to 36 meters
- Span range for column-supported space frames: 30' to 80' (9 to 24m)
- Span range for wall-supported space frames: 30' to 130' (9 to 39m)

- Over hang 15% t 30%

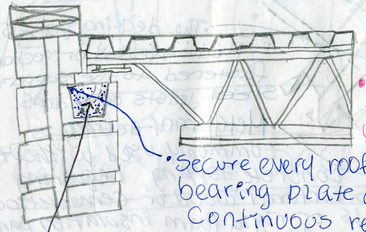
Open-web steel joists



- Top and bottom chords parallel; required roof slope may be achieved by shortening some of the joist supports and sloping the joists, or by tapering the insulating layer of the roof deck.

- LH/DLH Series LH an DLH joists are ava ble with single or double pitch top chords.
- Top chord pitched one way
- Top cho pitched tw ways
- Standard 5 3/8 per foot (1:12

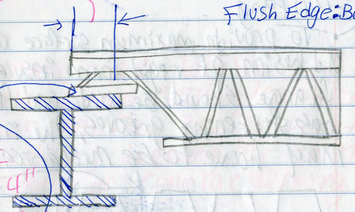
Open-web joist framing



Parapet: Bearing Wall

- Metal gravel stop and fascia
- Metal roof decking is secured to all supports with puddle welds or mechanical fasteners.
- Secure every roof joist to a steel bearing plate anchored in a continuous reinforced bond beam.
- Two 1/2" (13) Ø anchor bolts: for LH/DLH series joists, use two 3/4" (19) Ø anchor bolts.

Flush Edge: Bearing Wall



- Minimum bearing length: 2-7/2" (69) for K series joists; 4" (100) for LH/DLH series joists.
- Two 1/8" (54) fillet welds 1" (25) long or 1/2" (13) Ø bolt.
- For LH/DLH series joists two 1/4" (57) fillet welds 2" (51) long or two 3/4" (19) Ø bolts.