

Final Recommendations:

When designing a building for maximum occupancy in areas with strict zoning requirements often factors other than economy dictate the final design. In the Lexington II building project, the design was required to meet local height requirements and certain structural systems became unfeasible while trying to achieve the maximum number of usable floor levels. To create the smallest possible floor sandwich flat plate slab was used with close column spacing.

By redesigning the building as a composite system the height requirement was no longer met, however other advantages presented themselves. Using a composite system was only economical once the bay sizes had been increased. Although the system I designed works with the existing architecture, larger bay sizes would also provide more architectural freedom to redesign the building interiors if desired. Fewer columns spread further apart will also alleviate congestion that can occur on the sub-grade parking levels. Using a composite system affected the weight of the building lowering the seismic load. A composite structure also has its advantages when integrating other systems. MEP systems are now able to fit into the floor sandwich with no major changes to the components used.

For reasons of practicality, the final design of the substructure was one way joist floors. Keeping the substructure concrete will protect the building from subterranean conditions. Using two types of structural systems results in specialized and costly connections, however when many other advantages are present connections should not be considered the controlling factor in deciding if the design is feasible.

Economy, however, is often the most critical criterion used when evaluating building systems. Cost analysis using *R.S. Means* showed that there is very little advantage to either system over the other. The cost of the concrete system begins to compile when an additional 10% for waste is accounted for. The biggest advantage of two way flat plate is its ability to maintain an acceptable building height. Steel which is often considered more economical did not prove to be greatly so. The economy of a steel system is dependent on the scale of the building project outweighing many other costs which accompany steel. When dealing with a building the size of Lexington II, the full advantage of economy through scale was not able to be reached.