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Technical Report #2: Pro-Con Structural Study of Alternate Floor Systems
Submittal Date: 31 October 2005

Executive Summary

Technical Report #2 is a basic overview of the main floor system of the building, along with a comparison of this existing system to four other alternative floor systems. The proposed floor system for the Erie Convention Center and Sheraton Hotel is a steel framing structure with 8" hollow-core precast concrete plank. Through the use of RAM Structural System Design, the CRSI Design Manual (2002), and hand calculations, I have analyzed and designed the members for the following four floor systems:

- Composite steel beams with composite steel deck
- Non-composite steel beams with form deck
- Open web steel joists with form deck
- One-way concrete pan joist

With each system, I compared the floor sandwich depth, weight, vibrations, time, and cost concerns with each other and with the existing system. From this analysis, I found that the existing system has the quickest erection time due to the use of precast concrete. The 8" plank will minimize the vibrations greatly, meeting serviceability requirements. Even though the floor sandwich is very large in comparison to the other systems, the difference in time and cost outweighs the benefits offered by this factor.

Other viable options are the composite system, the non-composite system, and the steel joist system. These structures are much lighter than the existing system, however vibrations for the non-composite and joist systems must be taken into consideration because of the thin slabs. The one-way concrete system is not a feasible option because of the on-site time for forming, pouring, finishing, and curing the concrete, as well as the greatly increased weight on the foundation and large girders needed.