



Milestone Business Park
Building #4
Germantown, Maryland

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Construction Management

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Technical Assignment III

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Executive Summary

This goal of this technical assignment is to provide a preliminary outline of the research I will be conducting next semester. Included in this document a summary of the critical industry issues discussed at the PACE Round Table, research topic, identification of problems and opportunities and analysis topics.

I will focus my research on LEED design and implementation. The goal of this research is to provide industry member with adequate LEED information prior to design and bidding through an information pamphlet, LEED guide and a list of experienced and interested industry members. Breadth topics will include implementing additional LEED points to advance the rating, an interior tenant design and eliminating surface parking with the addition of a parking structure.



Critical Industry Issues – PACE Round Table

A. Prefabrication

The first session during the PACE Round Table discussed the pros and cons of prefabrication. Dr. Horman opened the panel with a generic description of prefabrication, which he defined simply as preassembly. The panelist each described prefabrication and their use of it.

Prefabrication can be placed in two distinctive categories: offsite prefabrication and onsite prefabrication. Offsite prefabrication includes any work done offsite in a controlled environment; such as steel fabrication and precast concrete. Onsite prefabrication includes rebar ties to prepare for a concrete pour.

The main benefit of prefabrication is the ability to assemble systems before arriving onsite. Prefabrication happens more often than realized through MEP trades, precast concrete and steel fabrication. A representative from Southland Industries stated they prefabricate most of their duct work before arriving onsite. He also stated they are working towards becoming more digital when designing the mechanical system, with the use of AutoCAD files and Building Information Modeling (BIM).

Another advantage of offsite prefabrication is the controlled environment the system is assembled in. By assembling in a controlled environment, the contractor is guaranteeing the desired quality assurance. Prefabrication also allows quality control checks to be more effortless and performed in a more efficient manner.

By prefabricating offsite, this allows for faster onsite assembly and construction. Trades are better able to handle crews due to less congestion and ultimately able to cut back in the cost of general conditions.

One last benefit I will discuss can also be considered a con. Final design decisions are made early on. If done correctly, prefabrication can start earlier and has the ability to reduce design changes and change orders later in the construction phase. Stan Carlat of Hensel Phelps, states making final decisions early in design phase is nerve racking and ambitious for the design team. Another disadvantage of prefabrication is the time, money and thought it takes from a design standpoint. It is also felt the architect or design team lacks the freedom of creativity. When performing large productions, such as houses in a development, the design team is unable to



customize. At the round table, it was also noted that the design team will need some incentive from the owner.

Lastly, prefabrication in Green Building was discussed. Due to the fact Milestone Building #4 is a LEED Silver building; I feel I could implement this topic into my research. Benefits of prefab in Green Building include the reduction of waste and cost of production and better quality of component system. When prefabricated, component systems operate more effectively and efficiently which allows for enhanced indoor air quality (IAQ).

B. Building Information Modeling (BIM)

This summer, with the job I was working on, there were many RFIs regarding spatial coordination of the MEP systems. These RFIs led to time and scheduling issues along with additional costs of labor and material. I am especially interested in this panel discussion, because I have experienced it first hand and am looking for ways to decrease the RFI and change order flow.

Some key advantages of Building Information Modeling (BIM) include early communication through the design teams, engineers and trades, communication through visualization and the capability to decrease RFIs and change orders. By thorough coordination between trades and design professionals early on, the construction team is later able to be ahead of the game during coordination meetings. This is able to increase efficiency by productivity and cost benefits. With incorporating the earlier panel discussion, by implementing BIM, offsite prefabrication is able to start sooner.

A cultural shift is noticed when incorporating BIM into a project. There will need to be continuous training and retraining of the workforce. Current tools do exist to incorporate BIM; we as construction professionals need to spread the word.

Another challenge is the actual implementation of BIM into projects. Time, cost and lack of knowledge are huge factors but owners aren't requiring BIM. Todd Vochinsky of Baron Malow Company closed out by mentioning that it is hard to quantify money and time savings until a mistake happens.

