

Hiro McNulty – Structural Option
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Hyatt Regency – Hotel and Conference Center
Pittsburgh International Airport, PA
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Thesis Proposal



EXECUTIVE SUMMARY

The Hyatt Regency – Hotel and Conference Center at the Pittsburgh International Airport, PA, is a 275,000 square foot multi-use building located directly adjacent to the airport's landside terminal. The building consists of an 11-story tower and 1-story conference center with an additional partial level below grade.

In the original design of the structure, seismic loading was not required to be considered under the building code used, Boca 1996. The original design created a concrete tower, which under current building codes has very large seismic loads based on the building weight. While the current system was determined to be adequate under the calculated seismic loads, by reducing the building weight, it will likely reduce the seismic loading on the building and greatly change the design requirements under current building codes.

Research will be done to re-design the concrete tower to a steel framed system. Both braced and moment frames will be considered with research to determine which would be the most viable solution. Computer modeling will be performed using RAM, which is a commonly used structural engineering software package for structural steel design. Using the software, the building weight can be determined and compared to the calculated weight of the concrete tower. New lateral loading analysis will be performed to determine the decrease in loading due to the decrease in building weight. Analysis will also look at the impact the changes can make on the foundation of the building. With decreased building weight, it is believed that the foundation size can be decreased as well. Once the re-design of the tower is completed, research will be conducted to determine if the tower and conference center should remain independent or if they can be structurally connected without major impact on the buildings.

A cost estimate will be performed to determine the cost impact on the project with the proposed re-design. This investigation will look at the changes in member sizes for steel framing as well as the impact on the foundations. The cost will be compared to the original building cost to determine if the change in the structural systems will be justified. This analysis will be completed after the structural re-design has been completed.

Mechanical concerns will also need to be addressed when changing the structural system. Research will be done to determine if the new system impacts the mechanical systems in the building due to structural changes. In addition, the new system will require additional fire protection, most likely in the form of spray-on fireproofing to the steel members. Changes to mechanical systems as well as necessary changes for fireproofing will be determined and used in the comparison between structural systems.