THE CLARK

The Sterling & Francine Clark Art Institute

Williamstown, MA.

Thesis Technical Assignment III

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Executive Summary

The THIRD technical report provides an analysis of the Sterling and Francine Clark Art Institute in several different aspects. Contacting the Turner owner representative, various issues were analyzed which involves constructability issues, schedule acceleration scenarios, and value engineering topics.

With the nature of our industry, issues can occur at any phase of construction. In this report, there will be three construction challenges that were analyzed. Those issues include the embedded MEP in the mat slab, architectural walls, and HYDROTECH® waterproofing. Solutions of those issues were discussed as well. A BIM model was created to resolve issues regarding MEP system in the mat slab. Regarding the architectural walls, a tent enclosure was purchased to keep the building warm during construction.

As with all projects, schedule is the most important plan a project has. The construction team developed plans to keep the project on time with least costs possible. This plan included critical path analysis, schedule acceleration scenario which is working 10 hours a day in addition to Saturdays for a month long.

The project team had the opportunity to value engineer the project. This report illustrates the most valuable value engineering topics that were applied in the project. Those are relocation a manhole, tunnel tie-in, deferred painting scope, and reclaimed granite curbing.

At the end of the report, there will be observations of problematic issues of the project and areas of improvement. These observations include MEP prefabrication, BIM implementation, precast floor units, and IPD implementation. The section will also show how those observations will be implemented and what are the effects, advantages, and disadvantages of them on the project in terms of schedule and cost in general.

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Constructability Challenges

The Sterling and Francine Clark Art Institute new addition is a state of the art museum; with such great project, there is always the possibility of facing construction issues. The major construction issues that occurred were during the construction phase of the project. The three major construction issues that were faced were regarding the mat slab foundation, architectural walls, and concrete waterproofing.

Mat Slab Foundation

One of the biggest obstacles faced the construction team at the Sterling and Francine Clark Art Institute was in the construction of the mat slab foundation because of the embedded Mechanical/Electrical/Plumbing (MEP) conduits in the slab; even though the project specifications and MEP details have been studied and incorporated in the design. If the issue wasn't resolved in a timely fashion it would affect the schedule greatly. That will be due to size of the slab and its thickness of 2'–6". Given that thickness of a slab, future changes and modifications to resolve any issues are almost impossible. Thus, early coordination is essential to mitigate those types of issues. As a result, the team had to create a building information model to better coordinate the construction of the thick slab. They only investigated and modeled the in-slab MEP for the mat slab foundation coordination as they are the only part of the mat slab construction causing issues. Therefore, they were able to run a clash detection tests using the proper software. So, the model helped the team to more understand the way MEP conduits were laid out and where the problems were to fix them and redesign wherever needed. The team accepted the extra costs and efforts were put into creating the model to solve the problem both properly and swiftly.

