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11-20-2006

Technical Assignment 3

Alternative Methods and Research

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A. Executive Summary

Within this technical assignment are the initial steps that will be the framework for the thesis research and analyses that will be written in the future. The topics that are discussed in this report are critical industry issues from the fall PACE (The Partnership for Achieving Construction Excellence) Roundtable, a critical issue research method, a problem identification list, technical analysis methods, and a weight matrix.

The critical industry issues highlight the fall PACE Roundtable. During this seminar there were 3 discussion sessions with multiple topics for the attendees to choose from. The discussion sessions I attended were entitled “Start-up, Operations, and Maintenance”, “Modeling Implementation and Challenges”, and “Building Respect with Owners and Operators”. The information that was presented at the Roundtable was informative and helpful but did not help in regards to formation of ideas for thesis research and analyses.

The critical issue research method develops a research topic to study. From the experience on a jobsite of a historical renovation, I have focused on building rehabilitation and the development of methods to simplify the error filled process that comes with renovating a building. Considering that every renovation is different, I have produced a questionnaire which I plan to distribute to companies and individuals that have first hand experience to gain a better understanding of the problems they have faced and how they solved them.

The problem identification list and technical analysis methods identify possible problems on the project site and have us expand those problems into an analysis which could benefit the project in some way. The current analyses that I am pursuing are:

- A value engineering analysis which concentrates on the converting individual room heating pumps into air handling units that service multiple rooms.
- A schedule reduction analysis that compares a structural wood system to a structural steel system and the schedule impact of the change.
- A constructability analysis on the water reduction systems that could be applied around the site and the cost impact.

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B. Critical Industry Issues

Session 1D – Start-up, Operations and Maintenance

- What are the most common forms of callbacks and maintenance problems in recently completed buildings?
- What are the best practices that can be applied during project start-up?
- How can owners prepare O and M teams on new building projects?

The discussion was highlighted by what many of the industry members found important in the start up of a building. The time allotted allowed topics to vary from the quality involved in the turnover of a building to the expectations that an owner may look for in their building before turnover.

Session 2C – Modeling Implementation and Challenges

- What are the technical challenges faced by companies during implementation?
- What opportunities does BIM present?
- Is it a significant change to shift toward BIM?
- What part of projects should or should not use BIM?
- What would make BIM more practical & appealing?

The basic consensus at the beginning of the discussion was that BIM is underused and moderately new. Although there were experienced BIM users present, the interest of implementing BIM into the working world was still present. The use of BIM in different phases of construction and by different groups was seen as a must; however, most of the negative BIM factors came down to its cost. The best way to make BIM appeal to owners and others is to make it standard thus everyone can see its worth and usefulness.

Session 3A – Building Respect with Owners and Operators

- How can builders best earn the respect of building owners and operators?
- What are the indicators of respect by an owner and how does this affect projects?
- What are the most common ways to lose respect of owners?

Although the respect of others is encountered, it is rarely discussed; this session gave the group a chance to do so. The ways to build and hold respect were laid out in this discussion, which were being honest and communicating as well as other common sense ideals. One of the other ways of respectful conduct was to work with the owners and operators and not for them thus to build trust and a relationship instead of just providing a service.

The Partnership for Achieving Construction Excellence Roundtable this fall was themed Building Respect. The discussion sessions that comprised the bulk of the Roundtable varied from challenges with building systems and new modeling technology to developing respectful relationships with other individuals within the industry. It also held group building activities and times in which to meet the other attendees.

In my own observations, the discussion sessions were enthusiastic. The level of interest and knowledge in all the topics was high which initiated interesting and informative conversations. Unfortunately for myself, I did not find any of the information presented specifically useful for the historical project that I am researching.

C. Critical Issues Research Method

Problem Statement
During the design and construction of a building that is being rehabilitated there is a typical expectation for problems and inconsistencies to arise. With a consistent supply of buildings that need to be rehabilitated, continually having problems and inconsistencies on a project hurts the schedule, costs, and ultimately the company undertaking the project itself. Therefore, with all experience that has been accumulated so far, should there not be a preferred construction method for rehabilitated buildings that could maintain if not save schedule time and costs?

Research Goal
The desired result of this research is to gather witnessed solutions by professionals in the construction industry with a focus on building rehabilitation. With the gathered information recorded, it would be possible to produce procedures to aid in the design, construction, and troubleshooting of a building rehabilitation. Thus having predetermined procedures, there is the possibility to reduce cost, delays, and the project schedule.

