

## **Basis of Design**

This section applies to the general structural requirements.

### **Background**

- This section is intended to assist the Structural Engineer and other design team members during the design process. The University's intent is to build high-quality structures. If there are questions about this information or proposed alternative ideas, discuss them with the Project Manager and Campus Engineering. We encourage an open dialog between the University and the design team. The structural engineer should also familiarize themselves with the other applicable sections of the Facilities Services Design Guide.

### **Design Criteria**

- Typically for the structural design, utilize the most recent version of the International Building Code (IBC) with whatever local municipality amendments that exist. The IBC is considered a minimum requirement. Structural engineer needs to consider other factors in their design such as temperature effects, shrinkage, long-term maintenance, and serviceability items. Note that some Facilities Services Design Guide sections require use of a Seattle Department of Planning And Development (DPD) Director's Rule. Note that this applies to all UW property locations including Tacoma, Bothell, Friday Harbor and all others.
- The structural engineer is encouraged to provide a cost-effective economical design that gets the University the most "bang for the buck". Incorporate repetition wherever practical in the design.
- The structural engineer is required to design all the structural details for the building. Fabricator/contractor designed details are not allowed with the exception of fabricator designed items as described below. The use of "Similar" details is discouraged. Provide sufficient detailing so that the contractor can accurately price and construct the building. If "Similar" details are used where appropriate, then specifically indicate on the detail just what is "similar" about it.
- Deferred submittals are allowable for such items including steel stairs and curtainwalls. These submittals must be stamped and signed by a PE. The structural engineer of record needs to closely review the submittals. The structural engineer of record needs to design and detail any connections/embedments in the main structure for the deferred submittal item to connect to.
- Provide key plans of each building level that clearly indicates the design live load used for each different area including the roof. Indicate if live load reduction was utilized in the design. This information will assist the University during future tenant improvements etc.
- Specify that the contractor is to use concrete placement and finishing techniques which produce the specified or higher F-Numbers. Require that each day's work be measured as soon as possible so, if there is a problem, it will be identified and corrected before it is repeated.

### **Inter-discipline Coordination**

- Coordinate the structural work with all other disciplines. The structural engineer needs to be "proactive" in this coordination by reviewing all the other consultant's drawings and asking the

appropriate questions. Consistently look for revisions in the other consultant's designs in order to stay up to date with an accurate structural design.

- Be aware of all the loads and requirements of the other consultants. For example; be sure to note housekeeping pads, inertia pads, operating (not shipping) weights and location of equipment, window washing equipment etc.
- Verify that there are no conflicts of "space" in the design. Verify that the structural framing does not conflict with any other components of the building. Review and indicate all structural penetrations required on the drawings. Submit study sections through the building in critical areas that indicate the location of the structure and how it relates to the other building components.
- Request information from the other consultants early in the design. Passively waiting until another consultant passes on information often leads to problems in the design and coordination.

### **Plans**

- Drawings and reports of existing buildings are available from Facilities Records. Structural Engineer is responsible to attain whatever existing drawings and reports are necessary.
- The attachment B requirements at each phase of design are considered a bare minimum. Include whatever information is necessary at the various phases in order to achieve an accurate cost estimate and proper coordination.
- Structural Engineer is responsible to review whatever "secondary" structures that are detailed on the other consultant's drawings. For example; stairs shown on architectural drawings, retaining walls shown on landscape drawings, mechanical platforms shown on mechanical drawings.

### **Calculations**

- Submit structural calculations with construction document submittal. Submit additional calculations as requested by Campus Engineering.
- Format and number structural calculations in an easy-to-follow format. Divide calculations into categories such as foundations, first floor framing, roof framing, lateral design, etc.
- Include clear explanation/summary sheet before all computer output that explains analysis used, assumptions made, and conclusions. Include sketch of computer model nodes and member numbers.
- Indicate at the start of each calculation a description of what is being calculated. Indicate in the calculation what the conclusion is. For example; For a typical floor beam at 10 feet on center (oc), include "Calculate typical floor beam at 10'-0" oc" and indicate what beam is selected for use in the project. Include calculation for how the loads for the member being designed are determined.

### **Design Evaluation**

**The following information is required to evaluate the design:**

- Programming Phase: Identify structural system requirements and any exceptions to the Facilities Services Design Guides.
- Schematic Design Phase: Refer to requirements specified in the individual Structural sections.
- Design Development Phase: Refer to requirements specified in the individual Structural sections.
- Construction Document Phase: Refer to requirements specified in the individual Structural sections.

### **Construction Submittals**

- Refer to requirements specified in the individual Structural sections.

### **Related Sections**

- Facilities Services Design Guide - Seismic Analysis & Upgrade of Existing Buildings
- Facilities Services Design Guide - Modifications of Existing Buildings
- Facilities Services Design Guide - Shoring
- Facilities Services Design Guide - Foundations
- Facilities Services Design Guide - Slab on Grade
- Facilities Services Design Guide - Structured Floors
- Facilities Services Design Guide - Roofs
- Facilities Services Design Guide - Concrete
- Facilities Services Design Guide - Reinforced Masonry
- Facilities Services Design Guide - Structural Steel
- Facilities Services Design Guide - Timber
- Facilities Services Design Guide - Cold Formed Steel Framing

### **Products, Materials and Equipment**

- Refer to requirements specified in the individual Structural sections.

### **Installation, Fabrication and Construction**

- Refer to requirements specified in the individual Structural sections.

END OF DESIGN GUIDE SECTION