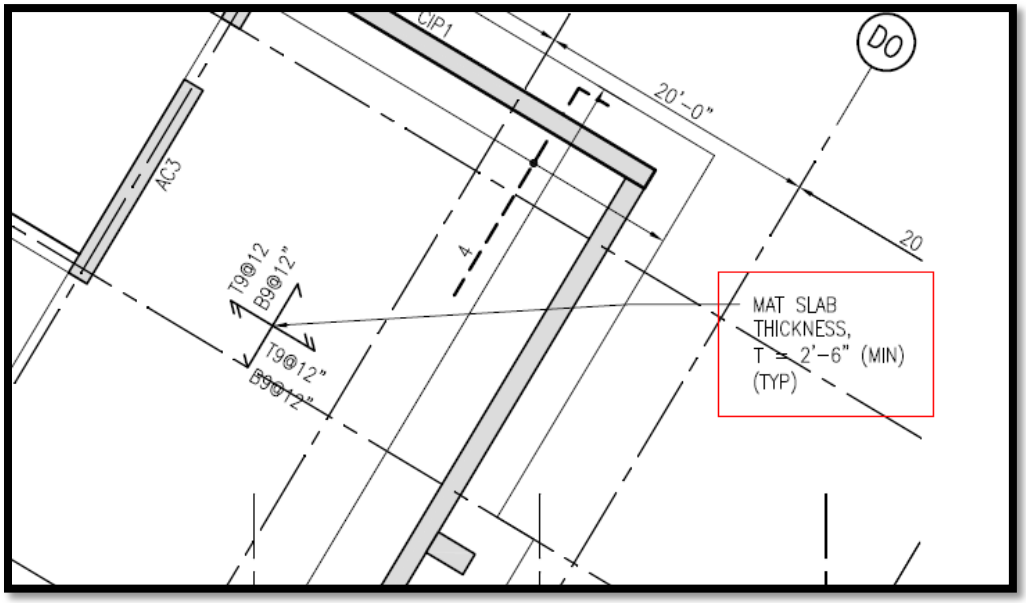

Figure 1: Mat Slab Foundation

Architectural Walls

Another obstacle faced during construction was associated with the weather conditions where the building is located at. It is located in Williamstown, MA where the cold weather hits the building impacting the construction process greatly. Therefore, the team has to deal with situation and keep weather impacts to a minimum. Since the building is built from cast in place concrete, concrete curing is an issue. Fresh concrete is not to be cured in too cold or too hot weather. It is to be kept between 50^0 and 85^0 F to get the best results. In this project, the hydration reaction process is slowed down a lot or might practically stop (once temperature goes below 40^0 F) due to the cold weather. Thus the team has to be prepared to adapt the construction of concrete walls, specifically the architectural ones, during the cold weather in winter time in the Berkshires to avoid delays. Also, the decorative, i.e. architectural, concrete may get dry faster where decorations (surface) are and that leads to sensitive skin that can be easily damaged with time. Therefore, the team decided to purchase tent enclosure that will to enclose those walls and will be heated to proper temperatures to keep concrete hydration process at the desired rate. Hence that the enclosure will not only keep the concrete safe, better yet, it will create a better environment for carpenters who are working on the architectural formwork allowing them to work more efficiently.

HYDROTECH® Waterproofing

Given that the project is located in Williamstown, MA, the severe weather would impact construction as well as building systems. So, here is where another obstacle in construction that rose up to confront the construction team at the project which was waterproofing the seals of construction joints and other openings. The purpose of the waterproofing is to prevent water leakage into the building causing costly damages. As a result, the waterproofing is going to be applied almost all over the building. The best waterproofing that can be used per to the location and the nature of the building is made by HYDROTECH® which consists of "a thick, tough, flexible, self-healing membrane. It is a special formulation of refined asphalts and synthetic rubbers." (1) This particular type of waterproofing is very effective at this project since it eliminates all curing failures. In addition, it works perfect since it conforms to all surface irregularities and that is the case in this irregular geometrical shaped artistic building. It also leaves no seams which is suitable for the architectural walls. When it comes to weather, it can be installed at temperatures as low as 0° F with the appropriate installation preparation. Figure 2 shows a typical detailed section where waterproofing is applied on an architectural wall.

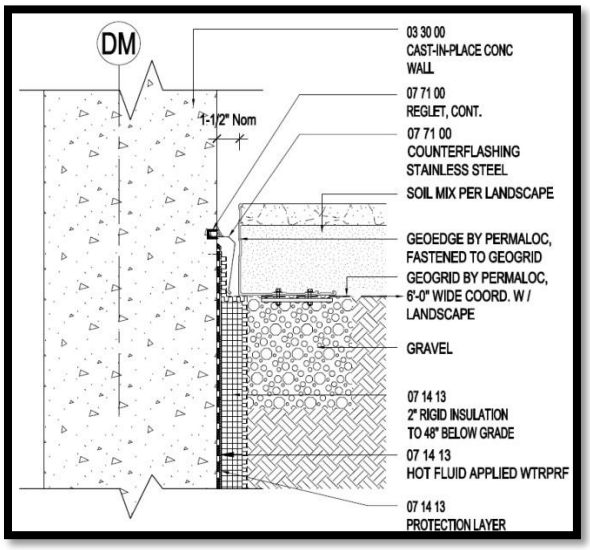

Figure 2: Typical Detailed Section of an Architectural Wall

Figure 3 shows a typical detailed section where waterproofing is applied on a footing edge.

