Trump Taj Mahal Hotel

Atlantic City, New Jersey

Thesis Proposal
Executive Summary and Breadth Proposal

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Executive Summary

The Trump Taj Mahal Hotel is a 40 story hotel tower being built along the boardwalk in Atlantic City, New Jersey. It serves mainly as an expansion to the existing hotel on the adjacent lot. The tower's main lateral force resisting system is a massive concrete shear wall core. The floor system is comprised of both a filigree flat plate system in the main area of the floor plan and a conventionally reinforced concrete flat plate located in the core of the tower.

In order to open the Trump Taj Mahal Hotel in a more timely manner, a steel redesign will be conducted on the tower. This redesign will include both the lateral force resisting system and the gravity system. Special care must be taken in the design of each in order to avoid too many impacts to the architecture of the tower.

The lateral force resisting system will be designed as a core of steel braced frames. Adequate stiffness must be provided by the braced frames in order to effectively handle the design wind loads provided by the wind tunnel report issued by DFA. The strength requirements of AISC Manual of Steel Construction 13th Edition LRFD and the drift limitation of H/400 must be met or exceeded.

The current filigree gravity system will be redesigned as a steel frame with pre-cast planks. This system will be oriented in such a way that does not change the current floor to floor height of the tower. Some areas of the tower's plan may be too complex in order to utilize planks; therefore a slab on metal deck may need to be used in those areas.

By redesigning the Trump Taj Mahal Hotel in steel, various opportunities will arise for breadth studies. Two studies will be conducted; the architectural impacts resulting from the newly designed braced frame core and the construction management impacts of a steel structural system with comparison to the current concrete system.

Breadth Proposals

By redesigning the Trump Taj Mahal Hotel in steel, various opportunities will arise for breadth studies. Two studies will be conducted; the architectural impacts resulting from the newly designed braced frame core and the construction management impacts of a steel structural system with comparison to the current concrete system.

The redesign of the tower in steel will impose various effects on the architecture of the tower. Because of the significant amount of changes being made to the core of the tower, a study will be conducted on the architectural impacts resulting from the newly designed brace frame core. The impacts to the architectural layout of the core will include alterations of the core openings, stairs, elevators, and service areas. A significant amount of changes are also being made to the floor system of the tower. In order to properly conceal the newly designed steel frame at the perimeter of the building, the addition of soffits above the window of each hotel room may be required. The partitions in between each hotel room may need to be widened in order to conceal the steel frame running on column lines in between rooms. A Revit model with each structural system will be constructed in order to illustrate the key architectural impacts; Both floor plans and interior renderings will be utilized.

There is a substantial difference between the construction management of a steel structure and concrete structure. Such differences include cost, scheduling, sequencing, and site conditions. Cost and scheduling of each system will be estimated utilizing the 2007 RS Means reference. Sequencing will be conducted using Primavera Schedule; a schedule of both structural systems will be compiled. Site conditions, including the tower crane size and place, of the newly designed steel system will be analyzed and compared to the current site. Finally, both the steel and concrete systems will be compared, illustrating key advantages and disadvantages of each.