



Kristen Eash  
Construction Management  
Technical Assignment 3  
Advisor: David Riley  
November 21, 2005

## **Executive Summary**

Technical Assignment 3 delves into possible topics for the Thesis Proposal. Several project related issues and company issues were evaluated as possible candidates for the Thesis topics. These topics were evaluated on size and complexity of the topic, its potential for alternative methods, value engineering, schedule reduction and constructability review. The ability to research each topic was also considered.

The PACE Roundtable held on October 13, 2005 was a very good place to hear about the issues that are affecting construction. It allowed an open forum for students and industry people to get together and discuss problems, expectations and the future of the construction industry. There was a chance to go to two breakout sessions and group discussion on team building and the Katrina resultants.

From the issues that were identified as a result of the PACE Roundtable, I chose to look into an issue that affected my project; WBE/MBE solicitation. This is the process whereby all contractors who wish to bid on any DGS project need to solicit bids for subcontracted work from minority and women owned businesses. I intend to find out whether requiring this is deemed fair by prime contractors, if they increase their bids due to being forced to provide this extra work, and if there are any other issues with respect to the solicitation process.

After a visit to my building and talking to the workers and key player for the project, several issues were brought up. These issues, listed in the Problem Identification section, were used to pick out a few to use for the technical analyses.

Those issues chosen to be used in my three technical assignments are adding a windmill to the roof of my building to generate electricity, adjusting the cladding system for the building from a metal panel siding to either the brick or glass panels which clad the remainder of the building, and structurally redesign of the skylights to remove the steel joist that runs through the center of it.



Kristen Eash  
Construction Management  
Technical Assignment 3  
Advisor: David Riley  
November 21, 2005

## **Critical Industry Issues**

The PACE Roundtable was held on October 13, 2005 at the Penn Stater Hotel and Conference Center. The day was started with a welcome breakfast and introductory speech. Then the attendees divided up into one of the four sessions. For my first session, I attended 1-A: Integrated Design Management.

This session focused on improving the construction drawings by innovative approaches such as performance specifications, value engineering, design assist, and earlier subcontractor involvement. Performance specifications seem as though they can either help or hurt the project depending on the project and how limiting the specifications are. A good way to improve specifications is by design assist or just allowing subcontractors to pick their systems and locations by earlier involvement. This will allow subs to use systems that they are good at installing and know work well.

The other important topic that was discussed was that of value engineering versus cost cutting. The difference being one reduces price while maintaining the buildings integrity while the other just reduces the bottom line. It was discussed that the earlier that this is done the better. Most contractors that I talked to implied that value engineering should be performed while the building is in schematic design and only about 5-10 % of projects do this correctly. This means that the subcontractors and Project Managers need brought onto the project earlier on (or a design assist option used). This could lead to more contractor desire for design-build delivery method.

Our last topic focused on owner motives. We discussed that for most owners the project cost, schedule and final appearance and use are the driving forces for the owner. It is a contractor's job to make sure that the owner gets what they need for the building to be complete on time, on budget and with their desires. It is also our job to enforce an appropriate distribution of money. This means that we need to be able to tell the owners

no to elaborate systems that will do little for the project. It surprised me to think of telling the owner how to spend his/her money was part of my job. I thought we just acted an executer of their will.

Going into this session I was interested in specifications since I had written and corrected a number of these for my last job. I also desired to learn how to give solid value engineering advice. Although these issues had little bearing on my thesis project at this time, I still found the discussion filled my interest and provided me with useful ideas for my future jobs.

For my second session I decided to switch topics. This time I chose to attend Session 2-D: Team Building – Project-Level Team Development. This session discussed owner and design professional motivation, personal skills, and contractor prequalification. All of these topics are oriented toward how a project team can learn to work together well to get a project completed.

Owners are motivated by a number of things. Some are out to make money. Others need additional space. Still others would like recognition. All however would like a good experience while having the building designed and constructed. This means that listening to the owner's expectations, monetary limitations, and needs is an important skill. To do this it was stated that the soft skills come into play. Being personal and using the soft skills (listening, reading body language, expressing interest, looking people in the eye, good communication etc.) are central to ensuring owner satisfaction. I was surprised to hear that a few business and etiquette classes would be useful. These skills would then also be useful for managing the rest of the project teams.