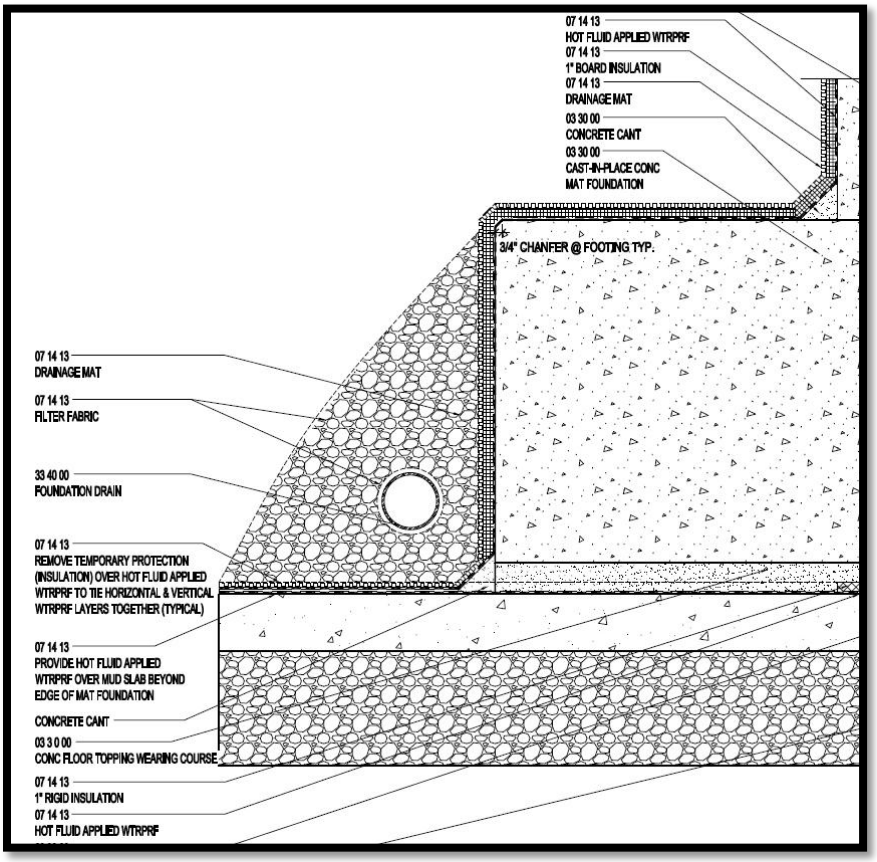

Figure 3: Typical Detailed Section of an Edge Footing

(1) *http://www.hydrotechusa.com/waterproofing.htm*

Schedule Acceleration Scenarios

Critical Path of the Schedule

The critical path of this project consists of specific activities that need to complete at a specific point in time in order for the process of construction continues. There are many important tasks throughout the project; however, only the ones that greatly affect the progress of the project and have a great important will be mention as part of the critical path activities.

The critical path for the construction phase is as follows. The first and task that need to be initiated after gaining access to the site would be beginning with the excavation phase, this task is the first to open up the ability for other tasks to begin once this is completed especially that excavation does not have to be finished completely before placing the foundation begin. The second milestone would be to begin work on the superstructure. As soon as the foundation have been placed, work can begin on the stone cladding placement and CIP concrete which is the main structural system being used. Even though there are also other structural systems such as steel and CMU, none of these systems are part of the critical path since they do not control other tasks.

