

Basis of Design

This section applies to the design and installation of structural steel, steel joists (open-web steel joists) and steel decking.

Design Criteria

- Use most recent version of the International Building Code (IBC) with local municipality amendments. Referenced standards include American Institute of Steel Construction (AISC), American Welding Society (AWS), American Iron and Steel Institute (AISI), and the Steel Joist Institute (SJI) specifications and standards.
- Clearly identify which welds in the project are seismic critical welds. Identify special materials, procedures, and inspection required for seismic critical welds.
- All connections are to be designed by the engineer of record. No fabricator designed connections are allowed.
- Specify that only WABO certified welders are acceptable.
- Use composite design whenever possible in order to provide a cost effective design. Specify a regular spacing of welded studs such that the contractor can easily install the correct number of studs on each member. In other words, do not specify multiple numbers of studs for beams of the same length.
- Use of steel joists is acceptable only for roofs in areas that are not supporting rooftop or suspended units greater than 1000 pounds operating weight. Do not utilize steel joists for floor construction.
- Clearly indicate any special loading that occurs for the design of the steel joists. These loads include snow drift, duct and piping weights, and equipment weights.
- Indicate the locations of steel joist bridging on the framing plans so that it can be coordinated with the other consultants. Take special care to coordinate with the architect where the framing will be left exposed.
- Indicate locations where shoring of steel decking is required to support the weight of wet concrete.
- Steel decking may be used for garage construction as a form only. Provide reinforcing bars (not WWF) in slab to support 100% of the design loads. Take note of minimum concrete cover indicated for garages in Structured Floors section.
- Take special care if underfloor ducts (such as Walker Ducts) are to be installed in a topping slab over steel decking. Check gravity and diaphragm loads on the decking.

Design Evaluation

The following information is required to evaluate the design:

- Schematic Design Phase: Provide schematic plan indicating typical steel framing. Outline specifications.
- Design Development Phase: Provide framing plans, typical steel details. Draft specifications.
- Construction Document Phase: Complete design and specifications.

Construction Submittals

- Shop drawings for structural steel, and steel decking.
- Mill Test Reports for Structural steel, bolts nuts and washers, and shear stud connectors.
- Manufacturer Certificate for steel joists.
- Shop drawings and calculations for steel joists.
- Product Certificates for each type of steel deck.

Quality Assurance

- Provide inspection of all steel fabrication and erection by an independent testing lab.

Related Sections

- Facilities Services Design Guide - General Requirements - Structural
- Facilities Services Design Guide - Structured Floors
- Facilities Services Design Guide - Roofs

Products, Material and Equipment

- All steel exposed to the weather shall be hot dipped galvanized unless an acceptable alternate coating is specified.
- Provide a G60 minimum coating on all steel decking.
- Consider specifying structural steel with a high recycled content.

Installation, Fabrication and Construction

- Structural steel fabricator shall be an AISC-Certified Plant Category Cbd. As an alternate to this requirement, the contractor shall pay for full-time inspection during the fabrication of the project steel. This inspection will be conducted at the fabrication plant by the owner's inspection agency. In addition, the fabrication plant must also be acceptable and approved in writing by the engineer of record and the building official.
- Pretension all high-strength bolts at all steel to steel connections. No snug fit nuts allowed on high-strength bolts.
- Install and cure base plates grout prior to pouring concrete on superstructure above.
- All field modifications shall be approved by the engineer of record and discussed with UW Campus Engineering prior to implementing the modification. All penetrations shall be ground smooth. Engineer of record shall specify any shoring requirements necessary to support steel members prior to cutting or welding.
- Steel joists to be fabricated according to the Steel Joist Institute Specifications.

- Button punching of side lap connections of steel roof deck (where no concrete topping) is not allowed. Provide welded, screwed, or other means to connect side laps.

END OF DESIGN GUIDE SECTION