



**CONCLUSIONS,  
RECOMMENDATIONS  
AND  
ACKNOWLEDGEMENTS**

## Conclusions & Recommendations

The goal of this thesis was to investigate concrete skip-joists as an alternative floor system. This included looking at a change in lateral system. One of the main issues with the current lateral system is the reduction in available exterior façade for windows. Creating more areas for natural lighting will help lower the lighting costs as well as increasing worker productivity.

The new reinforced concrete skip-joist system is a feasible alternative to the existing composite framing. An estimate comparison was performed using ICE 2000. The estimate of the new system showed a savings of \$400,000 over the existing system. In contrast to this, a look at the construction schedule showed an increased duration of 75 days. However, with the new system there is far less lead-time in material procurement. Formwork pans come in standard spans and depths. As a result, once the designer has settled on using skip-joists it is a matter of determining the joist widths. Once dimensions are settled procurement of the pans can begin. Reinforcement details can be worked out after the pans have been ordered. This allows for a more flexible design process.

Many other things need to be considered when making a decision on which system to use. For example, skip-joists significantly increased the required foundation sizes. The jump from shallow foundations to deep foundations could impose a significant cost increase. Since the Wilkins building already rests on deep foundations the cost implications would not be as large as switching from a shallow foundation. However, in some cases caisson diameters double and/or triple to support the increased building weight. To help offset the cost of increased diameters the caissons can be belled. Other things to consider are the effect on the lateral system. In this case, switching to concrete introduces a cost savings. Concretes properties create moment connections with very little effort. As a result, the entire facade of the building is freed up. Furthermore, the effect on ceiling cavity height is important to consider. If the ceiling cavity is too short complications can arise for other trades such as the mechanical, lighting, and plumbing teams. By switching to skip-joists, the ceiling cavity does not change significantly one way or the other. Another incentive to using concrete is concretes fire retardant properties. The existing steel system requires spray on fireproofing everywhere.

An important factor in settling on a floor system is the competence of workers in the area. For example, in Washington DC almost every building is constructed using concrete. Thus, the work force in DC is better equipped for concrete than steel buildings. In Columbus, both trades are used. Ceco Concrete has worked with many design firms to construct concrete skip-joist buildings in Columbus. This makes it more feasible to use skip-joists in the future.

In conclusion, either system will work for the Wilkins building. However, I feel it is important to have an uninterrupted façade allowing for as much natural lighting and ventilation as possible. For this reason, I would recommend reinforced concrete skip-joists with moment frames. The flexible floor plan is maintained while creating unobstructed views of Columbus from every location around the perimeter.

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