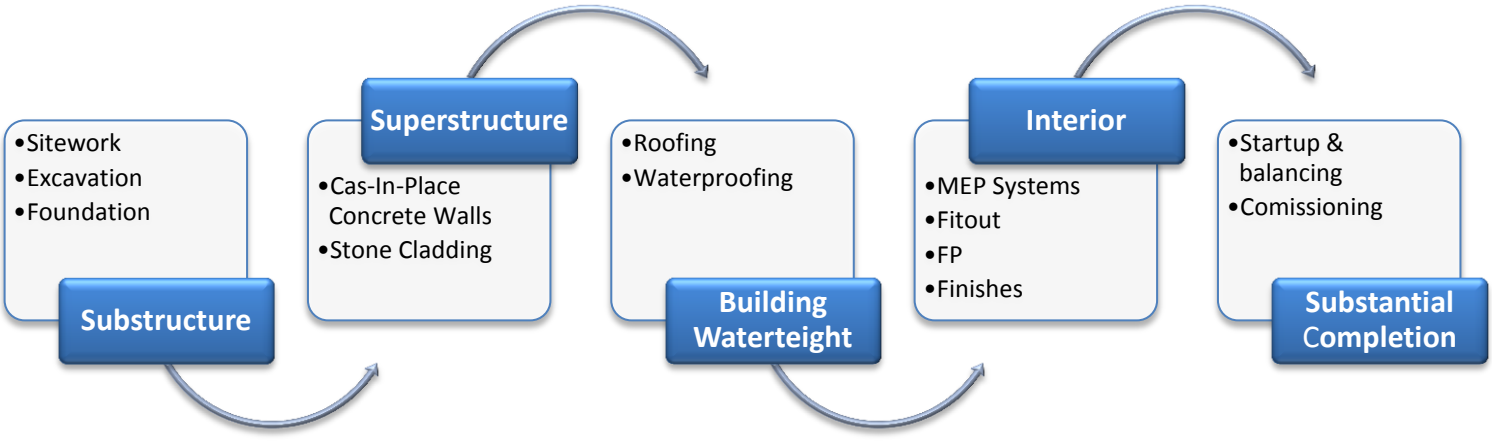

Figure 4: Critical Path Chart

Building watertight is the next major critical path as interior activities cannot be completed prior to the completion of the superstructure. Following that, the critical activity would be finishing the interior work in which the most important tasks to be finished are: MEP system installation, Fit out, Fire protection systems and Finishes.

Major Risk to Project Completion

During construction, project completion risks change as the project progresses. This can happen due to specific owner needs or to accommodate for future needs. In this project, being done with the first part of the building which is the basement, will bring the need of getting equipment put into place to start building operation as the new generators, for example, are located in the new basement. Before occupying this space to operate the building, obtaining a Temporary Certificate of Occupancy (TCO) is necessary by state code. In order to get the TCO, 'life safety' requirements have to be met (a prerequisite to receiving a TCO). For instance, fire alarm and sprinkler system is one of the life safety requirements that have to be fully functional even though only part of the building will be utilized.

Schedule Acceleration

The construction team has come up with many strategies and plans. Those strategies and plans were studied and analyzed carefully to get the best value of the money that is about to be spent while sustaining best results on the field and catching up with the schedule requirements. Generally, schedule acceleration is working areas of the project that fall on the critical path. Also, it is necessary to have a plan that is formulated and agreed to by the subcontractor before presenting the plan to the Owner. One of the plans, during de-scope meetings, was to include a second shift operation to meet schedule requirements. It did not turn out to be the most effective since workers from the second shift have to pick-up where someone else left off and vice versa. What was an effective plan, after digging through several different ideas, is working extending hours to be 10 hour shifts at short bursts and adding one more day to the working week which is Saturday. As a result, the working week will have a total of 60 hours instead of 40 hours yielding total of 20 hours of overtime. The plan was effective for about a month long to make up time that was lost due to weather conditions. This plan seemed to yield the best result for the money spent. Moreover, the crews work continuously and do not burn out if it is not for an excessive period of time. That will achieve the team's goals which are catching up and getting best money value with the same product.

Value Engineering Topics

Form email and phone call interviews with the project engineer Rob Stewart, regarding Value Engineering (VE) on the Sterling and Francine Clark Art Institute, there are VE aspects found that were implemented in the project. The VE aspects would be brought to the owner attention to decide whether to pursue them or not per to his evaluation and needs. Dollar amounts can not be disclosed or discussed per to owner wish.

The VE that were employed on the building were done during design phase of the project. One of the VE aspects is how the tunnel connecting the new building and the existing building, the Manton, would be tied-in. Originally, the way to connect the tunnel to the Manton is to cut into the Manton. As a result, a construction of a temporary partition to separate occupied space from construction activities is needed. After revising earth restraint system, results showed that they would be able to construct the new tunnel without cutting into the Manton. That allowed saving money due to eliminating temporary partition. Also, the current occupants of the Manton will not experience as much of impact as if they were to cut through the Manton while the construction is going next to them.

Another VE aspect is about relocating one of the drainage manholes, Drainage Manhole 30 (DMH 30). The manhole is to be near the existing building area, which is the Manton. Specifically, the location of the DMH 30 would have required the team to excavate and add independent sheeting for the manhole to be able to build it. After revising existing building structure drawings, they found out that if they relocate the manhole to be closer to the building it would enable them to build it within the boundaries of the installed sheeting system. Therefore, the new location will eliminated excavation and independent sheeting from being necessary to place the structure as shown on Figure 4. So, it will reduce much cost and time.

