

Executive Summary

The following Senior Thesis Report is the conclusion of a year-long study and research of multiple analyses developed through the knowledge encompassed through the Architectural Engineering curriculum at the Pennsylvania State University. This report is on the construction of 2B + G + M + 7 Mansoura Development, located in Doha, Qatar. Three analyses were conducted in order to provide and target problematic and acceleration schedule concerns through the use of Precast Concrete construction, implementation of different construction practices and lastly through field labor management and different scheduling techniques.

Analysis 1: Construction of Precast Concrete vs. Cast in Place Concrete

The first analysis focuses on the feasibility of replacing the exterior cast in place wall with precast concrete wall panels. Through the use of precast concrete modules, the schedule benefited from schedule reductions. In addition, the panels were tested to explore the structural and mechanical effects it would have on the building and was compared with the current cast in place system. After conducting this analysis, the overall schedule was reduced by 9 days, with an added cost of \$459,729, however there was potential cost savings through resizing of mechanical equipment and structural slab and foundation thickness.

Analysis 2: Comparison of Construction Practices between the US & Qatar through the Assessment of the HHD project (Penn State) & the Mansoura Development

The second analysis investigated the different construction practices that were implemented between both the US & Qatar. It was to identify the differences and see what could be improved with the current construction process for the Mansoura Development, to create the opportunity to improve the schedule, cost of the project and general quality of the final product. The three main topics compared were Labor wages, Safety Programs/Procedures and Quality Control Programs. The results of the analysis proved that having higher/trained skilled labors, OSHA trained personnel and a better quality control program like the HHD project was in the best interest to reduce project cost and schedule.

Analysis 3: Field Labor Management and Alteration

The third analysis aimed to find schedule saving scenarios, in order to by-pass the halt of construction during the hot summer months in Qatar, where temperatures reach over 122 °F. The primary concern was to build the superstructure before the summer months therefore re-sequencing activities was important. The use of a short interval prediction schedule (SIPS) proved to be very successful, with the implementation of a Man Power Loaded Schedule to portray the man power on the site at all times and make sure SIPS was a feasible option. This analysis estimated over 3 months of schedule savings.