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Technical Report 3

Holiday Inn Express

Absecon, NJ

December 1, 2009

Table of Contents

Executive Summary 2

Constructability Challenges 3-4

 New Entry 3

 Existing Facility 3-4

 Staff Coordination 4

Schedule Acceleration Scenario 5-6

 Critical Path 5

 Project Completion Risk 5

 Project Schedule Acceleration 5-6

Value Engineering Topics 7-8

 Implemented Ideas 7-8

 Unused Ideas 8

Problem Identification 9

 Energy Efficiency 9

 Framing Inspection 9

 Site Congestion 9

 Public/Private 9

Technical Analysis Methods 10-12

 Energy Efficiency 10

 Building Controls 11

 Alternative Materials 11

 Increase Manpower 11-12

Executive Summary

In the third Technical Assignment areas are examined to see where the Holiday Inn Express project could benefit from further research.

The first three sections of this Technical Assignment are based off of an interview with the construction manager of DRK Associates Barry Gardella. During this interview, topics about constructability issues, potential schedule acceleration ideas, and value engineering topics were discussed. The constructability issues that were discussed were the need for a construction entrance to the site, separation from the existing facility, and staff coordination. During the schedule acceleration section we discussed areas that could be accelerated like the installation of the underground plumbing pipes, and problematic risks like not being ready for the framing inspection. Finally we discussed ideas for value engineering. The one idea they did use was a floor joist material change resulting in a \$20,000 savings, and the idea they didn't use was to implement solar energy to the project.

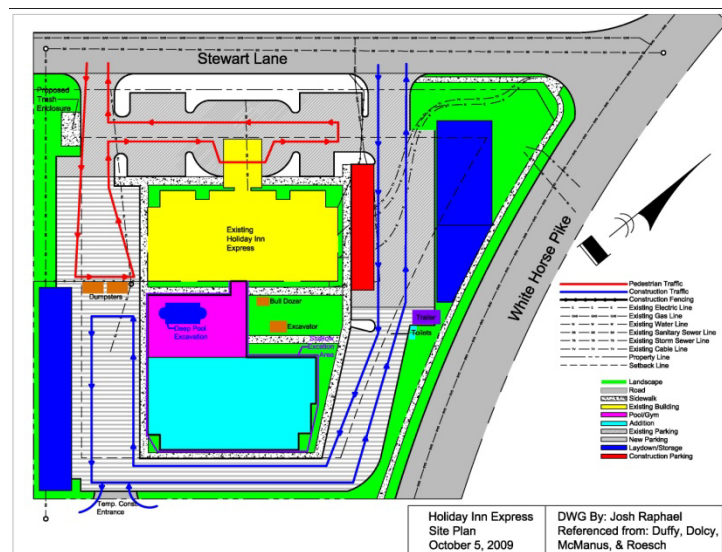
The final 2 sections were my observations from the interview. This section contains problem identification, and technical analysis methods. The big topics here were the implementation of energy efficient systems and alternative energy sources. Alternative materials are also discussed that will help cut time and cost.

Constructability Challenges

On any project you can guarantee there will be construction issues that need solutions. These issues can result from an abundance of things like unfavorable site conditions, existing conditions for renovations and additions, and staff coordination.

New Entry

The first challenge that arose was the need to access the addition portion of the site without disrupting the existing building or destroying the existing entrance. The existing entrance and exit are located at the top of the site plan shown on the right. The new entry was constructed off of a road jug handle and enters at the bottom left of the site plan.



There were a few reasons while this entrance had to be constructed. First off the existing entrance was too narrow for some of the larger equipment like the crane and concrete mixer. Another issue was that with the material laydown areas and the areas used for the addition the site had become congested and made it difficult to travel through to get to the new site. The final reason why the new entrance was needed is the use of the existing building. If the existing facility and the construction crews were sharing the same entrance it would be more difficult to separate hazardous areas from the public and would also make the entrance less appealing.

Existing Facility

Constructing an addition adjacent to an in-use hotel has its issues. Since a hotel is a place for rest and relaxation construction noise has to be scheduled around customer comfort. To do this the use of heavy equipment was not used early in the morning but rather closer

Josh Raphael / CM / Dr. Riley

Holiday Inn Express/ Absecon, NJ

December 1, 2009

to the expected checkout times. During the early hours manpower is used only to connect frames and install rough-ins. Heavy construction was also scheduled around peak operating seasons which caused a large amount of construction to be built in the winter season instead of the summer season. Having the existing facility open to the public also made site cleanliness very important and is a partial reason for having a safety inspector on site daily.