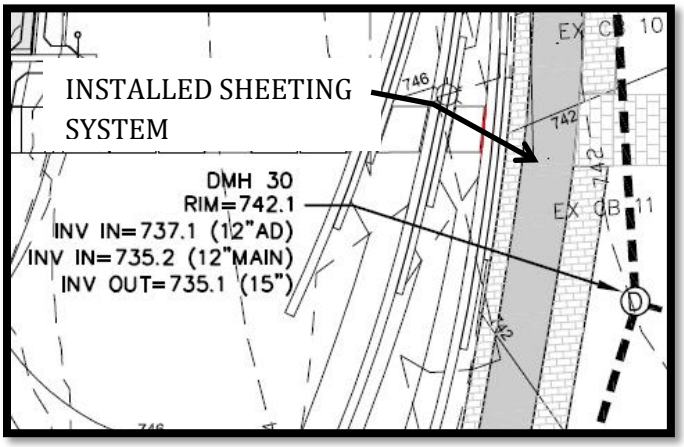

Figure 5: DMH 30 New Location

Moreover, the project specified epoxy paint with traffic coating for many surfaces of the back of house mechanical rooms in the basement. The owner elected not to install this during the basement construction, and instead deferred it to the upper level construction in order to help meet budgetary requirements.

The last VE aspect implemented in the project is about Granite Curbing. The project specifies the installation of new stepping-stones and weirs in the lawns next to the new addition called Rain Gardens. These were to be constructed from newly cut dimensional granite. The team changed the newly cut dimensional granite to be constructed from re-claimed granite curbing pulled from one of the existing parking lots on the building that was demolished earlier. That helped easing the process of getting better LEED evaluations and green initiatives as well as resulting in good amount of savings.

There were some ideas for VE that were considered in the project that were not implemented. One of them was leaving soils on-site from excavation after construction is done. The idea was not approved due to the aesthetic disturbance they may cause to the new building and the fascinating landscaping on the project. The other one was using benching soils instead of placing sheeting which was not as effective.

Critical Industry Issues

First Session, 1B: Assembling/Procuring an Integrated Team

The first session I attended was Session 1B: Assembling/procuring an integrated team that was moderated by Dr. Robert Leicht. Many students and industry members attended the session including Ms. Jessica Wolford, Trammell Crow Company. In this session, one of the first topics was discussed is how the owner is going select a good team for an Integrated Project Delivery (IPD). Ms. Jessica Wolford highlighted that the selection process is all based on the established 'trust' between the owner and other companies that the owner dealt with before in most cases. So, if the owner trusts a certain company because they had it do a job for him/her and it was in a good quality or if the company was recommended by someone who he/she trusts, then that company will be selected to be one of the IPD team.

It also brought to my attention that IPD is not just using building information modeling (BIM) software such as Navisworks models built by different trades and the model is ran under several clash detections tests. Better yet, IPD has a broader horizon. I learned that IPD is bringing all trades at time of design to have their thoughts on the design and be included in this phase of a project. Which greatly helps eliminating conflicts down the road whether they are field conflicts or not. What surprised me is that IPD is not very widely used due to the risks it may has. It is true that if the project succeeded everyone will share the pie, but if it fails they all share the risk. With all that risk IPD has, selecting an IPD team is mostly based on owner's trust and that is the only measure for selecting teams. There should be several standardized tests, certifications, minimum number of qualified personnel who are equipped with the knowledge and experience that will work on the project that will implement IPD, or other standard sets designed by a recognized institute or organization. Another surprise was about BIM use on projects. I did not think that contractors will invest money in an aspect that they are not asked to do. Implementing BIM to a project and taking the cost and the effort to create the BIM model without owner's request yielded a smooth transition towards implementing more technology to projects. With time and the advanced technology, BIM will be an important pillar in construction. So, the difficulties and contracts issues will be eliminated as they will be adjusted and modified to suite IPD projects.

