



The Department of Architectural Engineering  
The Pennsylvania State University  
University Park, PA

## The Elements of a Proposal

Prepared by Dr. Tom Boothby, Associate Professor of Architectural Engineering

A proposal addresses a *particular* problem, and the proposed method of solution of the problem. A proposal generally contains the following elements:

- The background of the problem
- A statement of the problem
- Proposed solution(s) of the problem
- Method to be used for each solution
- Tasks and tools to be used in each solution
- Schedule to be followed in problem solution
- Concluding remarks

### Executive Summary

An executive summary, if provided, is a *stand alone document*. It should provide the information given in the body of the document, without requiring the reader to leaf through the full document! The only difference between the summary and the body of the report is that fewer details are furnished in the summary.

*Don't say:* Proposals are then given as to what I will be concentrating on for the coming semester

*Say:* The proposed thesis will include an investigation of a steel rigid frame structure, a steel frame with reinforced concrete masonry shear walls, and a monolithic cast in place reinforced concrete rigid frame structure.

### Background

The background is provided to orient the reader to the specific problem that will be addressed. It should be focused on providing enough information that the subsequent discussion can be placed in context. It should be accessible to a general, technically literate reader. In the case of a thesis proposal, it is a discussion of the important aspects of the building considered in the later thesis proposal

*Don't say:* The area of concentration is the atrium gallery and the periodical reading room.

*Say:* The \_\_\_\_\_ Building is a 140,000 Square foot building used as leased and private offices. It is built on four stories, each occupying an area of 100 feet by 350 feet. The structure consists of ....

*Important note:* This section can only be written effectively if it contains tables (such as programmed spaces and square footages) and graphics (floor plans, elevations, building sections).

### **Statement of the Problem**

All proposals focus on the solution of a problem. In your case, until you recognize a problem with the existing design, or a problem that faced the designers of the original system, you will be unable to propose a satisfactory thesis topic. Probably the most important component of the proposal is a clear, concise statement of the problem that you are proposing to solve.

*Don't say:* I have decided to analyze one of the rooms that I have looked at for my electrical and mechanical proposals....

*Say:* A floor structure must be designed for the \_\_\_\_\_ room to resist all dead loads, equipment loads based on the following equipment schedule, and a live load of \_\_\_ PSF, per BOCA Table \_\_\_\_\_. Moreover, the total depth of the floor ceiling envelope must be less than \_\_\_\_\_, to accommodate a ceiling height of \_\_\_\_\_ within a floor to floor height of \_\_\_\_\_ or less....

### **Proposed Solution(s) of the Problem**

At the time of writing the proposal, you must be able to present, in sketch form, a solution or a set of solutions to the problem you are investigating. You must also be able to outline the method, and a detailed task by task description of the solution procedure, but these will be discussed in a later paragraph. The solutions you propose should be *specific*. A generic listing of design criteria is not a solution.

*Don't say:* The proposed structure will comply with the loadings in the BOCA *National Building Code*, the ACI *Building Code Requirements for Reinforced Concrete*, ....

*Say:* Alternative #1 will be a reinforced concrete flat slab system, as illustrated in Figure \_\_\_\_\_. The floor will consist of an 8" reinforced concrete slab, 11" thick at drop panels. The floor will be provided with a 12"×18" edge beam at the perimeter. The columns will be 14"×14". The floor to floor height will be 10'-6". The lateral load resisting system will consist of reinforced concrete masonry unit shear walls at the exterior stair towers and the interior elevator shafts. Floor loads will be computed on the basis of the live loads in the BOCA *National Building Code* as shown in Table \_\_\_\_ below.

## **Solution Method**

This section will demonstrate whether you are qualified to solve the problem you have presented. The reader must be provided with *detailed, specific* information on the proposed method of solving the problem you have outlined. This section will include a discussion both analysis and design methods. If computer programs are to be used, discuss how the inputs will be prepared and how the outputs will be presented.

*Don't say:* I will use ADOSS to determine reinforcement in the flat slab system.

*Say:* The design of the flat slab system will be based on Chapter 13 of ACI 318-95 *Building Code Requirements for Reinforced Concrete*, Equivalent Frame Method. Analysis for gravity loads will be completed on the computer program ADOSS, an implementation of the Equivalent Frame Method. Trial sizes, as outlined above will be input into the computer program. Live load patterns, including full live load on all spans, full and half live load on adjacent spans, and 75% full load and no load on adjacent spans will be investigated....

## **Tasks and Tools**

In this section, provide the reader with further evidence of your qualifications to solve the problem by showing detailed understanding of *all* steps necessary to arrive at a satisfactory solution. This section will also lay the groundwork for the timetable that follows by identifying and elaborating the items that will be shown on the schedule. This section is best kept in outline form.

*Example:*

### I. Concrete Beam and Two Way Slab Alternative

#### Task 1. Establish trial member sizes

- a) Determine beam sizes based on ceiling height requirements and ACI 318-95 Table 9.5(a). Determine whether detailed deflection calculations will be necessary
- b) Establish slab thickness by ACI 318-95; Section 9.5.3.3
- c) Determine most economical balance between beam and slab thickness based on costs in Means *Building Construction Cost Data*

#### Task 2. Determine floor loads

- a) Find self weight based on member sizes from Task 1
- b) Find superimposed dead loads based on building plans
- c) Find live loads on the basis of BOCA *National Building Code*; Table 1606
- d) Find wind loads based on BOCA *National Building Code*; Section 1609

#### Task 3. Complete initial frame analysis

etc.

### **Timetable**

Using the task numbers assigned above, develop a week by week summary of the remaining semester and target dates for the completion of each of the tasks discussed above. This should be presented in graphic form, as a bar chart, a flow chart, or a calendar with benchmark dates.

### **Additional Issues**

It is preferable to write in the third person, although it becomes a little trickier to avoid the passive voice.

*Don't say:* I will investigate a steel rigid frame structure....

*Say:* the proposed thesis will include an investigation of a steel rigid frame structure....

### **Non-structures option**

The proposal for structural work should include a significant investigation of some aspect of the design of the structure of your building. As a minimum, one gravity load issue, such as a floor or roof framing scheme, and one lateral load issue, such as the wind load resisting system, must be included. If it is actually in support of the work you are doing in your option, it is far more likely to keep your interest. Your consultant will be happy to make suggestions if you are stuck for a topic.

### **Format**

The proposal should be presented in a professional manner. Use headers and subsections as appropriate. In most cases, it will be helpful to include sketches, drawings/plans, and photographs in the body of the proposal or as an appendix. Refer also to the "report format" directions distributed earlier in the fall semester by Prof. Parfitt.