Staff Coordination

An issue that caused some coordination problems was the hierarchy of contractors. DRK Associates the General Contractor did not have authority over the site contractor. The site contractor was under the authority of the project owner only. This caused issues with sharing equipment and site area making it difficult to coordinate. To solve this issue DRK associates decided to go over the heads of the site contractor and spoke to the owner whenever they needed the site contractors to do something. Once the GC decided to go to the owner with site issues the coordination between GC and site contractor increased greatly.

Schedule Acceleration Scenario

Accelerating the schedule can result in an early finish date, cost reduction, and prevent late fees.

Critical Path

The critical path for the Holiday Inn Express is very simple. The schedule starts with excavation and pouring concrete pads and foundations. Once this is finished the stair towers are installed followed by framing and mechanical, electrical, and plumbing rough-in of the first floor and continues up until the third floor. The roof is then installed and finished. The insulation and drywall then close up the walls and finally the finishes are implemented from the bottom up.

Project Completion Risks

One completion risk that was explained to me was the framing inspection. Since the inspectors are scheduled to inspect on certain days there are many issues that may arise. If the framing is not complete when the inspector is supposed to show up they will have to reschedule which can cause a delay based on the inspector's availability. In addition if the inspector finds mistakes or errors the construction will be delayed until the errors are fixed and the inspector has time to revisit.

Project Schedule Acceleration

One area that has potential for acceleration is the installation of the underground plumbing. The current schedule states that it will take 55 days for this installation. The project manager explained to me that there was no issue with the installation but rather the delay is caused by lack of manpower. If the plumbing trade had decided to double or triple there onsite staff the project could easily be accelerated by a month.

Two other potential schedule acceleration ideas are also areas to research for my thesis. The first is a combination drywall/ insulation that will cut down on installing both. The

Josh Raphael / CM / Dr. Riley

Holiday Inn Express/ Absecon, NJ

December 1, 2009

other idea is the use of wireless controls which would greatly cut down on the electrical rough-in installation time.

Value Engineering

Value Engineering can be one of the most useful ways to save money on a construction project without losing any of the expected quality. On a small project like the Holiday Inn Express it is difficult to find areas of improvement and cost efficient solutions. A few main areas to start to look for savings are alternative building materials and energy sources.

Implemented Ideas

The first idea implemented on this project was to choose the best material for the floor joists that would be the cheapest without quality sacrifices. When selecting floor joist materials many options were analyzed. The three materials that were looked at are steel, concrete, and wood. Steel was eliminated first since the building load did not require a high strength material for support and the cost of steel was significantly greater than wood or concrete. Concrete was then eliminated since it would require more equipment, more time for curing, and an overall greater cost. Therefore the most viable solution was to use wood, but which wood construction would be the most efficient.

Originally Harry Harpers Architects had determined that L65 TJI floor joists would be suitable which is why the plans still call for TJI's. However DRK Associates made the choice to use wood trusses instead of L65 TJI floor joists (not included in the plans I used for Technical Assignments 1 and 2). DRK Associates determined the



savings they would make while procuring materials. The result of this material change was a \$20,000 savings. With savings like this it is suggested that I look into alternative materials for other parts of the building in my thesis analysis.

Josh Raphael / CM / Dr. Riley

Holiday Inn Express/ Absecon, NJ

December 1, 2009

The second idea implemented on this project was the choice to allow the owner to purchase the furniture, fixtures, flooring, and finishes. While this may not seem like a big deal there was a lot of savings in this decision. The owner received discounts on selected furniture offered by the Holiday Inn Express. In addition the owner saved money by not having to pay a middleman or fees to the General Contractor for procuring these items. The General Contractor also saved time by not having to search for the best items and would not slow down the schedule.

Unused Ideas

The one main idea that was not implemented was the use of solar panels for energy savings. The number one reason that this idea was not used was due to budget limits. The owner however has shown great interest in this idea and plans to implement solar panels in the future to save on future energy bills.

Problem Identification

Energy Efficiency

The Holiday Inn Express building lacks any opportunities to save on energy usage. There are a lot of energy efficient ideas that can help cut energy costs in a hotel building. Since each hotel unit is controlled individually by those who rent it, it is hard to manage the energy usage in each unit.

