

STRUCTURAL TECHNICAL REPORT 2

STUDY OF EXISTING AND
ALTERNATE FLOOR SYSTEMS

DIMITRY A. REZNIK

STRUCTURAL OPTION
ADVISOR: DR. PARFITT
NORTHBROOK CORPORATE
CENTER

11/5/2005
AE 481W



EXECUTIVE SUMMARY

This report presents a detail analysis of existing floor system that is used in the design of Northbrook Corporate Center, and describes the design of four alternative floor systems. In this study a typical interior bay is used to design, analyze, and compare the systems. All typical loads were calculated in accordance with the International Building Code 2003.

An existing design incorporates a composite concrete slab on metal decking held in place by steel joists. Equivalent alternative systems are designed to hold an office space live and superimposed dead loads across the typical 30'x30' bay. Modification of the existing system, where steel joists are replaced by steel beams, is analyzed as one of the alternative systems. Also the advantages and disadvantages of two-way concrete slab, one-way voided slab, and one-way joist systems are discussed in the body of this report. Drawings of section and/or frame plan are provided along with the description of each individual system. A comparison chart of all the systems is provided at the end of this report. The systems are compared based on their size, self-weight, ease of installation, and overall cost.

This report is based on calculations located in the appendix. Design of concrete slabs was based on the CRSI Design Handbook 2002. Copies of the tables used in the design s are also available in the appendix.

The purpose of this report is to determine what alternate floor system is the most reasonable system to consider for further design and analysis of the Northbrook Corporate Center. Based on analysis provided, this report recognizes the superiority of the original design, and suggests a one-way concrete joist system for further study as a feasible alternative to the existing system.