

THE INNOVATOR

Newsletter

SPRING 2013

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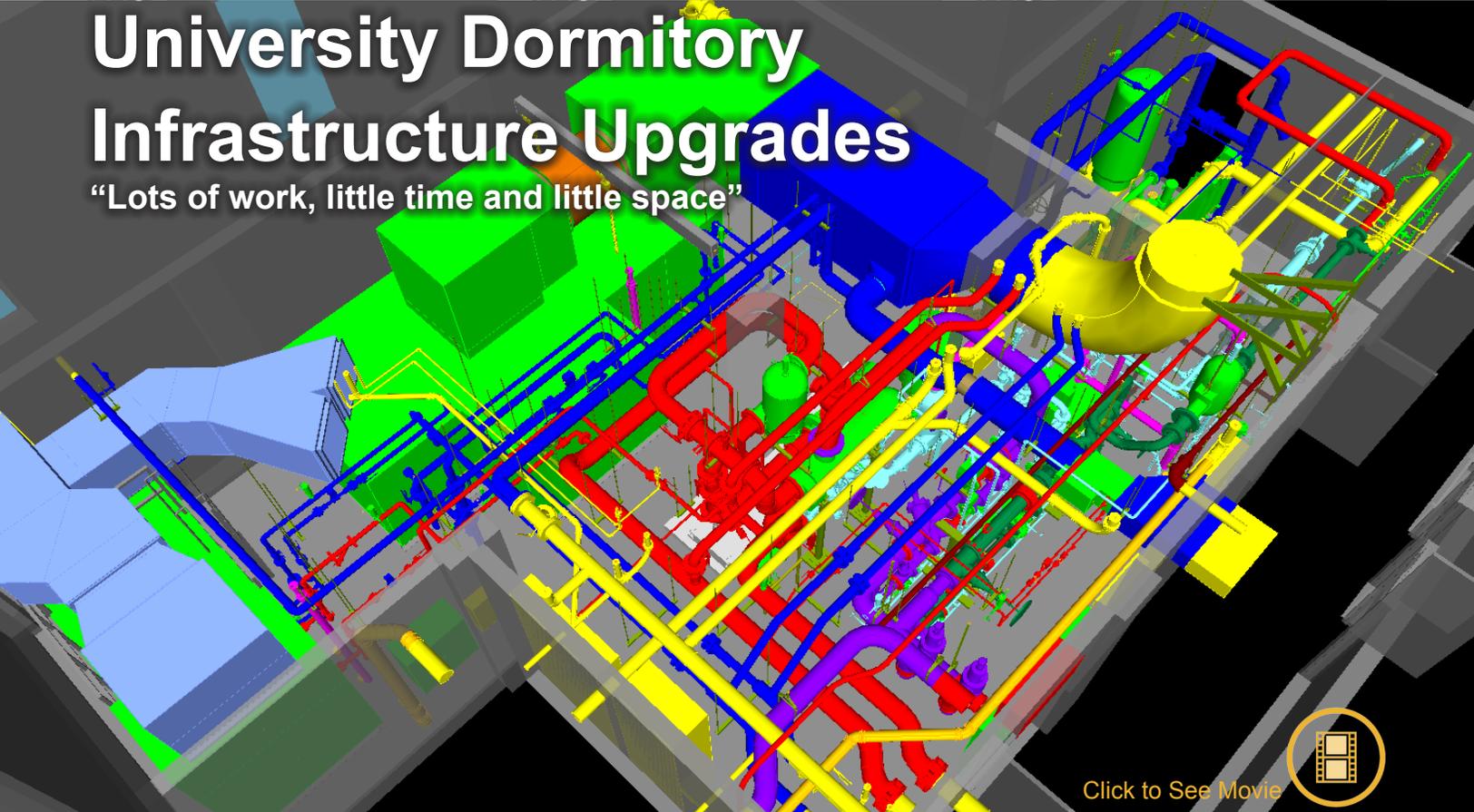
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LIFE STYLES

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University Dormitory Infrastructure Upgrades

“Lots of work, little time and little space”



Click to See Movie



**Tom Green & Company
Engineers, Inc.**

LORD · AECK · SARGENT
ARCHITECTURE

DATUM

MPS
MECHANICAL & PROCESS SYSTEMS, L.L.C

Although it may seem we've done this article before...we haven't. This is the third “submarine-type” project we've completed as part of a multi-phased air handler replacement project at a well-known flagship university in the Austin area. It is another project that required intricate planning, design, and construction all within a fast-tracked schedule, and that used virtual design and construction (VDC) initiatives. Kudos to our superb Project Team, including [LAS Architects](#), [Datum Engineers, Inc.](#), [MPS](#), and special thanks to the Owner and the great team it provided.

This project included a much bigger scope and even greater room constraints than those prior. It included documenting existing conditions in 3D, replacing two forty year old air handlers, replacing a steam-to-heating water converter, adding a dedicated outside air unit, major modifications to the domestic water service entrance and pumps, and a huge effort related to creating appropriate maintenance clearances.

