

# The Downtown Family **YMCA**

Detroit, MI



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# Executive Summary

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The purpose of this technical report is to recognize an industry issue that I want to pursue through my research and to identify problem areas that are good candidates for research, alternative methods, value engineering, and schedule compression.

The first item that will be presented is the 'Critical Industry Issues' segment. This part mainly summarizes things discussed at the PACE Roundtable Meeting held on October 13<sup>th</sup>, 2005. This meeting presented many 'hot topics' that the construction industry faces today. The topic that seemed the most interesting to me dealt with integrated design management. Among the things discussed were; performance specifications, value engineering, and different delivery methods.

The 'Critical Issues Research Method' explains, in further detail, what factors are involved with integrated design management and how I plan to pursue research in this topic. The main research steps involve published research and personal interviews. Besides this, the goal, the audience and who this research will benefit, will be identified.

Problem Identification is self-explanatory. Potential problems that could be pursued through a detailed analysis of technical building systems and construction methods are identified. These are mainly problems that the project manager for this project and I discussed and observed during my visit of the site.

The 'Technical Analysis Methods' is a continuation of the 'Problem Identification.' In this section, 3 problems are specifically chosen to be addressed as technical analysis activities, and show how they can be classified amongst the core thesis investigation areas. In addition to this, a description of steps that I will take to complete my research analysis will be stated.

Lastly comes the weight matrix, this chart is used to illustrate how I plan to distribute my efforts among the different analyses for the problems identified. The four core areas of investigation are as follows:

- 1) Critical Issue Research – self explanatory, only for the critical industry issue
- 2) Value Engineering Analysis – identify areas to save cost and/or time that will infringe upon design or budget
- 3) Constructability Review – determine potential areas for redesign or reconstruction, and alternatives that would ease coordination problems
- 4) Schedule Reduction / Acceleration Proposal – self explanatory, show plans on how to save time and how much of a budget impact there will be.

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## Critical Industry Issues

### *Executive Summary*

The purpose of this short report is to summarize what I learned and experienced at the PACE Roundtable discussion on October 13, 2005. This event brought students and professionals from the construction business together to discuss current topics of interest, or 'hot topics', in the industry.

The different sessions that were held included: Integrated design management – adding value to design, Frontiers for Innovation – promoting innovation, Healthcare Facility Design and Delivery – barriers to high performance healthcare facility delivery, and Team Building – in house teams and business development. These sessions were followed up by successors of similar titles and further discussed the topic.

Unfortunately, due to a previous engagement, I was not able to stay for the second round of sessions. Since I was able to stay for the first round of discussions, I decided to choose Integrated Design Management I: *Adding Value to Design*. I chose this session mainly because it is a topic that I was interested in. Besides this, I know that my thesis building had issues with the design of its systems as well as the altering of their design for the interior.

The main topics that were discussed/touched on during the first session were:

- How can performance specifications help/hurt the design process?
- How can value engineering be distinguished from cost cutting?
- What new barriers to integration are created by design firms opposed to design-build?
- How is Design-Build delivery evolving?
- What motivates owners to pursue different types of delivery methods?

During our session we managed to touch on a majority of these events (due to the limited time). Both the professionals and the students gave great opinions and inputs regarding the topics discussed. The following is a summary of what was discussed during the first session of Integrated Design Management

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## CM Thesis Proposal Part 1: Critical Industry Issues

The first session gave me a good insight into how the professionals think and what their opinions are towards the topics as well as their common objective to reach certain goals to benefit their companies and to differentiate themselves from their competition.

Another observation that was very obvious throughout this discussion was the relationships between the owner, the contractors and the architects. This mainly brought to light how each of them think and their expectations in getting the project done.

An additional topic that was of high interest to me was the discussion regarding “When is it value engineering and when is it considered cost cutting”. I remember hearing one of the professionals answering this question by saying (more or less): If the design is complete and construction has already begun, it would be best defined as cost cutting.

