

David Lee
AE 481W
Structural Option

Advisor: Andres Lepage
URS Office Building
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STRUCTURAL TECHNICAL REPORT 2

Pro-Con Structural
Study of Alternate Floor System



EXECUTIVE SUMMARY:

Contained in this report is the floor system analysis of URS Office Building. Currently the five story URS Office Building employs a slab on grade and composite floor system for the floors two through five. Gravity loads were taken from technical assignment 1. Therefore dead load was calculated according to the actual weight of the permanent building components and live load was taken directly out of 2003 IBC. Design aids were used to assign preliminary size to different floor system. CRSI Concrete Design Handbook (2002), Manual of Steel Construction LRFD 3RD Edition, PCI Design Handbook 5TH Edition (1999), Post-Tensioned Concrete Design Work Book, and United State Deck Design Manuel and Catalog of Products were used to size members from composite to precast systems. For the cost estimate RS Means Assemblies Cost Data 31ST Annual Edition (2006) and RS Means Building Construction Cost Data 64TH Annual Edition (2006) provided rough estimate of each floor system.

The original floor system is efficient, cost effective, and reliable. Beams and girders provided in the drawings were found to be adequate by hand calculation and RAM modeling. In this document are five possible alternative floor systems. First alternative is to increase beam spacing, hence reducing labor cost. This system needs further analysis to determine if vibration is in the acceptable range, but it is a viable option. Waffle slab is the second alternative presented. Since waffle slab increase the self weight by factor of close to two, this system will not be considered a possible solution. With the significant reduction in floor depth from the original system and possible reduction in construction time hollow core, the third alternative, is a very attractive alternative. Fourth alternative presented, the double tee, will not be pursued any further due to the increase in floor depth. Lastly post-tensioned 2 way flat slab was the fifth alternative analyzed. Of the alternatives, this system had the smallest floor depth and least cost per square foot. Post-tensioned slab is also a possible substitute for the current floor system. Weighing the pros and cons of each floor system, the original floor system is proved to be a good solution. Alternatives larger beam spacing, hollow core, and post-tensioned slab should be analyzed further to determine if improvement to the current system is possible.