Erie on the Park
Chicago, IL

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Structural Emphasis

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Executive Summary

It is the intent of this report to analyze alternative floor system designs and determine whether or not they are sensible alternatives to the current open-web steel joist system.

Current Floor System

The current floor system consists of a 2" concrete slab on metal deck diaphragm spanning across 14K6 open-web steel joists, which in turn span 26' between W12 steel beams.

Alternative Systems

The following alternative floor systems were compared to one another and to the original system based on a number of different criteria. These criteria are system weight (PSF), overall depth, potential for vibration problems, fire protection, constructability, and the cost of materials and installation.

1. Concrete Continuous Span Joists
2. Concrete Flat Plate
3. Concrete Flat Slab with Drop Panels
4. Lightweight Precast Concrete Double-Tees
5. Composite Deck and Composite Steel Beams

Conclusions

When investigating the alternative floor systems I realized that the concrete systems have an inherent resistance to fire which is a benefit during construction because spray-on fire proofing is not needed for these types of floors. The greater weight of the concrete systems is a benefit when considering induced vibrations, but it requires a more substantial foundation to support the increased dead loads. The precast and composite steel system provide a decrease in labor costs because the pieces are easily assembled and there is little to no formwork needed on site, unlike the cast-in-place systems which are heavily reliant on formwork. In the end two systems were eliminated from the list of viable alternatives: the concrete joist system because it was very costly to install and the flat slab with drop panels because it did not provide any significant advantages over the flat plate system. The remaining systems would require further investigation to determine the final candidate for an alternative floor system.