Senior Thesis Program
Department of Architectural Engineering
Pennsylvania State University
University Park, PA

Structural Technical Report 1
Structural Concepts / Structural Existing Conditions Report

The **Structural Concepts / Structural Existing Conditions Report** consists of a requirement to describe the physical existing conditions of the structure of your building. It should provide an overview of all the structural components of the building including, but not limited to, the general floor framing, structural slabs, lateral resisting system, foundation system, bracing elements, expansion joints, secondary structural systems for equipment support etc. and support and bracing of the exterior envelope of the building. A section of this report must describe how the primary components work together as a system.

As part of the writing component of AE 481W, this report will be submitted to your consultant for review and comment. Students will then resubmit the report responding to the faculty comments. The document should be written in Microsoft WORD 2010 and submitted to your consultant in electronic form. The tracking function will be used to provide comments and corrections. Then the student should respond to those comments with tracking so the changes are highlighted.

Note: An evaluation form used by the structural faculty to review this report is posted on the ePortfolio website. This form will serve as a valuable checklist and provide additional insight into the information that should be covered by your report.

The following is a representative list of items that must be included in all reports. Other items should be included as appropriate to providing an understanding of your particular building. You must include all the items required for any Senior Thesis Report Heading. In addition, a Table of Contents is expected for this report. If using appendices for additional information referred to in the main body of the report, they should be numbered for reference purposes but do not have to be consecutive with the main body of the report (Pages may be hand numbered or you can use A1, A2, etc.)

1. Provide an Introduction/Summary of the overall structural system. Be very specific relative to framing types, material strengths, spans, etc. Provide diagrams, framing plans etc. when ever possible to avoid large amount of descriptive text.

2. Include a description of codes that will be used and for what. List all the appropriate parts of model codes (IBC etc), design codes (AISC, ACI), and structural standards (ASCE 7). It is not necessary to list all the applicable ASTM standards. A table can be

used for the codes and descriptions of their use on your building. The table should be introduced in the text with a description of its purpose.

3. Students must include copies of typical framing plans, framing elevations and building or structural sections as necessary to completely describe the framing layout to your consultant in the report. Clearly identify those elements on the framing plan that are parts of the lateral force resisting system. Simplified original sketches prepared by the student showing basic framing elements are preferred to reduced size copies of the plans, particularly if reduced original plans are difficult to read at the reduced scale needed to fit in the reports. Copies of plans may be included as a supplement or appendix or in the body of the report if they provide additional information and clarity to the report.

4. Each report must include a detailed description of the structure, including conclusions as to the types of design theory or structural concepts that may have been used (LRFD v ASD, shear walls v braced frame, etc.). Included in the discussion on lateral force resistance should be a description of the lateral load path and how the applied forces travel through the structure and are distributed to the various framing elements. You should discuss the impact that these concepts or issues will have on your work. Include sketches, diagrams etc. to help explain your system. Once again, students must be sure to clearly identify which structural elements are participating in the lateral load resisting (include a discussion of floor diaphragms, collector beams etc.) system providing sketches or framing plans that identify the system parts and components.

5. Note that all figures, charts, sketches and photographs should be labeled and numbered and addressed in the body of the report text. It is recommended that you call all of these items "Figures" so that they can be successively numbered for convenience and organization purposes.

6. As is standard for most technical reports of any considerable length, an executive summary is required on the first page of your report. Make sure that the executive summary provides a mini snapshot of your findings, not just a relisting of the requirements of the assignment. **This should be an abbreviated version of the report, not a table of contents in paragraph form. Consider this a stand-alone document**.

7. Reports should be submitted as a word document as an attachment to an email sent via Angel. The review function in word will be used to provide specific comments for improvement of the report.

Evaluation

The reports should, above all else, demonstrate that you are becoming competent to practice as a structural engineer. The more correctly, clearly and succinctly this is demonstrated, the better the grade. Taking the consultant through what you understand about the building and its design provides best opportunity for a good grade. Clarity and quality in writing is also essential. Refer to the grading checklist for specific elements that will be evaluated.

Below is some additional guidance about specific parts of the report:

Introduction:

- The Executive summary is not an introduction. Do not refer to it as part of your introduction.
- The Introduction should provide a more thorough description of the building than the one in the Executive summary. Include some figures like a rendering or a picture, a typical architectural floor plan, a map of the location, etc.
- The report should be able to stand alone as a document. The contents should not rely on the assignment description to have purpose. Introduce the scope and purpose of the report.

Sections of the Report:

- Each section of the report should have a purpose defined.
- For example, sections that include general information like codes, and materials, etc. should be introduced as having purpose in the remainder of the report or future calculations.

Appendices:

- The appendix is supplemental. The body of the report should not need the appendix to be understood. Do not put figures in the appendix that are essential to understanding the discussion. For example, a picture or rendering of the building is helpful to understanding the description as is a floor plan and should not be in the appendix.
- Do not put anything in the appendix that is not referred to in the body of the report. For example, one might show a typical floor plan in the body of the text and note that other plans are included in the appendix.