Between all panelists, the benefits and challenges of BIM were clear. However, Kurt Maldovan of Jacobs Engineering stated that GSA is converting to BIM and is starting to require it on all of



their jobs. This is extremely important to me and the company I work for since GSA is one of our largest clients. Another panelist mentioned that “We do not want to have the general contractors and subs not bid on a job because they don’t have the technology, but rather teach and help the subs learn BIM to have partnerships in the future.” I feel this is extremely important in today’s industry and where fellow students and I can play a large role on the construction team.

C. Workforce Development: Labor/Management Shortages

Working in and around the Nation’s capital the workforce is always there, but the quality of the workforce is not. Many of the laborers were of a minority, unskilled and lacked communication skills. I didn’t realize this issue until I worked on a job for the FBI, where we had to turn away many members of our workforce due to immigration and security concerns.

The discussion was opened with Dr. Riley presenting the audience with a few jaw-dropping statistics: 10% increase in retirees and 30% decrease in new enters of the workforce. It is best to break down this discussion into three categories; the value of good labor, how do you get new labor and how do you keep the laborers.

The Value of Good Labor

The panel discussed the increasing number of minorities in the workforce. The intensity of this concern is primarily based on job location; however it is a hot topic. With the workforce becoming more diverse, the issue of illegal immigrants arises. These laborers are usually inexperienced but are appealing to trades because of their willingness to work for low wages. The companies then become responsible for training the new hires, but due to lack of time they are often trained on the fly. Another concern with legal immigrant and minorities is their communication skills. Many speak their native tongue with minimal English. This causes superintendents to be bilingual and the value of new hires with a second language is very appealing.

How do you get new labor?

Many panelist feel construction knowledge should start during childhood development. There are already many organizations set in place; Operation Toolbox, Bob the Builder, Operation Workplace. These all allow children to become aware of the construction industry. Technical schools, high school and armed forces have programs established that teaches a skill; electrical, welding, mechanical... Trades should then try to recruit from these establishments.



How do you keep laborers?

The panelists agreed that the best way to keep laborers is to show them a career path and a vision. Continuous training and responsibility proved to be most attractive. Offering benefits such as a healthcare and retirement plans and higher salary can also be considered ways to maintain employees. Ray Sowers of ONCORE Construction mentioned that little incentives can be just as strong as long term benefits. These can include shuttles, free parking and food or tickets they can take home and share with their family. All of this is an attempt to attract better quality employees.



Critical Issues Research Method

Problem Statement

Green Building is a hot topic in today's industry. However, the client of Milestone Building #4 had to take away LEED points early during construction because of cost, availability of materials, trades, and knowledge within the construction industry. Even though this was not a topic of discussion at the PACE Round Table, I decided to talk to a few industry members at the career fair and Round Table about this issue. After speaking with them, I found that many other companies, when implementing LEED design into a project for the first time, have experienced similar problems.

Goal

Over the next few months, the goal of the research is to provide industry members with adequate LEED information prior to design and bidding. An information pamphlet, LEED guidelines and a list of experienced industry members will be developed. This will not only inform the industry about sustainable buildings but also aid to excel in LEED design and construction.

Steps to Achieve Goal

1. Educate self of LEED criteria and requirements.
2. Learn LEED classification and rating system.
3. Develop information pamphlet.
4. Find developers, architects and contractors that have been successful in implementing LEED design. Conduct an interview to find out about any interests and hesitations, as well as any key success indicators.
5. Develop list of experienced industry members and a list of industry members that are interested in implementing LEED.
6. Process data collected from industry members and develop a more detailed goal base on feedback.
7. Develop the guide.
8. Test the guide with both experience and inexperienced industry members.
9. Make any changes based on feedback from industry members.



Problem and Opportunity Identification

Impervious Surface Parking

At Milestone Business Park, all parking consists of a surface parking lot made of impervious pavement. Impervious surfaces promote stormwater runoff that flows into the sewer system instead of infiltration into the subsurface. Currently there are over 1,700 existing and proposed parking spaces and 775 spaces intended for the future development. With the target of Milestone Business Park being a sustainable development and Building #4 as a LEED Silver rating, I feel the parking condition does not accurately reflect the intention of the site. A parking garage that has a small footprint and builds up will decrease the amount of impervious surfaces and can increase the LEED points.