Second Session, 2C: Strategies & Opportunities For Taking BIM Into The Field

The second session I attended was Session 2C: Strategies & Opportunities for taking BIM into the field that was moderated by one of the graduate students. From the session's title we can know that it is mainly about how BIM models will be used in the construction field. One of the interesting ideas was the smart box. The smart box is a cubical on the field that has an LCD screen and a computer. That will assist people on the field to pull up the drawings and 3D models they need electronically. The smart boxes are usually connected to the office which

enables them to have the most up to date models or drawings. Having such technology on site helps people on the field to better understand and visualize what they are building using updated and current 3D models. It also helps the people in coordinating between conduits for instance. At the same time, the traditional 2D drawings are still the standard way of communication on the field. The reason why it is comfortable to use 2D drawings is obvious which is people used to use them for a long time. In addition, it is going to be hard to educate all different people with different educational backgrounds how to use BIM models and how to get the information they need. With time passing by, the construction culture will shift from 2D's to 3D's with the evolution of technology that makes 3D/BIM models. Nevertheless, there are trades that are more evolved than others due to the complexity of the work they perform and the need for a better way of coordination. Good examples of trades that implement BIM/3D models are MEP and fire protection trades. Hence, the use of BIM models can improve safety on site. That is because of the coordination that can be done with the models so hazardous areas are predictable. What's more, BIM model sensors can be made particularly in the safety 3D models that track changes on site.

One of the obstacles this great technology is facing is 'automation.' That is if a designer changed a piece of information with wrong changes on a drawing and it was sent to a smart box, people on the field will build based on inaccurate drawing. That can turn this technology on itself by making it unreliable. With that being said, the model or the drawing that has been changed has to go through several professionals to accept the changes before they are out to the field to minimize human errors. As mentioned earlier, BIM model sensors can be made to track changes on site such as changes on load distribution due to site conditions. Another way of tracking BIM models can do is labor tracking and issues related to them. Doing it this way will definitely cut down time since they do not have to go through any printing processes and then transferring them to the field.

Another obstacle is with the code officials. There is a technology gap between code officials and contractors which decreases the efficiency of BIM use. The gap will be decreased with time as BIM and technology is getting more involved in more the construction industry. That is because more contracts will be more BIM suited which enforces code officials to update their codes and standards to meet market needs and events.

Industry Panel: Differentiation in a Down Economy

This afternoon session was moderated by Dr. John Messner. This panel mainly discussed how to survive in the down economy and what are the characteristics the construction companies are looking for in an applicant. One of the industry members suggested closing down offices that do not have a lot of construction activities within their range and open other ones where

construction is active. Another suggested developing smart plans and ways to operate the company. For example, focusing on the market needs and having the right number of people working on the project. Another example is use the best tools to improve and expand the company's capabilities.

At the end of the panel, all industry members agreed on the idea of the most important characteristics in an applicant are leadership and communication skills.

Application to the Project

The idea of having smart boxes on the construction field can be very practical and beneficial on construction sites. So, applying this technology is going to be effective at the Sterling and Francine Clark Art Institute project since they are having coordination issues with the MEP embedded in the 2'-6" thick mat slab. That is because it is going expedite and facilitate the information transmission. What is going to make more effective is 3D/BIM modeling everything on the project, from MEP's to safety models. That way, the team can utilize 3D's to better show details on drawings. For example, they can have isometric views of detail next to the 2D ones within the traditional 2D shop drawings to better visualize the way that particular detail is built. This was, the project can help in shifting the construction culture more towards 3D models which is beneficial for all industry members. What's even more facilitating is having hand held tablets such as iPads. That can increase efficiency by not having more than one person using the same smart box. It also makes easier to zoom in and out to see the details of drawings. Moreover, people in the office can communicate more effectively using those devices by sending emails or even up to date drawings or addenda. The issues that can face this technology are as discussed earlier which are human error in terms of drawings addenda and code officials.

Key Contacts

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Problem Identification

There are several features in the construction of the Sterling and Francine Clark Art Institute new addition that have identified as potential problematic issues for the construction team which the case with any project in our industry. Those problematic features were discovered through contacting the construction team and analyzing constructability challenges, schedule acceleration scenarios, value engineering topics, and lessons learned PACE roundtable sessions. The problems that will be discussed next may essentially contribute to the research topics that will be pursued in my thesis research.

Embedded MEP in Mat Slab

Given a thickness of 2'-6" of a mat slab with embedded MEP's, it raises a red flag indicating a potential coordination problem that could happen. That is what happened with construction team in the project. They have studied the potential issue early and then they decided to 3D models the embedded MEP's. Then, they ran the created 3D models under different clash detection tests, e.g. hard clash detection, using Navisworks. The 3D models and the clash detections helped the team significantly by visualizing how the MEP system will be brought together to mitigate future conflicts in the field that would have been expensive to fix. From the PACE one to one feedback period, the industry member, Mr. Robert Grottenrhaler, suggest utilizing prefabricated MEP systems in the mat slab which can reduce more field conflicts with the use of the 3D models as well as reducing costs.