Framing Inspection

Like I mentioned earlier the framing inspector is on a tight schedule and can only visit the site by appointment. With the risk to greatly delay the schedule if the inspector for any reason cannot do his job on that appointment due to incomplete works it is important that we schedule around this inspection. To prevent this risk added time should be allotted in the schedule before inspections to allow breathing room.

Site Congestion

With the site being used for business and construction simultaneously the site can get pretty congested. The added entrance helps separate construction from business but the laydown areas still take up a lot of site area. Staying organized and choosing the appropriate locations for laydown will prevent congestion.

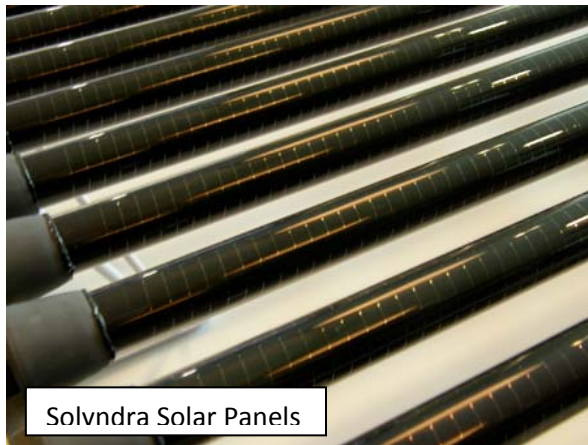
Public/Private

Finally when I went to visit the site I noticed that the construction areas were not completely blocked off from the public. This could be a huge safety issue and people from the public could easily stumble into hazardous areas. DRK Associates should look into increasing the amount of construction fencing and signage to prevent injury or lawsuits.

Technical Analysis Methods

Energy Efficiency

As previously stated there are not any energy efficient ideas being applied to the Holiday Inn Express Addition. The implementation of BAS Systems (Building Automative Systems) can help cut back on unneeded energy usage. This system would also be useful in hallway lighting at night. If you did not need to keep those lights on when the hallways were empty you can save a ton of energy each night.



Solvndra Solar Panels

The other idea is to implement solar panels like the owner originally had wanted. At the PACE Roundtable Energy and the Construction Industry breakout session we discussed a new type of solar panel called Solydra. This type of solar panel is cylindrical and placed on a reflective roof surface to absorb more energy on a larger surface area of panels. Since the south end of the addition

faces a wooded area it would not impair the appearance of the new addition. The added solar energy can help not only the overall electrical systems but also help heat the water pumps. In a hotel hot water is used often for showers and cleaning so an alternative source could greatly decrease energy usage.

Research in alternative energy sources and alternative electrical systems can be useful to my thesis. In order to determine whether any ideas will improve the projects efficiency, research must be made to determine initial cost and future savings from implementing these energy saving ideas.

Building Controls

The owner had stressed that at the finish of the project they expect the existing and addition building will be controlled as one building. In order to do this the electrical crew had to connect all existing conduits to the new addition. Again an idea was brought to my attention at the PACE breakout session. The use of wireless controls can benefit this project in many ways. With wireless controls it would be simple to control the new addition from the existing building without connecting to the existing electrical utility through conduits. The schedule would also be shortened due to less conduit installation. Cost savings would be made by needing less conduits and wires.

To determine whether this would be beneficial to this particular project we must compare initial cost of the wireless controls to the cost of running all the extra conduits and wires as originally planned.

Alternative Materials

DRK Associates have used alternative materials for floor joists to save on cost but other building areas were not analyzed. A fairly new material has been used on other projects which combines drywall and insulation into one material. With the drywall and insulation combined installation time could decrease. This particular material is also fairly cheap and is thinner than the normal drywall and insulation which gives the owner larger room areas without increasing building size.

Since this is a newer material one issue that must be researched is the location of companies that carry this material. If there are no companies in the area and the material must travel a long distance it may not be cost efficient to switch to this material.

Increased Manpower

One of the biggest schedule delays to this project is the installation of underground plumbing. To solve an issue where the task is taking too long and no other issues have arisen a simple solution is to add manpower. Cutting this time down should not only accelerate the schedule but also save money in the long run.

Josh Raphael / CM / Dr. Riley

Holiday Inn Express/ Absecon, NJ

December 1, 2009

I must research the staff size of the plumbing contractor used and if they do not have a large enough staff to increase manpower, other contractors should be looked into.

Alternative installation methods could also be looked at to see if there are quicker ways to install the piping.