

## EXECUTIVE SUMMARY

The following Senior Thesis Final Report is the culmination of multiple technical analyses developed through knowledge gained in the Architectural Engineering curriculum as well as through industry member experience. This report focuses on the construction of the Science and Technology Center at Coppin State University located northwest of Baltimore, MD. Four analyses were executed in an effort to provide schedule acceleration scenarios through production principles, modularization, and new design methods.

### **Analysis 1: Schedule Resequencing**

The first analysis addressed the feasibility of resequencing the original schedule and replacing a portion of the exterior cladding assembly. In addition, different production methods including the lean principles of Short Interval Production Scheduling and Last Planner were investigated for implementation. The cladding system replacement from terracotta wall tiles to brick veneer proved to be cost prohibitive, while the lean principle of Last Planner exemplified significant benefits.

### **Analysis 2: Modularization of Curtain Wall System**

The second analysis focused on implementing a unitized curtain wall system. With faster prefabricated production offsite and less expensive labor necessary onsite, this method provided areas of cost savings and schedule reduction. In addition, lean production methods, such as pull production, were implemented for more efficient construction methods. Through these methods, the project schedule was reduced by 28 days and costs were reduced by \$612,000.

### **Analysis 3: Finned Tube Radiator System Design**

The third analysis investigated a value engineering option of replacing the finned tube radiators along the perimeter of the building with linear diffusers in the ceiling. Eliminating the labor-intensive brazing connections and expensive hydronic piping for the radiator units provided an opportunity to reduce the schedule and save costs. Ultimately, the total boiler load was reduced by 358,000 BTU/HR, the schedule was accelerated by 62 days and \$132,000 in cost savings was determined.

### **Analysis 4: Alternative Foundation System**

The fourth analysis focused on an alternative foundation support system in lieu of the current rammed aggregate pier design. A driven steel H-pile system was chosen to support the foundations on the south end of the building. This system provides higher quality assurance standards and, in this particular case, an accelerated installation time. In total, the schedule for this activity was reduced by 40% and a total of \$25,000 was saved in the project budget.

Through these four analyses, the schedule was accelerated by 94 days and a total of \$769,000 was saved. These findings lend to the overall goals of the owner for schedule acceleration and cost savings while also providing a basis for effective implementation.