

Section 2: Executive Summary

The Thesis Final Proposal is intended to discuss the four key technical analyses that influence the execution of the Square 1400 Apartment Building located in Fairfax, VA. The building is a 327,431 SF apartment building with a neighboring three-story parking garage. Each of the analysis topics focuses on one idea that will improve the efficiency of construction. These topics include structural modification, schedule efficiency, prefabrication implantations, and energy savings systems.

Analysis 1: Change in Cast-In-Place Structure

The current structure for the Square 1400 Apartment Building is a six-inch cast-in-place structure with post-tension reinforcing. This cast-in-place structure has a large impact on construction cost, schedule, and manpower. The design of a new structural system, wood or Infinity, would result in a substantial direct and indirect cost savings with possible impact on the overall project schedule.

Analysis 2: SIPS (Short Interval Production Scheduling) + BIM (Building Information Modeling)

The project utilizes traditional scheduling techniques and minimal BIM was implemented. The use of the Short Interval Production Schedule (SIPS) method helps to break construction activities into detailed repeatable activities. This differs from the conventional way of project scheduling as it usually breaks projects into smaller operations instead of larger tasks resulting in a higher level of detail for individual tasks, which increases productivity and quality control.

Analysis 3: Increase Production Through Precast Brick Panels

Traditional Fraco Scaffolding System was used on all sides of the building to assist with the placing of exterior brick. This tied up the exterior of the building, which made it difficult for different trades to perform work on the building envelope and get materials into the building. This slowed down the production of a number of trades. The use of prefabricated brick veneer panels will substantially increase productivity, decrease site congestion, and improve trade coordination while achieving a similar building aesthetic.

Analysis 4: Critical Industry Issue: Operations and Maintenance + BIM

Today's buildings are becoming more complex and difficult to operate as there is a high demand for information rich models that will assist with the upkeep of the different building systems. In some cases, a more complex building means more energy costs. In the apartment setting, it can be challenging to monitor the energy use between each apartment unit. With the installation of an energy-savings dashboard, the hope is that the competitive nature of the residents, along with other incentives, will greatly reduce the building's overall energy intake.