

Problem Statement:

Proposed Investigation:

Lexington II's design was greatly influenced by the demand for shallow floor sandwiches imposed by the Washington D.C. height restriction. It is customary for engineers in D.C. to design using two way flat plate slab or pre-stressed concrete (traditionally the shallowest sandwich depths) without thoroughly investigating other structural systems. Had Lexington II been located outside of the central Washington D.C. area other structural systems which employ the use of beams and the creation of a deeper floor sandwich would have been investigated further. Another structural system may have proved to be a more time and cost efficient design for The Lexington.

For my project, I am investigating the effect a steel structural system would have had on the overall design of Lexington II had it not been located in a height restricted area. The steel system will be analyzed on the basis of time and cost.

Investigation Method:

In order to investigate the effects a steel system would have on the Lexington II building project, I plan to design the Lexington II with a steel system and compare my final design to the actual concrete design of Lexington II.

To design The Lexington as a steel building I first plan to look at several systems. Through a brief analysis I will determine which system is the most appropriate for Lexington II. The system deemed the most feasible will then be used in a total building design of Lexington II. In order to complete the design, RAM steel as well as hand calculations are utilized.

The lateral system of Lexington II will also be designed in accordance with a steel structural system design. Alternatives to be considered for the lateral system are shear walls, braced frames, and moment frames. Member analysis and drift checks will be performed using finite element software, such as STAAD.

After the completion of both the gravity and lateral system, the building as a whole will be looked at. By looking at the systems and how they work together, other important details can be checked, including foundation and connection design.

The final step of the analysis is to compare my steel design to the current concrete design of Lexington II. This comparison will look at construction management criteria such as time of construction. The most important criterion that will be investigated is the cost of a steel design versus the concrete design.