

Executive Summary

Over the course of the 2013 and 2014 academic year, Memorial Vista was analyzed to identify areas in which alternative solutions in either construction or design would enhance the project's goal of shortening the schedule. These analyses were brought forth after an unforeseen utility relocation extended the original base building completion date 68 work days. Through feedback from the project team, independent research, and advisor meetings, three major areas were chosen for additional analysis. The following report presents the three analyses as part of the Architectural Engineering senior thesis project at the Pennsylvania State University. It is important to note that the purpose of this thesis and analysis is strictly educational and is not intended to critique the project or team in any way.

Analysis 1 – SIPS Scheduling Applied to the Building's Façade

Memorial Vista has a façade that is made up of glazing, precast concrete panels, and metal paneling. All of these elements are bolted or welded directly to the concrete structure upon installation after they have been properly framed. For this analysis, the façade will be looked at to produce the most efficient installation of the materials that make up the façade. By implementing SIPS, the schedule will be reduced in its overall duration for enclosing the building, which in turn would reduce the duration of the entire project schedule. In the end, the analysis will yield a savings of 33 days if implemented, along with a general conditions cost savings of 2%.

Analysis 2 – Prefabrication and Study of Photovoltaic Windows

For this analysis, the installation of the windows will be studied even further. This building is made up of 65,558 square feet of glazing, where the possibility of prefabrication and modularization of the glass could be done to allow for a quicker installation time. Instead of hanging one window at a time, multiple window systems could be manufactured and then lifted into place to quickly attach to the structure. The result was that 10 days were saved in the prefabrication process alone on top of the 33 days saved from Analysis I. To potentially allow for more incentive of this analysis for the owner, the south façade of the building was also fitted out with photovoltaic glazing. In the end, the pay off period would be just under 24 years with only a 1% savings on the annual bill, which leads to that part of the analysis to be turned down.

Analysis 3 – Implementation of an Automated Parking Garage

The final analysis looks at the parking garage that was designed. The owner asked that the contractor excavate to the lowest foundation level across the entire 4.7 acre site looking for contaminated soil. This is extremely time intensive, where if an in-situ electrical thermal treatment was completed, time may have the potential to be saved. The cost will be increased 14 to 24%, but the time saved may be well worth the expense. To further reduce the schedule, an alternative to a conventional ramp style parking garage will be studied. The idea of implementing an automated parking garage will reduce the depth of excavation both horizontally and vertically. In the end, the goal of reducing the schedule should be accomplished with the potential for a garage with the same number of spaced for 40% of the overall cost.