



Barshinger Life Science & Philosophy Building

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Structural Option  
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## Structural Technical Report #2

### Pro-Con Structural Study of Alternate Floor Systems

#### Executive Summary

This technical report outlines a preliminary investigation of four alternative floor systems. Simplified design calculations and product catalogs were utilized in developing adequate systems for the required design loads. All floor systems were designed for a typical bay of size 20'x30'. After reasonable systems were designed, they were compared against each other in such categories as weight, depth, ease of construction, construction time, vibration damping potential, foundation impact, and lateral force distribution. Vertical members were not part of the preliminary analysis, but were still considered in the overall system comparison.

The following floor systems were analyzed:

- Existing System: Composite Deck w/ Composite Members
- Alternative System #1: Composite Deck w/ Open-Web Joists
- Alternative System #2: Two-Way Concrete Waffle Slab
- Alternative System #3: One-Way Concrete Pan Joist System
- Alternative System #4: Precast Hollow-Core Plank on Steel Frame

Preliminary analyses determined that only the Precast Hollow Core Plank (#4) system merits future in-depth analysis as a true alternative to the existing composite. This alternative was chosen primarily on the basis of overall depths and system weights that were similar to or less than the existing system. It did not prove as efficient as the existing system over all the categories, but Alternative System #4 was the most promising.