Weather Impacts on Architectural Walls

With location of the building, severe cold weather can impact construction significantly. The team has dealt with the situation effectively in terms of cost and the method followed. They decided to use a tent enclosure to keep weather impacts on construction at a minimum. The purpose of using the tent is to keep concrete at desired temperatures, with the use of efficient space heaters, so it has the best hydration rates possible. In addition, the tent helped keeping the formwork carpenters warm which is a better environment for them to gain maximum labor efficiency.

Waterproofing

Applying the hot fluid, HYDROTECH®, waterproofing was a challenge that was faced by the construction team. Given the irregular geometrical shaped building, the HYDROTECH® waterproofing gives extreme flexibility to cover the areas that have to be waterproofed. Moreover, since the building is an art museum with a lot of architectural walls, work should be done with great care is important to conserve the beauty of these walls. So, leaving no seams after waterproofing application is essential and that is one of the HYDROTECH® qualities. Despite the benefits of the HYDROTECH® waterproofing, it can be difficult to install it in the deep foundations where have to be more excavated to give the professional personnel the room to get into that tight area to apply the waterproofing membrane which is potential problem that can impede the construction.

Variations in Walls' Dimensions

The Sterling and Francine Clark Art Institute was designed by the famous architect Tadao Ando. That means this building has many aesthetic features to serve the function of the building which is an art museum. So, it is expected to have uncommon features in the building and a lot of variation in wall dimensions is one of them. These variations will definitely slow down construction due to losing repetition in the walls' dimensions. The advantage of having repetitive dimensioned walls is that builders can have templates of formwork for instance that can be utilized for creating formwork for more than one wall. So they don't need to cut a different dimensioned formwork for each wall. In addition, one formwork can be used more than once if some walls' dimensions were the same.

Connecting the Tunnel to the Existing Building

Constructing a building next to an existing building that is in operation is always a challenge to any construction team and needs a lot of planning. The plan has to be convergent to eliminating disturbances to the occupants in the operational building next to the construction work. That is the case in the Sterling and Francine Clark Art Institute project. Connecting the tunnel that connects the existing building (the Manton) to the new addition was a challenge due to the construction noises that will disturb the Manton's occupants as it is a research building. From early coordination, the team was successful in connecting the tunnel with almost no disturbances.

Technical Analyses

Analysis 1: MEP Prefabrication

The MEP system that is embedded in the thick mat slab is the main issue as discussed earlier in the report. If the issue was not resolved in a timely fashion, there would have been great losses to redo the work due to the thickness of the mat slab. That called the need to focus more in the coordination of the mat slab. Also, since the project is delayed by almost a month, there are many options to make up time, for instance, doubling shifts or working on Saturdays and Sundays. Another option that can significantly accelerate the schedule is MEP prefabrication.

Prefabrication can increase schedule acceleration in many ways. First, builders can have the MEP prefabricated units, in this case, under quality control. So, they can have a higher quality product with accuracy in production. It also eliminates waste and scraps which reduce material cost. Moreover, that can help being a greener building which can get the owner more LEED credits. Another benefit from of prefabrication, it increases labor safety as they are not exposed to any cutting work using sharp pipe cutters.

More research will be done on logistics, time, and cost savings. The research will include how much time the prefabrication will makeup time the project. That will be illustrated through comparing current method time consumption versus prefabrication method to get the number of man hours and percentage of time savings. Regarding costs, the time savings will reflect on cost. Another element of cost comparison cost is considering cost of how and where the prefabricated units will be shipped, stored, and fitted into placed. For logistics, the following aspects will be considered: the number of deliveries of prefabrication versus current method, storage, equipment locations, laydown/shake-out areas, and on site traffic due to large trucks that will be delivering prefabricated units.

Figure 6: Prefabrication Warehouse

Image is courtesy of Google image.

Analysis 2: Building Information Modeling

BIM is a widely used tool by many construction companied. However, many of them don't utilize it at its maximum uses. BIM is not only a 3D model created by a 3D modeling software such as REVIT®; it has more uses than running clash detection tests. For the Sterling and Francine Clark Art Institute BIM was only utilized as a clash detection tool and was implemented after document completion. That decreased the efficiency of BIM use on the project.