Tenant Fit-out Design

Milestone Building #4 is a core and shell office building, which will be leased as tenant space. Currently, there are no tenants for the space upon project completion. A marketing committee has composed a strategy to obtain tenants. I would like to investigate different design strategies and develop a typical design for an office space. This design will be incorporated into schedule to be “move-in” ready upon completion.

Increase LEED Points

Milestone Building #4 was originally rated as LEED Silver, only one point one away from LEED Gold. After revisions in the design, the points were decreased, but still obtaining a LEED Silver rating. Implementation of additional design features will lead to an improved LEED rating.

Delivery Method – GMP with LEED Change Order

Milestone Building #4 was originally designed and bid as a non-LEED building, even though that was their intent all along. After the project was awarded, the architect finished the design with a set of LEED revisions, which became a change order to the contract. After noticing issues fulfilling LEED credits and cost, the owner decided to cut back on points. This could have been prevented if LEED was considered in the initial design. A more accurate cost and a detailed execution plan would have been established early on. This will also save on unnecessary planning and estimating.

Building Envelope

The building envelope consists of many different materials and systems such as masonry, windows, flashing, aluminum louvers, metal screen, metal studs and steel railing. Joints where



the different systems come together are susceptible to leakage. With multiple materials and systems, come numerous trades installing the different systems. This can cause issues with coordination and communication between trades and general contractor. Consider using a prefabricated exterior system where builders are better able to regulate leakage. A detailed schedule, coordination and communication plan will help regulate trades. Also, when using masonry veneer skilled labor is required. This can be expensive and time consuming. The use of alternative materials for the building façade may benefit the schedule and cost. The schedule can also benefit from prefabricate materials.

Disturbance to Adjacent Building

There is much vacant space on the site to spread out; however Building #2 is located next to Building #4. With Building #2 being fully occupied during construction, safety of the building and its occupants are of utmost concern. A no-fly-zone should be established for areas close to buildings and pedestrian paths. Also, a covered walkway should be installed for safety of pedestrians. The tenants of the adjacent building are concerned about noise and dirt during construction along with the additional traffic and parking. Noise should be kept to a minimum during regular business hours and tenants should be notified if there is an exceptionally loud or dirty/dusty day. Tenants should be provided with a weekly news letters about the construction and what to expect during the week. Construction personnel should have designated parking and deliveries should during peak traffic hours should be avoided. Any delivery trucks should be rerouted to the back entrance of the site.



Technical Analysis Methods

This section outlines the problems identified in the previous section and describes what my research will be focused on for the remainder of the year.

Increase LEED Rating

The goal of this technical analysis is to increase the LEED rating from Silver to Gold. I will focus primarily on enhancing the categories which currently have the lesser percentage of points and implement specific design features. The research needed includes the design and construction requirements for the additional points. Also, a schedule and cost comparison will be examined.

Interior Tenant Design

This technical analysis will design an office space for a future tenant. I will either develop a general design using ideas from many different industry areas or choose a tenant and develop a design for them. This design is intended to fit into the construction of the building without delaying the schedule. Upon substantial completion, the tenant area will be ready for occupancy.

Impervious Surface Parking vs. Parking Structure

A comparative analysis will be done between the existing and proposed impervious surface parking and a parking structure. This will be focused mainly from a sustainable view. This analysis will include the design and implementation of a parking garage and eliminate the parking lot. At least three sustainable site points can be gained from this proposal. Also, from a structural standpoint, the most efficient and effective system will be investigated and implemented. A cost and schedule analysis will be studied.

**Weight Matrix**

During the spring 2008 semester, the above technical analysis and research will be further investigated. Below is a breakdown of my time and effort allocation.

Analysis Description	Research	Value Engineering	Constructability Review	Schedule Reduction	Total
Increase LEED Rating	15%	5%	5%		25%
Interior Tenant Design	10%		5%		15%
Parking Structure		5%	5%	5%	15%
LEED Guidelines	45%				45%
Total	70%	10%	15%	5%	100%