December 18

Proposal

2007

St. Elizabeth's New Psychiatric Hospital
2700 Martin Luther King Jr. Ave., SE
Washington, DC 20032

Nicholas Nigro
Construction Management
Dr. Riley

Table of Contents

I. Executive Summary

This document contains the specific areas of interest that will be analyzed for my thesis research this spring. The three particular topics contained within are Workforce Development, Structural Steel Erection Sequencing, and Removal of Green Roof.

Analysis I- *Work Force Development*

This analysis will attempt to identify the causes of negative industry perception and examine the necessary steps to reengage interest into the trades.

Analysis II - *Structural Steel Erection Sequencing*

This analysis will focus on re-sequencing the complex steel erection sequences that are intertwined with the masonry phasing schedule. This will also involve an in depth look at crane usage and placement. The goal of this analysis will be to reduce the overall construction schedule and improve the flow of superstructure phasing.

Analysis III – *Removal of Green Roof*

This analysis will explore the long term benefits of a green roof system in comparison to its short term construction impacts both environmentally and economically. A redesign of the roof will take place to accommodate a more conventional roof system. This will involve both structural support system (**Structural Breadth**) and the mechanical system (**Mechanical Breadth**) supplying the space.

II. Introduction

The Project consists of a 2-story 448,000 square foot new psychiatric hospital that includes both criminal and civil wings, a central mechanical plant, auditorium, gymnasium, and commercial kitchen. The project broke ground in December 2006 and has been progressing at scheduled speed. Presently, the new hospital is midway through the erection of the building superstructure and the on-site personnel count is at approximately 125.

Area Statistics

- Gross Area: 448,190 sq ft
- Assignable Area: 349,730 sq ft
- Amenities and Building Support: 99,460 sq ft

Occupancy Classification:

Mixed Occupancy building with dining, treatment malls, wards, and small area of Assembly occupancy on the first floor.

III. Analysis 1 - *Work Force Development*

Problem Statement

The PACE roundtable attempted to address the current state of the construction industry with regards to its labor force. The discussion on Workforce Development brought up interesting points about the declining involvement of domestic workers. As a result, the workplace has been flooded by foreign help and language barriers are becoming problematic. Aside from this issues however, the industry deserves a thorough look into where the allure of being a tradesman was lost, and what can be done to restore it, if anything.

Research Goal

The past few generations have cultivated a negative perception of the construction industry and it is becoming more and more powerful in the eyes of the nations' youth. The desire to become a tradesman has dropped drastically and our industry is seeing the effects

NIGRO

in a major way. My research goal for the next several months is to analyze the methods of recruitment for both the roofing and electrical trades and draw conclusions about what can be done to re-stimulate domestic interest. I intend to determine whether or not there is a chance to reengage our youth into this industry, and if so, what are the necessary steps that need to be taken in order to succeed. Through this research, I ultimately intend to formulate a tool to boost trade enrollment and test its effectiveness.

Research Steps

1. To begin, I need to gain a comprehensive understanding of the current state of the industry by looking at current employment information.
2. In order to get a hold on past employment trends in the industry, I need to compile data from previous years outlining where youths have been heading post high school.
3. Contact Penn Tech and Inquire about their recruitment techniques.
4. I then intend on surveying the general public to get an idea of what common perception of the construction industry is.
5. Once I have a database of hard employment numbers, the next step is to communicate with contractors to see where they are commonly pulling their labor force from.
6. I would then interview industry members about what they feel the future looks like for the workforce and gain insight into what their thoughts are for change.
7. After gathering all of the fore mentioned information, I will then make deductions as to where the industry currently stands and what needs to be done to move it into the desired direction.

Sample Survey

1. What is your highest level of education?
2. Are you in the construction industry?
3. Is someone in your family in the construction industry?
4. If yes, are they happy with their current career?
5. What do you think the average yearly salary of a plumber is?
6. Would you recommend that your child pursue a career in the construction trades?
7. Would you approve of your son/daughter marring a person in a construction trade?

St. Elizabeth's Hospital

Page | 5

IV. Analysis 2 - *Structural Steel Erection Sequencing*

Problem Statement

The intricacy of the 38 separate steel erection sequences posed coordination problems with masonry production. If either trade strayed slightly from the strictly prescribed sequencing and phasing schedules, there were direct schedule impacts due to either party not being able to perform work.

Research Goal

The new hospital is designed as a load bearing masonry structure with an internal steel frame that supports SOMD for the first, second, and third floors as well as for the roof. The structural steel sequencing became extremely intricate when combined with the phased masonry schedule. I believe an in depth look at redesigning the projects' phasing and crane usage would yield a significant schedule reduction and in turn general conditions cost savings.

Research Steps

- Examine current steel erection sequences
- Devise an alternative time saving sequence
- Model alternative sequence using 4-D software
- Compute any additional costs attributed to accelerating steel erection
- Compute reduced general conditions costs after reduction in overall schedule
- Compare additional results to current sequencing

Expected Results

Through this analysis I expect to accelerate the current schedule and reduce the complexity of the sequencing. By reworking the phasing and taking a thorough look at crane placement and/or adding an additional crane, I hope to reduce the overall duration of the project and in turn lower general condition costs.

V. Analysis 3 – *Removal of Green Roof*

Problem Statement

A non-inhabitable Green Roof was designed for a large portion of the hospital's roof.   As a structure that pursued no LEED® rating or any other sustainability practices, was the green roof economical and do its long run benefits actually outweigh its environmental construction impacts?

Research Goal

I intend to compare the long term benefits of a green roof to its environmental construction impacts. For example, does the additional steel required to support the roof have a greater environmental impact than the roof is able to return in the future? In addition to this sustainability research, an alternative roof design will be explored which will require the redesign of the structural system supporting the roof as well as the mechanical system supplying the space. The benefits of a green roof directly correlate to a reduced heating/cooling load in a particular space. In the specific situation of removing the green roof from the building, the mechanical loads involved would have to be re-examined and designed accordingly. An in depth look at increased mechanical costs would have to be explored and compared to the structural savings incurred by reducing the roofs load.

Research Steps

- Gain excellent knowledge of green roof systems including construction methods and long term benefits
- Quantify pros and cons of green roof system
- Redesign the roof structure to accommodate a more conventional roofing system
- Redesign the mechanical system servicing the space to support the alternative design
- Compare and contrast the opposing roof systems in terms of cost, schedule and environmental impacts
- Make recommendation as to which overall roof system is the most appropriate for this application

Expected Results

The expected outcome for this analysis is reduced costs and schedule acceleration if the green roof proves to be environmentally and economically unnecessary. However, if the redesigned roof system does not disprove the green roof option, it will be recommended that the design remains as is.

VI. Summary

Through this research I expect to gain an in depth knowledge of tackling real world issues presented with projects on both the management and design sides of the spectrum. Examining the analyses selected will allow me to interact with industry members to come up with viable solutions to the problems at hand. On a more specific level, I hope to gain extensive knowledge on the benefits of green roofs and become exceptionally proficient with scheduling techniques. Overall, I look forward to expanding my academic knowledge gained thus far by closely interacting with several facets of the construction industry.

VII. Weight Matrix

Description	Reserch	Value Eng.	Const. Rev.	Sched. Red.	Total %
Work Force	30				30
Removal of Green Roof		15	15	5	35
Steel Sequencing			15	20	35
Total %	30	15	30	25	**100%**