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Dear Members and Colleagues:

The Washington Building Congress is going strong! We achieved an amazing 91 percent member retention rate this year, and to date have added 18 new company members, 13 small businesses, and 62 additional reps. The Membership Services Committee hosted an interactive new member orientation for an enthusiastic group at the WBC on February 23. The committee, led by new Chair Kelly McGuire (Ruppert Landscape) and Board liaison Tara McCarthy (Page Southerland Page), is doing an incredible job this year. I would also like to recognize Alfred Llop (RK&K), who stepped down as chair in February when taking a new job, for his service over the past two years on the committee.

Since the beginning of 2018, WBC has been on the move with Craftsmanship and Star Awards judging, winter networking, Hammerheads Lucky Strike, Hall of Fame video session, Women’s Roundtable program, and the St. Patrick’s membership event. To top it off, the spectacular 62nd annual Craftsmanship Awards banquet and Hall of Fame induction were held on March 16 with over 1,000 attendees.

I would like to thank the Community Services Committee and the WBC membership firms who participated in the 9th annual Member Giving edition of the Bulletin. The committee’s next major initiative will be the April 28 Rebuilding Together Workday. This year’s team, led by House Captain John Matos (Langan), will be reaching out to the membership seeking donations of labor, materials, and financial support. Thanks again to the Community Services Committee, Chair Vanessa Carrion (Gilbane), Vice-Chair Edward Dudlik (Morgan Stanley), and Board Liaison Ken Ellis (RK&K).

The Program and Education Committee put together the extremely well received Women’s Roundtable and Networking event February 15 with over 100 in attendance. Special thanks to Laura LoBue and Pillsbury Winthrop Shaw Pittman LLP for organizing and hosting the event in their beautiful meeting space. Thank you to the Program Committee, Chair Kevin Paruk (Structural Technologies), Vice-Chair Owen Walker (Smith Pachter McWhorter, LLC), and Board Liaison Bob Frew (Balfour Beatty Construction).

The WBC Craftsmanship Awards Banquet was held at the Washington Marriott Wardman Park on March 16. We proudly recognized over 400 individual craftsmen for their important contributions to our industry. WBC received 255 entries this year, of which 84 were selected as Craftsmanship award winners. Out of these 84, the top eight entries were nominated for Star Awards. The three Star Awards winners were announced at the end of the awards banquet. We also inducted two new members into the WBC Craftsman Hall of Fame, including the first women to join this prestigious group.

I would like to conclude with a special thank you to the Craftsmanship Awards Committee, Chair Todd Scales (Manhattan Construction), Vice-Chair Karen Cotton (HITT Contracting), and Board Liaison Sean Frazier (HSU Builders). We sincerely appreciate your support of this significant industry event. Special recognition also goes to WBC Past Chairman Darrel Rippeteau, creator of the Star Awards program, who retired in December 2017 following an illustrious career as an architect and artist.

Coming in May will be the Craftsmanship Awards special edition of the Bulletin featuring all 2018 Craftsmanship and Star Awards winners, Hall of Fame inductees, and event sponsors. This information is also currently available on the WBC website.

I look forward to seeing you at an upcoming WBC program or event. Thank you for your active participation and ongoing support of our great association!

Best regards,

Dan Buckley
WBC Chairman of the Board
RECENT AWARDS

ABC 2014, 2016 & 2017
Masonry Subcontractor of the Year

ABC 2014, 2015, 2016 & 2017
Safety Training & Evaluation Process Award, Gold Level

WBC 2014 & 2017
Craftsmanship Award

ASA 2014
Carson V. Carlisle Jr. Safety Award

Architect:
Architects Collaborative, Inc.

General Contractor:
Paradigm Contractors, LLC

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Grunley Named Vice President

Grunley is proud to announce that Adam Grunley has been appointed as vice president. He has served the company for more than half his life in various capacities, including laborer, assistant project manager, project manager, chief estimator and project executive.

For the past three years, Grunley has successfully led the creation of all project budgets and estimates as the director of estimating. In his new role, his experience, expertise and knowledge of the construction industry will continue to align the company’s capabilities with clients’ needs.

“Adam has consistently proven his leadership abilities. His dedication to his colleagues and client satisfaction have been a tremendous asset to our growth,” said Ken Grunley, President and CEO. “I am very grateful for the opportunity to work alongside my son, leveraging his own successes towards the growth of the company.”