### *How can performance specifications help/hurt the design process?*

- Places design burden on construction
- Delivery method; liability distribution
- Designer focuses on end product
- Evolved system (i.e. curtain wall, sprinkler system)

### *How can value engineering be distinguished from cost-cutting?*

- Depends if it happens before or during construction
- Owners see the green building option more attractive if they are not that concerned with immediate profit and plan on keeping the building for an extend amount of time
- Value engineering is not a result of being over budget, while cost-cutting is
- Different types of value engineering methods depending on type of project

How is design-build delivery evolving?

- D/B is good for competition/innovation
- Regional expertise: only 1 or 2 contractors that are mainly considered
- The east coast is more time/cost driven – making D/B a popular choice
- Different people have different definitions of what D/B is
- The owner should be involved in the process throughout the life of the project and should kick the project off correctly

Motivation to pursue different delivery methods

- Owner needs to be experienced: better on straightforward projects
- Design assist: will sometimes need to help out with performance specifications to have an idea of where the project is going.
- Depends on the type of freedoms and restrictions that are involved with the project
- Pre-award vs. post award

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## Critical Issues Research Method

Integrated design management is a topic that is both interesting to me, and a topic of much interest in the construction industry. This is a subject in which I would like to expand my knowledge on and pursue through my research. Value engineering, performance specifications, the use of different delivery methods, and establishing clear lines of communication between the owner, architect and CM are just some of the sub-topics associated with design management. I feel that this issue has much importance to any company in the construction industry, especially PACE members, and anyone interested in LEED certification.

In the construction industry, planning is everything. A project will be planned out months and months in advance before any kind of construction begins. The idea behind integrated design management is to have more collaboration between the owner, architect, and construction manager. The main purpose of this synergy is so that everything is coordinated well, to minimize impedances in the construction progress, and to generate innovative design ideas to make the building more efficient, without sacrificing design or increasing cost of construction.

My main goal in researching this topic would be to find out as much information as I can by getting various different points of views. I plan on establishing my credibility by reporting the information that I am going to personally gather. Establishing credibility is one of my main priorities since my presentation will be mainly targeted at people in fields of engineering and/or the construction industry.

I have already taken steps towards gathering very valuable information. I am currently looking for articles and research papers online that deal with integrated design management. I want to gather at least 3 or 4 papers and choose the best 2 out of those. From there, I plan to analyze the articles/reports further and present my findings. Besides this, I have made appointments to conduct phone interviews with both a senior engineer,

and an architect. I feel that by discussing the topic of integrated design management with them, I can get two different perspectives and collect important, credible feedback. The senior engineer is Mr. Benjamin Gerald from Holder Construction Company in Atlanta, GA, who I met at the PACE roundtable discussion, and the architect is Mr. Jeff Johnson from Integrated Design Solutions in Troy, MI, who I had a chance to meet this past summer during my internship with Barton Malow Co.

The questions that I will be asking Mr. Gerald and Mr. Johnson will mainly deal with some of the topics that were mentioned/discussed at the PACE workshop. I will ask for clarification and expansion of discussion on: how performance specifications can help/hurt design management, distinguishing value engineering from cost cutting, barriers that are faced by integrated design management, alternate forms of project delivery (especially design-build), and what motivates owners to pursue different delivery options. The interviews will not be limited to these questions, but I feel by having these questions discussed, it can provide my research with a strong, credible base.



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## Problem Identification

About a month ago I had the opportunity to attend a PACE roundtable workshop. Since I have a special interest towards the design-management and value engineering aspect of construction management, this is the workshop that I decided to attend. This especially worked out for me since that is what caught my interest in the Downtown Family YMCA project in Detroit.

Over the summer I had a couple of opportunities to visit the new YMCA in downtown Detroit. Since the visits were spread out over the course of 2 months or so, there were different issues being dealt with on the construction site during the visits.

