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Courtesy of Bernard Tschumi Architects

Pro-Con Structural Study of Alternate Floor Systems October 29, 2003

Executive Summary

This report studied the various benefits and drawbacks to several alternate floor systems for the University of Cincinnati Athletic Center. The alternate systems were selected, assumptions and design decisions were made, and each system was evaluated in a weighted pro-con format to determine which ones are viable alternatives to the existing floor system.

The original system and alternatives #1, #2, and #4 are viable options. Alternative #3 is not a viable option.

Original System: Composite steel beams with composite slab on metal deck

- Lower steel member weight
- Reduced beam depths (good for architectural criteria)
- Increased construction time due to shear stud installation

Alternative #1: Non-composite steel beams with composite slab on metal deck

- Heavier members
- Better vibration control
- Good durability and fire resistance

Alternative #2: Non-composite steel beams w/ non-composite slab on form deck

- Highly constructible and flexible for unique floor plan
- Increased beam depth will reduce flr-to-flr height, plenum space
- Increased construction time due to shear stud installation

Alternative #3: Steel joists with composite slab on metal deck

- Lower individual member weight
- Inefficient and costly due to custom span lengths
- Building services equipment can be run through open webs, saving plenum space

Alternative #4: Concrete one-way pan joists

- Lower material cost
- Heavier dead load can impact foundation, lateral system
- Potential for huge material and labor savings if diagrid is concrete