

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 were made to the structural system of the G.Muttrah complex. The building was relocated to the Houston, Texas, for a more dynamic design of the lateral system which included greater seismic and wind loads. Results from the design process indicated that 8 more shear walls, placed around the core of the building, were needed to sustain the new increased wind load.

In addition to the new loads due to the relocation of the building, the floor system was also changed. The flat plate on the first two floors and the two way slabs on beam on the rest of the floors were replaced with a two way post-tensioned flat plate system for the entire building. This new system decreases the thickness in the office floor from 14in to 8in. It also eliminated the beams in the residential floor while using fewer columns that spanned larger distances.

Furthermore, breadth topics were addressed as part of the thesis design. The first breadth topic is a study of the change in the construction schedule and cost of the new structural system where the analysis revealed that the new system saved about \$90,000 per floor and 9 weeks per floor in construction time. The second breadth topic is a study of the architecture since more shear walls are added, some of the interior spaces are redesigned to accommodate the new lateral system.