We accomplished the Team's collective goals with the use of Navisworks throughout design, for Owner presentation/collaboration, and for coordination and clash detection to resolve conflicts prior to construction. There was a very slim margin of error allowed. ~ Greg Maxwell, LEED - Designer/Technologist (More on Page 2)



1 DOMESTIC WATER

This project housed the domestic water entry to the building. TGCE provided dual 6" backflow protection, a 750 GPM triplex booster pump, and new building distribution header using stainless steel victaulic pipe and fittings.



2 STEAM TO HEATING WATER PLANT

The steam to 1,000 GPM heating water conversion plant consisted of a parallel, single-stage pressure reducing station, parallel control valve assembly, a heating water converter, flash tank, steam condensate return pump and meter, and associated traps/assemblies.



3 AIRSIDE SYSTEMS

The design included a new 32,000 CFM air handler with an external vane axial fan and a 4,200 CFM dedicated outside air unit custom built for this project. Close attention to details such as AHU coil removals, fan removal via equipment hoist beams, VAV access, chilled/heating water control valve accessibility were vital.

MORE FOR LESS A DISCUSSION OF PROJECT VALUE

More for less in Design.....Really?

In our last newsletter, our *"Did you Know"* article overviewed a variety of construction phase topics, including constructability, BIM, shop drawings, commissioning, and troubleshooting. In it, we discussed that the construction industry was (in our estimation) returning to the notion that it is possible to achieve more for less...when the focus is returned to the *bigger picture*.

More for less. In construction? In Design? In anything? Really? Absolutely, with the right team and the right process.

Being engineering geeks, let's talk about this more for less thing from the standpoint of a term used routinely in thermodynamics: **"Control Volume"**. The control volume is the boundary around which the problem or question is to be analyzed. Depending on where you draw this boundary, the answer can be different.

Let's apply it to Design Teams and to the project big picture. The current process for most design, even when some version of 3D or BIM is used, is to knock out the drawings as quickly and as economically as possible. This approach is the result of decades of downward fee pressure on A/E services, which in turn has lead more and more to drawings being as minimally detailed as required to acceptably illustrate "intent". (And of course "acceptably" inescapably has a variety of interpretations among the Owners, contractors, architects, and engineers in the industry.)

The result of this approach? The Construction Teams in today's projects spend inordinate time and money to create shop drawings that are in a constructible condition. Through our Construction Support Services (CSS), we've been a part of that process. The "control volume" has been built around the A/E fees. The quest has been to buy these services as inexpensively as possible. As one contractor has put it, "we usually receive what we believe are about 75% complete drawings, but we cannot build it to only 75%

completion, only 75% right. So, we are filling in more gaps which takes more time and more money."

I am not here to dog this approach. It is what it is. It exists today for a number of legitimate reasons (and possibly for a few not so legitimate ones). To pretend it doesn't exist in too many aspects of the industry is, in this author's opinion, not realistic.

But what happens if the control volume is drawn not around the A/E "soft costs", but instead drawn around the total project costs? What happens if, in cases where the project needs it and the Design Team can deliver it, a new approach is followed?

What happens if a Design Team historied in constructible design, with sufficient details and specifics, develops a design to a status of needing only minor tuning rather than major infills and corrections? What happens if shop drawings and their coordination take a fraction of what is currently being spent? What happens if the construction teams can count on what they see in the construction documents as being representative of the costs they will experience in construction?

With the control volume built around the entire project, this new approach yields

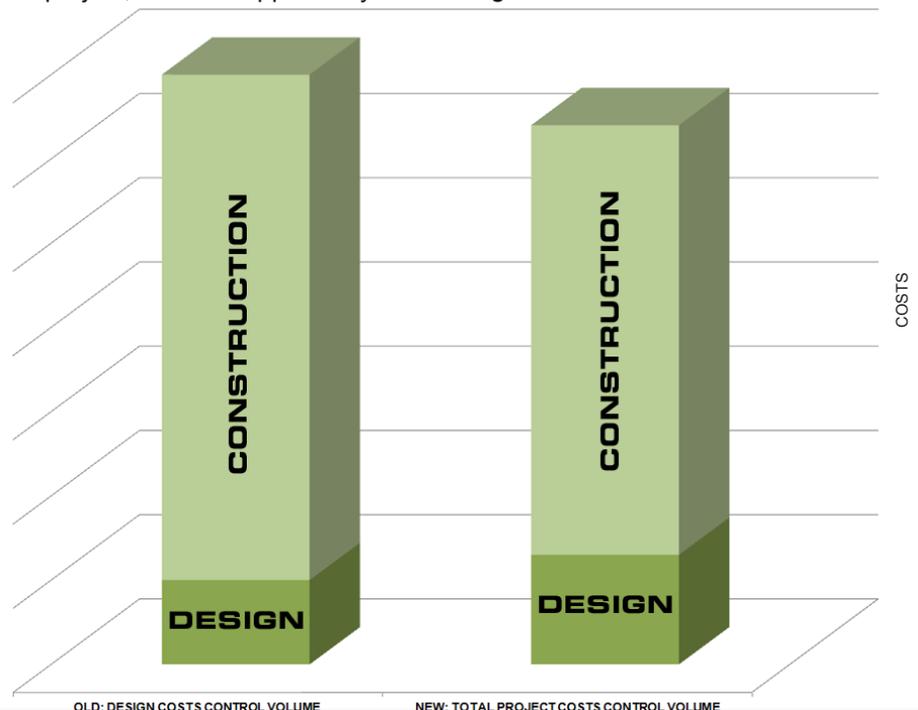
better definition of construction needs, and therefore truer costs on bid day. It reduces the time and effort to create coordinated shop drawings, thereby reducing their costs. It reduces the "unk-unks" (unknown unknowns) that ALL the project parties must endure (Owners, Contractors, Designers), thereby reducing RFIs, change orders, and other potentially costly diversions and distractions.

