

Executive Summary

This report will detail the description and analysis of not only the current structural system of the Renaissance Schaumburg Hotel and Convention Center but also will investigate a steel frame alternative.

As the building is currently designed, it is a 17 story hotel (including two mechanical floors) that is composed of cast-in-place concrete columns and beams, and utilizes a 10" flat plate post-tensioned flooring system. In order to investigate if a suitable substitute could be found a few studies were complete on possible alternate systems. It was found that steel framing may lend itself well to this assignment. After analysis of the steel system, shear walls had to be replaced with braced frames in order obtain reasonable story drift. The system allows for comparable deflection (5.1" of deflection over a new height of 203' compared to 4.4" deflection over the original height of 188' – corresponding to an L/470 and L/510 respectively.

After the initial structural change a cost and time schedule study was completed in order to see which system would carry the most advantage. The steel system was estimated to save 16% over the use of the concrete system. The steel system costs about \$16.40 per square foot while the current concrete system is about \$19.50 per square foot. When comparing construction schedules of both buildings it was found that the steel system (assuming procurement of the steel was complete at the same time the concrete system would begin construction) was considerably shorter in erection time (approximately a 7 week difference).

The last study preformed included a detailed look into the lighting and design of the guest room spaces. Luminaires were selected online, modeled in 3D and the space was rendered and analyzed using Autodesk Viz 2006. The point of this exercise was to get a firm grasp of light space requirements and was an attempt to accurately depict how a finished space may look. An exercise that could also prove useful in the advertisement of the building prior to opening and would give the owners an accurate detail of the space they are attempting to create.

After thorough investigation, comparing the performance of the structural systems, their relative costs, and construction timelines, it is recommended that since the steel system is comparable in performance and saves considerably in terms of overall cost and scheduling it should be considered as an efficient alternative to the current system.

This report is limited to analysis based on the most current design documents made available for the Renaissance Schaumburg Hotel and Convention Center by the lead structural engineer and architecture firm. Its function is to provide a detailed description and analysis of the systems currently in use, and the system proposed through the document. Simplified sketches have been included to further explain system layouts and details. Please see the appendix for other figures.