During the site visits, I would always bring up what design-management, value engineering and budget issues the project was dealing with. One of the first problems pointed out was the design of the basement. The project manager, Loren Luedeman, told me that the basement walls were designed to come up all the way to the bottom of the first floor slab. However, he stated that because they did, they faced an unforeseen cost. Due to certain seismic regulations, certain steel angles had to be installed to brace the two together. Another issue that came up dealt with having budget restrictions which ultimately led to having to get rid of some of the interior glass paneling and replacing it with gypsum board. Mr. Luedeman also mentioned that due to the '1/2 levels' in the building, this caused the HVAC duct to constantly dip and rise, which may have caused some inefficiency. There were also little things such as keeping all the stair guard panels consistent, due to architectural aesthetics. This caused more time to be wasted on installation and placement since these stair guard panels weren't easy to install and they weighed a significant amount. Besides this, I would like to look more into any load distribution concerns for the elevated track or any other part of the building. Additionally, I also want to ask questions regarding the lighting/electrical aspect. I was told that the project was able to save money by going to a single distributor for lights and

fixtures. I would also like to find out if there were any problems with the electrical system and if there could have been ways to improve it. Finally, Loren and I were looking at the mechanical room in the basement and we shared a discussion of some of the problems that the system had caused during its early stages. The pressures were hard to calibrate and keep constant. Due to the height that it had to rise, as well as some turns that the piping had to make, the system wouldn't function properly.

These are just some of the issues that I plan on discussing. I plan on talking to the project manager once again to get a better idea of other issues regarding the construction site, organization and other potential value engineering options.

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## Technical Analysis Methods

The technical analysis activities that I have decided to concentrate on have been specifically chosen because I believe that they can be further analyzed and shaped by the core thesis investigation areas. The areas are as follows:

- Critical Issues Research
- Value Engineering Analysis
- Constructability Review
- Schedule Reduction/Acceleration Proposal

The first analysis topic will focus on the basement and foundation. The two main areas that I will be reporting on will be the strip footings and the basement walls. The project manager for this project told me that the strip footings were thicker than necessary. I plan to look at the drawings and look at what they were designed as originally. After this, I will contact Mr. Luedeman, the project manager, and ask what the actual dimensions are, depending on the answer, I will ask what the appropriate dimensions should have been and then find out how much time and/or money could have been saved. I intend on asking Mr. Luedeman on a rough estimate, but then I will look at an RS Means catalog and will prepare a comparative estimate. The issue regarding the basement walls is a straightforward one, and I mentioned it in the 'Problem Identification' report. I know what the problem was and a rough estimate of the money that would have been saved. The next thing that I would need to find out are the specific seismic laws and design requirements that the YMCA project, and any other building in downtown Detroit, have to abide by. I will also have to review the drawings, so that I will be able to visualize the problem and point out specifically what is going on.

The second analysis topic will deal with the mechanical room and HVAC system aspect. I remember that Mr. Luedeman mentioned that there were problems with the mechanical room in the basement. Since I don't specifically remember what was wrong,

I plan on talking to him to find out what the problems were and what could have been done to prevent the problems. I want to find out if the building could have used an alternate system, or if it was a problem with the layout, routing and/or assembly of the system. In terms of the HVAC system, since I know that since the building had incorporated 'half-levels', there were sections where the ductwork had to rise and then fall again to accommodate these staggered floor levels. I am going to ask Mr. Luedeman if there were any inefficiencies due to the rising and falling of ductwork and what other challenges these ½ levels posed, in terms of mechanical equipment.

Lastly, I would like to investigate the structural aspect of this project. More specifically, load concerns. There is an elevated track in the YMCA that overlooks a basketball court. I want to know what problems were faced in the construction of this track and if there were any load distribution problems that needed to be addressed. Also, since I was talking about the ½ levels just a couple of moments ago, I am going to research a problem that was pointed out to me by Mr. Luedeman. I clearly remember him stating that during the construction of the half levels, there were beam inconsistencies that affected the design of the floors. This happened in the second level where the offices are located. There was a beam that was used that was a couple of inches deeper than required, and due to this, it caused the ceiling level to be 4" shorter than required. Due to this, the layout had to be redesigned and reconstruction has to be made so that the specific ceiling height requirement for an office is met.

## WEIGHT MATRIX

Description	Research	Value Eng.	Const. Rev.	Sched. Rev.	Total
Basement/Foundation		20%		10%	30%
Mech. Room/HVAC		15%		10%	25%
Structural			20%	5%	25%
Integrated Design Mgmt.	10%			10%	20%
Total	10%	35%	20%	35%	100%