This total project control volume yields an immediate payback that is achieved even before the keys are turned over. This payback is not theoretical. Based on our project experiences, including those within our CSS, Contractors have stated to us the payback is real. It is a win-win for all.

Where from here? Except in Design/Build (D/B) or Integrated Project Delivery (IPD) projects, moving toward the new win-win approach rests primarily with the Owners. Those of us who serve them in design or construction must therefore help them to be aware of the new mind-set and new opportunity.

For it is they who, in the overall, will receive the largest share of this overall "more for less."

~ Tom Green, P.E., LEED AP - Principal Engineer



TGCE LIFESTYLES

TGCE TEAM INTERVIEW



JENNIFER HALL, P.E.

Hometown:

Austin, Texas

Undergraduate:

The University of Tennessee

Favorite Food:

Pizza and Ice Cream

Why did you become an engineer? I became an engineer because I was interested in math and science and wanted to use my aptitudes in a career that had the potential to be financially rewarding. I quickly discovered through high school sports that I did not have a tolerance for blood or seeing people in pain (i.e., not going to be in the medical field), so I decided to pursue engineering. At 18 years old, I did not have a clear path of where I wanted to be in the engineering world when I began my undergraduate work other than to get a degree in mechanical engineering. I have three uncles that are Mechanical Engineers and having the benefit of their career experiences helped me decide to take that route.

For those who know you, what is one thing they wouldn't know about you? I have recently completed my first season of coaching with junior volleyball club Total City Sports (TCS). It was a great opportunity to combine my volleyball background and to serve the community. The experience has been very rewarding and I hope to be able to continue to serve in that way.

For those who don't know you, summarize in one sentence who Jennifer Hall strives to be. I strive to be greater every day.

As a newcomer to TGCE, how would you describe the culture of our firm? TGCE's culture is both team oriented and family-like. Team oriented in that everyone is helpful and assists each other to reach the common goals of turning out great work, creating new and maintaining client relationships, and being an industry leading firm. TGCE is also family-like in that we all genuinely care about each other and, of course, partake in the occasional prank.

Jennifer is the newest member of our Team and we are thrilled about the addition of her unique skill sets as TGCE continues to go the extra mile for our clients.

MOBILE APPS

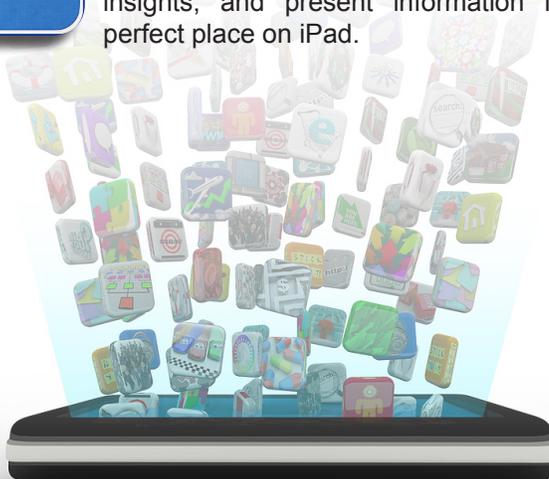
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Notability - \$1.99

Notability powerfully integrates handwriting, PDF annotation, typing, recording, and organizing so you can take notes your way! Discover the freedom to capture ideas, share insights, and present information in one perfect place on iPad.



TOM'S TRIVIA

1. What was the first American construction project where hard hats were required?
2. What was the second American construction project where hard hats were required?
3. What is the oldest manufactured building material still in use today?

* All "close to correct" responses will be pooled, with a winner drawn and awarded a \$25 gift card to The Home Depot.

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Check our website at www.tgce.com/news/newsletter for results.