



Washington-Lee High School

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Technical Assignment 3 Alternative Methods and Research





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Executive Summary

This assignment is going to explain what I plan on researching in the spring including my 2 breadth topics. The PACE roundtable that all 5th year CM students attended earlier this semester discussed several different issues in the construction industry right now. A summary of these discussions can be found in the first section.

The next section of this assignment identifies the critical issue that I want to research and how I will go about doing it. I chose to research why more schools are not trying to be Leed rated. I hope to create a booklet that will educate school board members on how to go about getting Leed rated and what points are the most achievable in a school.

The next section identifies several problems related to my thesis project. The problems identified deal with the building envelope, lighting, and acoustics. This is followed by a technical analysis section which chooses some of the problems discussed in section C and describes what research will be done.

The final part of this assignment shows a weight matrix on how I am going to be spending my time next semester.



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A. Critical Industry Issues

On the 24th of October all fifth year Construction Management students attended the annual PACE roundtable to discuss industry issues. This year the issues that were discussed were BIM technology and its use in the industry, Prefabrication and its advantages and disadvantages, and Labor shortages in the industry. Each of these sessions were very important in allowing students to gain a grasp on what kind of issues are going on within the industry right now.

Session 1: Prefabrication

The first session of the roundtable focused on prefabrication. This session probably related to my project the most out of all of the other sessions. It focused on both the advantages and disadvantages of having prefabricated parts for a building. Some of the advantages listed were the reduction in schedule, the quality of the work, and even the cost to complete the prefabrication. Some of the disadvantages brought up were being able to find companies close to the site to do the work, having to get inspections done offsite, and that some states don't allow inspections to take place off site. The disadvantages definitely surprised me a little bit. I previously did not realize that inspections would have to take place offsite to make sure MEP systems were placed properly. It also surprised me that some states would not even allow this to happen. That hinders the use of prefabrication in the industry a lot.

It was also discussed that possibly changing the name to something other than prefabrication could help it gain more popularity. It would have been nice to hear more information and opinions of what architects thought about prefabrication. It would seem like most architects would not like it because it simplifies the building and could make it seem very plain.

One of the key contacts that I made that might be able to help me with learning about what could be prefabricated on my thesis building was Ted Border from Whiting-Turner. He also gave a presentation on prefabrication in AE 473 that showed how much experience he has using prefabrication on different buildings. The exterior of Washington-Lee is pretty complex and using prefabrication could help with the quality of the building and reduce the schedule.



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Session 2: Building Information Modeling (BIM)

The next session at the PACE roundtable was about BIM technology and its advantages. It was interesting to find out how many companies are now offering BIM to owners and how this new technology was actually saving the company money. It was important to get real world examples about this new technology rather than just hearing about its advantages. Several good questions about BIM and its uses did come up during the session.

One that I thought was rather interesting was how it was going to be determined which companies are responsible for doing the work on completing the model. A comment was immediately made that BIM technology was making a lot more work for contractors while this might be done better by architects with the help of a contractor rather than having contractors have to hire people to specifically work on doing these models. Another interesting issue dealing with BIM had to do with contractual obligations and who would be liable.

BIM technology is really gaining a lot of popularity with owners and even smaller companies are starting to use this new technology. This issue would not really be a big problem for my thesis though since my building is a high school.

Session 3: Labor / Management Shortages

The last session discussed probably the most important issue that the industry is going to be facing in the very near future. The discussion started out by showing how the construction industry is losing a lot of skilled laborers and how new laborers were not there to replace them. It was also shown how much politics about immigrants can have a huge effect on the construction industry. I didn't realize that it was that much of an issue until my internship over the summer. There was a huge language barrier between laborers and the management.

This issue is going to become even more important in the future because not many high school students know that the construction industry can become a good career. The construction industry seems unable to recruit new laborers and has a bad reputation. It was discussed how the industry can change this reputation and start convincing more high school students to enter the industry.



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B. Critical Issues Research Method

Problem

One of the critical issues that I want to pursue with my research is Green Building in Schools. Leed Buildings are becoming more and more popular, however there are still not many Leed rated schools throughout the country. This is mainly due to cost, availability of materials, and a lack of knowledge by owners and school board members on Green Design.

Research Goals

The goal of my research is to show the advantages of having a Leed rated school to owners and school board members. This will be done by creating a small booklet on green building that will show board members which Leed points are most attainable and how to go about getting a building Leed rated. This booklet will also help school board members understand green buildings and how they can affect the learning environment for students.

Steps to Achieve Goal

1. Research Leed Criteria
2. Determine which points are most attainable for school buildings
3. Develop Booklet
4. Give Booklet to School Board Members looking to create new school
5. Give Survey to Board Members to see if booklet worked
6. Make changes based on feedback



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C. Problem Identification

Building Envelope: The building envelope on Washington-Lee High School contains many different elements. This means that a lot of coordination is needed between different subcontractors. This also means that there is a better chance for leakage. A lot of time on the schedule is spent on the exterior masonry.

Possible Solution: The solution for this problem would be to look at a prefabricated masonry system and compare it to the current system. A prefabricated masonry exterior should save time on the schedule and have a better quality than that of the normal system. A cost analysis could also show that a prefabricated masonry exterior could save the owner some money that could go into other parts of the building.

Lighting: Lighting level is very important in schools so that the students don't strain their eyes and can learn better. It is also important because several areas of the school will be accessed by the public on a regular basis. The lighting needs to be able to show the new school off in a good way. Washington-Lee High School is also going for a LEED Silver certification and there may be a more efficient lighting scheme that can help get more LEED points and get the building to a higher rating.

Possible Solution: Look at a better, more efficient lighting scheme in the gym and possibly classrooms. This will help create a better learning environment.

Acoustics: Sound level is also very important in a high school. If it is too loud students can get distracted and it can be difficult to learn.

Possible Solution: Look at the noisy areas in the building such as Gym, Auditorium, and Cafeteria, and find a better way to reduce noise. This could have several value engineering solutions that could be better for the school.



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Indoor Air Quality: Air quality is especially important in a high school but it is even more important because this school is going for Leed Certification. Schools sometimes have problems with mold in the mechanical system.

Possible Solution: Study how the building was commissioned and look for a better way to ensure that the air quality will be good on the first day of school.



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D. Technical Analysis Methods

Building Envelope

The research involved with the building envelope will consist of talking to prefabricated masonry contractors. It will be important to show the advantages and disadvantages of a prefab system over the current system. The focus on the prefabrication masonry system will be on the constructability, the cost savings, and even the possible reduction in the schedule.

Lighting

The lighting system will be analyzed to find if a more efficient system could have been used in certain areas. This will involve talking to the owner and design team that came up with the system. The redesigned system will then have a cost analysis done to determine if the redesign is better.

Acoustics

The acoustical system used in one of the louder areas of the building will be analyzed. This will involve talking to the acoustical engineer on the project and Moses Ling to help with some of the calculations. The new redesigned system will then have a cost analysis and constructability review done on it.



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E. Weight Matrix

Description	Research	Value Engineering	Constructability Review	Schedule Reduction	Total
Prefab Masonry Exterior	10%		10%	10%	30%
Green School Advantages	15%	5%	5%		25%
Lighting		10%		10%	20%
Acoustics	5%	10%	5%	5%	25%
Total	30%	25%	20%	25%	100%