

Executive Summary

Over the course of 2013 and 2014 academic year the following four analyses were performed for the Wardman West Residential Project located in Northwest Washington, DC. The main theme throughout these analyses was the implementation of an architectural precast concrete wall panel system in lieu of the lagging existing brick veneer wall system construction. The intended results of this proposed change was to save the owner money and accelerate the project schedule.

Analysis 1: Prefabrication of Brick Exterior Skin

This analysis investigated the use of architectural precast concrete wall panels in lieu of the building's existing hand-laid brick veneer wall system. The ultimate goal of this analysis was offer the owner schedule and cost savings with the lower material cost and faster erection and installation time associated with architectural precast concrete panels. The erection of the precast concrete wall panels would allow the building's wall system to be completed 88 days faster and reduce the overall building enclosure schedule by over a month at 31 days. The implementation of precast concrete wall panels would also save the owner approximately \$737,000 with a total cost of \$3.4 million, an 18% reduction in cost from the existing brick veneer wall system's total cost of \$4.1 million, and furthermore, a 4.8% reduction in the overall cost of the building's exterior enclosure.

Analysis 2: SIPS

A SIPS or Short Interval Production Schedule was developed for both for the original exterior brick work and for the erection of the proposed architectural precast concrete wall panels from the first analysis. Each scope of work will include a SIPS matrix schedule used to track the completion of construction zones and also a revised project schedule. The brick SIPS significantly improved the workflow of construction by optimizing manpower, which resulted in reducing the schedule by 12 days to 133 days, compared to the original brick work duration of 145 days. The APC Wall Panel SIPS also saved time to the project schedule by reducing the overall estimated duration for panel erection at 57 days down to 54 days.

Analysis 3: Safety Evaluation

To effectively evaluate the safety concerns associated with the erection and installation of precast concrete wall panels, an in-depth scoring comparison was performed with traditional brick masonry installation, as well as the creation of an Activity Hazardous Analysis. While, precast concrete wall panel erection resulted in a higher risk construction activity, both brick and precast wall panels have a significant amount of safety concerns when performed. With the help of this scoring comparison breakdown; the required training, inspections, PPE and concerns are identified. Also, the Activity Hazard Analysis specifically created for precast concrete wall panel erection and installation, would also benefit safety coordination on the project and ensure site safety is maintained.

Analysis 4: General Contractor Implementation Study for APC Wall Panels

The fourth analysis performed was a study investigating the implementation of architectural precast concrete wall panels as building enclosure system. The study resulted in an in-depth guide for general contractors on product selection, project team responsibilities and logistics. The practicality of the study allows it to be used as a tool for general contractors to reference when deciding on or coordinating the use of architectural precast concrete wall panels on a project. Overall, the implementations study would be beneficial to the general contractor, Clark Construction, on the Wardman West Residential Project if the building's exterior brick veneer walls were substituted with architectural precast concrete wall panels proposed in the first analysis.