Many buildings which implemented BIM in the early phases of construction have experienced significant valuable benefits. One of the BIM uses is 3D coordination as per to the BIM Project Execution Planning PDF published by the Computer Integrated Construction Research Program at The Pennsylvania State University. 3D coordinating the building can cut down time, cost, and effort in addition to the fact that most BIM uses rely on it. Another use that can be very effective and is applicable to this project is Asset Management. It is a process that aids the maintenance and operation of the Art Museum and its assets and artifacts. The building asset can include the building itself, including its artifacts, and building systems and equipment. This process ensures maintaining, upgrading, and operating assets efficiently at appropriate costs that satisfy both the owner and tenants. Another BIM use that can be utilized in a short time frame which is Space Management and Tracking that allocates, manages, and track assigned workspaces effectively utilizing 3D models.

The research that is going to be conducted is based on how feasible it is to apply certain BIM uses on the project and how beneficial they are to both constructions teams and the owner. Cost versus benefits measures will be analyzed to determine which BIM use is more preferred than the. Another measure that will be considered is time/effort versus benefits. For instance, how much/long would it cost/consume time and/or effort to apply the Asset Management BIM use and how long is the pay-back-period to owner to decide whether it is worth the cost and effort that will be spent.

Analysis 3: Precast Floor Units

Given the complexity of the architectural design to serve the aesthetics of the building, an irregular geometrical shaped building was an outcome. Using a traditional slab on grade (SOG) floor can be time consuming in addition to difficulties to pour concrete in tight areas and along the long building. That is time consuming and increases difficulties and effort.

A good option to reduce labor cost and time is to precast the floors. Big pre-casted slabs for the floors are not effective due to the irregularity in the building geometry. So, the solution is to break down the precast slabs into unitized panels that has as perfect as possible dimensions that can cover most of the floor areas with minimum joints. The benefits of this method can be, but not limited to, that it can reduce onsite safety issues, time, finishing, and cost.

More research will be done on how this method will affect logistics, time, and cost savings. The research will discuss how much time the precast floor units will makeup time for the project and how much lead time they need and the costs associated with them. That will be demonstrated through comparing this method versus current method. Areas for comparisons are time consumption and cost of units' installation vs. how long it takes to pour and cure concrete. In terms of logistics, the following aspects will be considered: the number of deliveries needed for each method and the costs and time associated, storage, equipment locations, laydown/shake-out areas, and on site traffic due to trucks delivering materials for both methods.

Analysis 4: Implementing IPD

Communication skills are critical and have to be existed within any team working on a certain project. Also, a cohesive team that works for the project is one of the success factors to a flawless project. The Integrated Project Delivery (IPD) is one of the most efficient and effective delivery methods for in the construction industry. IPD brings all project teams together which enhance and tides up their relationship and establish an understanding baseline between all members.

In IPD, the owner assembles the teams mostly based on trust as discussed in the PACE session 1B. The owner's trust generally came from a past experiences which eases communication, enhances relationships, makes the team more cohesive, and shares the united goal of completing a successful project between members. To support the idea of the united goal, the project profits and risks are shared. So, if the project turned out to be successful, all members will share the benefits and vice versa. Regarding communication, members will have the opportunity to communicate more in the early design phases of construction. That allows them to give their inputs on the design from their point of view which create synergy and stimulate thinking of other team's point of view or at least get them involved in a given problem they are trying to solve.

With that being said, less conflicts and issues on the construction field will occur. As a result less time will be consumed and this translates to money savings. Also, since everybody is involved from the beginning, there are fewer surprises expected which also cut down fixing costs and on the field. If IPD was planned right, the risks associated with it will be minimized.

For the initial extensive efforts from the different teams, there are costs associated. From different studies, it turned out that IPD has better value on the long run which makes the initial cost. That will be achieved through less problems during construction and a better product after construction specially if there are saving or profits that were gained due to utilizing this method of delivery.

The research that will be conducted to find out how feasible it is to apply to the Sterling and Francine Clark Art Institute project will include, but not limited to: initial costs of both delivery methods, long term benefits and whether the pay-back-period will be reasonable, and time savings that will be reflected on the schedule.