The other key person whose motives it is necessary to understand is the Design Professional. If they are looking for notoriety, then asking to change parts of the building might be difficult. It is important to find out the mission of the company that they work for as well as their own agenda. Also it is important to find that one thing that should NOT be changed. Figuring this "sacred cow" out early could prevent a big issue at later times. I was a little shocked to hear that design teams really do like being involved in the construction. A good piece of advice that I picked up was: if you allow them participation in the construction, then they will accept more of your ideas with the design changes.

The last subject that was discussed in this session was contractor prequalification. It was pronounced that many of the contractors looked very favorably with prequalification. Requiring firms to submit their financial, safety, experience, and team information helps owners limit who bids on projects. This also prevents under-qualified companies to sweep in and low bid a project from the true competitive bidders.

This issue had a lot of bearing on my thesis. I am looking into the cost and team impacts of requiring WBE/MBE soliciting for state jobs. Hearing professionals state that they like when prequalification is required on jobs surprised me and also made me wonder if they look at this in a similar light. I met a number of people at this conference that work on State jobs that I would be able to send out a survey to once one has been developed.

When this session concluded, the conference was dispersed for lunch. After lunch, we rejoined in the large room for a discussion on the effects of Hurricane Katrina. Listening to the professional depict what they thought would change in our industry over the next few years with respect to construction techniques, work loads, work availability and material prices was a huge advantage.

I was particularly interested in the location of work that would be expected in the next few years. At first, I was nervous about needing to move to the south to be able to work in a good company after graduation. Hearing that, although building cost will go up due to labor and material price increases, there is still expected to be a continuous amount of work in other areas made me extremely happy.

All in all, I found this roundtable to be very good. It provided a place for students to hear what concerns there are in the industry and the professionals to see what students are coming through the program this year. I was pleased that this conference gave me extra confidence for beginning a job in a company. I was unsure how prepared I was for graduating and becoming a professional, but now I feel sure that will some work the transition will not be too difficult. For this especially, as well as everything else, I would like to thank the industry members again for allowing this even to happen.



Kristen Eash  
Construction Management  
Technical Assignment 3  
Advisor: David Riley  
November 21, 2005

## Critical Issues Research Method

During the remainder of the Thesis work, I will be examining the WBE/MBE contractor solicitation process. This is the process whereby all contractors who wish to bid on any DGS project need to solicit bids for subcontracted work from minority and women owned businesses. I intend to find out whether requiring this is deemed fair by prime contractors, if they increase their bids due to being forced to provide this extra work, and if there are any other issues with respect to the solicitation process.

I would like to be able to use this research to show The Office of Physical Plant and the Department of General Services the price of mandating WBE/MBE soliciting and forms during the prebid process.

I intend to delve into the solicitation process. A survey will be sent to a selected list of contractors, from the Office of Physical Plant's contractor database, who have bid on DGS projects in the recent past. A rough list of planned questions for this survey can be found in Appendix 1. The key parts to my research will be the process review, the survey analysis, and a summary.



Kristen Eash  
Construction Management  
Technical Assignment 3  
Advisor: David Riley  
November 21, 2005

After a visit to the site and meeting with a number of the crew working on this building, several building issues have been identified. Pictures have been included with many of the items to make visualizing of the issue easier to see. These issues will be narrowed down and finally used to proceed with the remainder of the thesis experience.

### Problem Identification

- All cable trays in the server rooms are regular cable trays but the ones through the remainder of the building are ladder trays. According to the crew running wires it is much more difficult to run wires in this type of tray.



- The mechanical room distributions are weird. Finishes in the A section can't be completed due to the fact that the mechanical rooms haven't been finished and tested. This means that this area of the building can't be completed.



- There are issues with the roof design. It has been thought that the flat roof will crack with poor weather and that EPDM would be better.



- There are issues with access to Mechanical rooms. If there is a problem with a AHU there is no way to get most of them off or out of the building. There is one on the roof that is covered by an overhang that is now inaccessible. And there is a knee wall blocking the ones on the 2<sup>nd</sup> floor from being brought out how they were brought in.

