Executive Summary

This is the thesis final report, which will provide 4 in depth analysis of the Educational Activities Building project, located at Penn State Harrisburg. From the technical assignment performed in the fall semester, four problems or opportunities were identified to improve the construction process of this project.

Analysis 1: Alternative Roof System (Green Roof) - An opportunity for gaining more potential LEED credits to obtain LEED Silver Certification. An in depth research has been done on different green roof systems an d the current roof system was investigated to ensure the structural stability when the green roof is added. As a result an extensive green roof system was chosen for the Educational Activities Building which would cover 16,000 SQFT of the roof area. The green roof will take 4 days to be installed with a total cost of $181,120. This is a high initial cost for the new roof system; however the return on investment could be seen within the lifespan of the green roof. The biggest benefits are increased real estate value, stormwater management and reducing energy consumptions which results in utility savings.

Analysis 2: MEP Systems Prefabrication/Modularization -Prefabrication/Modularization is a critical industry issue that was considered for the Educational Activities Building project at the 22nd annual PACE Roundtable. MEP systems are the second most building systems that implement prefabrication. The prefabrication scope includes the main ductwork, electrical conduit and plumbing pipes. After a thorough research of this construction method and looking at case studies from previous project it was determined that MEP systems prefabrication will slice the schedule by 41 days. The original MEP systems completion day was 1/9/2014 but after the schedule reduction it was moved to an earlier date 11/13/2013. As for the implementation cost, the total labor savings is $362,329.52 and the general conditions savings is $130,238.14.

Analysis 3: Structural Steel Sequencing- it had been identified that there is a room for improvements in the steel sequence. Because it is on the critical path, many other tasks are dependent on it. To eliminate any potential delays, a new sequence plan is proposed, which will make the process more efficient, save 8 days from the project schedule and $27,328.32.

Analysis 4: Technology Integration for Information Management- The owner of this project "Penn State" is one of the industry leaders when it comes to the use of BIM thanks to the Office of Physical Plant. BIM is heavily used on the Educational Activities Building project but there is a room for more BIM uses such as a project document management and building maintenance scheduling. Additionally, tablets and desktop stations will be used in the field to increase productivity. The cost for the tablets and desktop stations are between $10,000 and $13,000 with a general condition savings of $2,565 per week which results in a $164,160 savings over the entire project schedule.

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