Research Steps
1. Identify and review current literature on the rehabilitation or renovation of buildings.
2. Develop a list of questions based on reviewed information and research goal to obtain opinions and knowledge from experienced professionals.
3. Conduct interviews with practiced professionals to discuss developed questions in focus of finding ways in which to refine the process of rehabilitating a building.
4. Compare results gained from interviews with professionals with reviewed literature of building rehabilitation.
5. Compile and summarize researched results into a presentable fashion for others to read and understand.

Interview Questionnaire
The following questions are the initial draft of questions that I would be using during possible interviews with experienced building professionals.
1. In what areas of the United States have you been involved with rehabilitated buildings?

2. What is you level of experience with building rehabilitation or renovations?
3. In what phases of the rehabilitation were you involved?
4. In those phases, how were you involved?
5. During that phase, were there any problems that could have been avoided through better planning? If so, please explain.
6. Due to any problems on the project, how were the schedule and costs affected?
7. From your own experience, is there a way in which many of the problems faced in a building rehabilitation could be fixed? If so, please explain.
8. Do you find current rehabilitation standards lacking? If so, in what ways?
9. Do you have any other opinions or experiences that may contribute to better understanding of building rehabilitation?

D. Problem Identification

The following topics are identified as sources for potential studies or analysis.

Room HVAC Systems
The current design that was undertook for the guestroom heating and cooling was an individual heat pump system that was located in a ceiling compartment at the entry foyer to each room. These systems do not have a direct fresh air source and are only supplied fresh air indirectly from the corridors or transferring through the windows. An alternative to these systems would be one air handling unit that could supply a whole building.

Steel versus Wood
The design for the additionally constructed building on the project site is a combination of steel and wood construction. There are other types of structural systems which could be used in the construction of the new building. A cost comparison between the existing structural systems and a conceivable alternative system can develop potential schedule or cost reductions.

Site Water Reduction
Through continual reoccurrences, water has made itself a problem on the jobsite. It has damaged existing structure sections as well as inhibited new installation however; many aspects of water damage prevention were not designed into the renovation of the building. An analysis of potential systems that could have been applied in addition to other precautions that can be taken could be completed. Other cost and schedule impacts can be given to show the effect if results from the analysis were applied.

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E. Technical Analysis Methods

The analysis methods presented below are formed from problems that have been identified at the jobsite for The Bedford Springs Hotel or by other sources. Each analysis is a basic framework for a potential study that could be beneficial toward the renovation of the hotel.

Analysis 1: Room HVAC Systems
The intent of this investigation is to determine the feasibility of heating and cooling each building with a limited number of air handling units. By exchanging room individual units for units that may supply multiple rooms, the quality of the airflow may stay the same if not become better all the while reducing initial unit costs and eventual maintenance costs. The desired result of the analysis is a value engineered mechanical system that is efficient but also reduces the scheduled installation time and cost.

Analysis 2: Steel versus Wood
The purpose of this analysis is to determine if it is more time and cost effective to use a structural steel system over a structural wood system. I intend to discuss possible constructability methods as well as cost variations with the department faculty and the site contractor. The goal is to use a system that not only allows the structure to be completed faster but also lets MEP and interior carpentry contractors into the building during the construction.

Analysis 3: Site Water Reduction
The reason for the study is to find constructible ways to reduce the impact of groundwater levels on the currently renovated structure. The main areas of concern are on the ground floors were there is underground ductwork, elevator pits, or wood joist supported flooring. I will examine possible solutions for each individual area and drainage possibilities for the entire site. The end result of this study should be potential solutions to the sites water problems as well as cost impacts for them to occur.

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F. Weight Matrix

The chart below shows the emphasis which will be put on the different topics chose for analysis.

Description	Research	Value Engineering	Constructability Review	Schedule Reduction	*Total*
Analysis 1: Room HVAC Systems	5%	15%		5%	*25%*
Analysis 2: Steel versus Wood		5%	5%	10%	*20%*
Analysis 3: Site Water Reduction	5%		15%	5%	*25%*
Issue Research: Building Rehabilitation	20%		5%	5%	*30%*
Total	*30%*	*20%*	*25%*	*25%*	*100%*