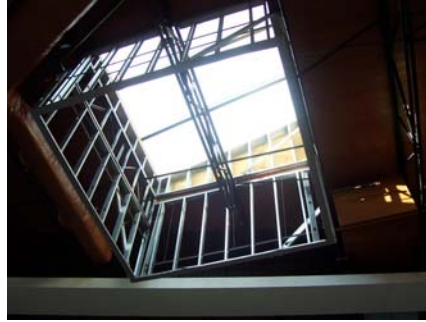


- There is no site access (driving) to any of the north side of the building.



- There have been issues with the metal paneling on other buildings in this area. The panels have been having issues with buckling and not sealing at window areas. Also where the panels are joined this sealing strip has been known to deteriorate within the first five years of building operation.

- An auditorium is being added to the building now that it is +80% completed. This is going to go out to bid soon. Will it be cheaper this way or as a negotiated C.O.
- The sky lights for the building all have joists running through them.



- I would like to see if wind power could be utilized to cut down on the building power load.
- The School is worried about the loading dock location. It is located next to two main building transformers and is on a steep slope with a hard curve. This could be problematic due to the icy winters that Erie normally receives.





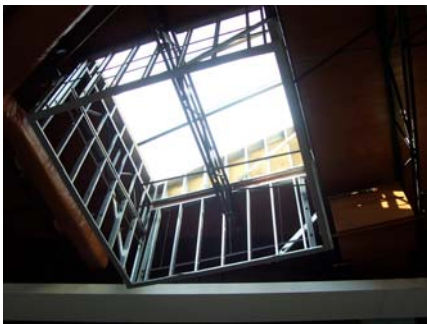
Kristen Eash  
Construction Management  
Technical Assignment 3  
Advisor: David Riley  
November 21, 2005

## Technical Analysis Methods

I plan on computing three analyses for my thesis research. First I would like to add a windmill to the roof of my building to generate electricity. The second analysis I plan to pursue is an adjustment of the cladding system for the building. I would like switch from a metal panel siding to either the brick or glass panels which clad the remainder of the building. Finally I would like to do a structural redesign of the skylights to remove the steel joist running through it.

For the windmill analysis I will research the wind patterns of Erie, PA to discover the power generating capabilities of the building. I will also perform a cost analysis of the electricity savings versus the initial cost. I will also perform a structural analysis of the roof to make sure that the windmill will be able to be placed on the roof. Finally, the schedule impact will be looked at. This will be my first Breath Assignment and deals with electrical power use reduction and circuit redesign as well as a structural strength check. Research of windmills and wind availability, the structural analysis, the electrical load reduction, the cost analysis, schedule impact, and a summary are the key issues to this topic.

There is a problem with metal panel siding in Erie due to the weather swings and construction practices so I propose to redesign the cladding of the building to increase the construction ease and cost of the building. This will take into account the cost of fixing the system while the building is in its first five years of building use. A comparison with brick and glass panel walls will be conducted. Research into the initial cost of construction and schedule, research into maintenance costs, a comparative analysis between the systems using cost, schedule, and constructability, and a summary are the measurable steps of this analysis.



For my second breath assignment I will do a structural analysis of a skylight in an attempt to remove the steel joist from the center of it. This will make the window look nicer and allow more light into the area. I will perform a load analysis of the skylight and then do a structural analysis to redesign the roof system for the joist to be removed. In my summary I will show the new design of the skylight.

Description	Research	Value Engr.	Const. Rev.	Sched. Red.	Total
Cladding System	5	5	15	10	<b>35</b>
Windmill	10	15	10	5	<b>40</b>
Skylight	1	2	7	0	<b>10</b>
Issues Research	15	0	0	0	<b>15</b>
Total	<b>31</b>	<b>22</b>	<b>32</b>	<b>15</b>	<b>100</b>

# Appendix 1

## MBE/WBE Solicitation Survey For General Service's Projects

1. Have you bid on a DGS project which has required WBE/MBE Contractor Solicitation?
2. How many?
3. Does this increase the time that is required in the pre-bid processes?
4. Does your company increase its bid to cover extra work?
5. How much does your company increase the bid by? (percentage or dollar amount)  
(If you are not comfortable answering this question, skip it)
6. Do you understand the contractor solicitation forms?
7. Do you think that this is a fair requirement for all DGS projects?
8. Have you hired a subcontractor that you wouldn't have normally used, due to this?
9. Do you feel that this requirement is accomplishing its intended purpose?
10. Additional Comments