

Executive Summary

The G.Muttrah Commercial & Residential Complex is an 8 story multi use building located in the city of Muscat in the Sultanate of Oman. Located on the coast, the 280,000 square foot reinforced concrete structure consists of two-way flat plate system on the first two floors and a typical two-way slab system on the rest of the building. The lateral system consists of 10 shear walls that are located in the core of the building. Considered a safe seismic zone, the sultanate of Oman also has low average wind speeds compared to the United States which results in relatively few shear walls for such a building.

As a senior thesis design project, changes will be made to the structural system of the G.Muttrah complex. The building would be relocated to the United States for a more dynamic design of the lateral system which would include greater seismic and wind loads. Since the building is originally located in a unique environment, a city that most resembles Muscat had to be chosen in order to reduce the changes in the initial design condition while adding greater wind and seismic loads. The city chosen for the senior design thesis is Houston Texas.

In addition to the new loads due to the relocation of the building, the floor system will also be changed. The flat plate on the first two floors and the two way slabs on beam on the rest of the floors will be replaced with a two way post-tensioned flat plate system for the entire building.

Different structural design software's such as ETABS and RAM concept will be used along with hand calculations to design a new structural system for the G.Muttrah Building. The new wind and seismic loads would change the lateral system, possibly increasing the number of shear walls while the new floor system would also affect the overall weight of the building. The new design would be conducted using US codes and standards.

Furthermore, breadth topics will be addressed as part of the thesis design. The first breadth topic would be a study of the change in the construction schedule and cost of the new structural system. The second breadth topic would be a study on the architecture of the building since more shear walls will possibly be added and also the lower weight of the building might require less or smaller columns.