Insurance Associates Moves its Headquarters after 10 Years

In January, the Rockville Staff of IA were welcomed into a new home at One Church Street. The agency moved from the building next door, 21 Church Street, where they operated for ten years.

This move marks the fifth historical move of the agency’s headquarters:

- 1956 – Agency was Incorporated
  Vermont Ave. Washington, DC
- 1970 – Connecticut Avenue
  Chevy Chase, MD
- 1995 – The Historic Wire Building
  Rockville, MD
- 2008 – 21 Church Street
  Rockville, MD
- 2018 – One Church Street
  Rockville, MD

Insurance Associates is fortunate to have the entire 5th floor of the building, which is the equivalent of 8,800 square feet, designed just for them! The new space at One Church Street features an open modern feel with low workstations and rounded desks so that employees can easily engage in client-centric conversation. The offices contain glass walls that enable light to enter and also contributes to the contemporary look. There are even new amenities such as a lounge for associates and a wellness room that were not able to be offered at the previous address.

“I am very excited about our new location,” said Stephen A. Spencer, President of Insurance Associates Inc. “The added space of having an entire floor to ourselves will enable us to grow and serve our clients more effectively than ever. We simply cannot wait to share this new state-of-the-art office with our clients, company partners, and colleagues.”
DAVIS Announces Company-Wide Promotions

Recognized by the Washington Business Journal as one of the area’s “Best Places to Work” for 11 consecutive years, James G. Davis Construction Corporation (DAVIS) announced several new year promotions, including multiple executive and senior vice presidents. Many long-time employees will take on new strategic roles, with a focus on efficiencies and sustainable long-term growth.

Jim Davis, President + CEO, will continue to lead the company alongside firm principals Dennis Cotter and Bill Moyer. Davis said, “These exciting promotions not only demonstrate our commitment to providing the best service to our clients, but also to the individual growth of our employees.”

Executive Vice Presidents

With nearly 100 years of combined construction experience and a career-long tenure at DAVIS, Jim Dugan, Carl Hirrlinger and Mike Pittsman have each been named executive vice president. In this role, each will collaborate with multiple market sectors with a focus on further developing best practices related to project execution and market growth, ultimately carrying out DAVIS’ mission: redefining the way people experience construction by building success for all.

Senior Vice Presidents

Continuing the upward momentum, six individuals were also promoted to senior vice president, including Dominic Argentieri, Constantine Athanas, Michelle Christen, Ben Cohen, Ron Juban and Chris Scanlon. Each will continue to elevate DAVIS through their leadership and expertise, embracing and promoting DAVIS’ core values and culture.

Vice Presidents

With 20+ years in operations at DAVIS, Dave Mesich has been named vice president – construction operations. With his collaborative approach to connect office and field staff, Mesich will impart his extensive technical knowledge to these groups. Additionally,

Dave Chandler, CSP has been named vice president – safety. Chandler will continue to foster the inherent safety culture at DAVIS, spearheading safety initiatives and innovative program development, always ensuring that safety is the number one priority.

PROMOTIONS – OPERATIONS

Senior Superintendent
- Mike Miller

Senior Project Manager
- Tim Boyer
- Erin Ruiz, LEED AP
- Geert Visscher

Project Manager
- Katherine Adewole
- Chris Graziani
- Dylan Hutchinson
- Lauren Kennedy, LEED Green Associate
- Yasamin Masahi, LEED Green Associate
- Logan Phillips, LEED Green Associate
- Cameron Sheppard

Project Superintendent
- Ryan Devlin

Assistant Project Manager
- Adam Abramson, EIT
- Bryan Atkins
- TR Clausen
- Melissa Consiglio
- Tyler Daley
- Alec Desaulniers, LEED Green Associate
- Jaime Escudero Leon
- Abel Espinal
- Alex Fischer
- David Hieronymus
- Hala Ishak
- Kyle Jiron
- Matt Kelly
- Bryce Lencske, LEED Green Associate
- Geremy Mahn
- James Martin
- Jacob Stark
- Edward Stratton
- Doug Watson, LEED Green Associate
- Max Wnorowski

Field Engineer
- Willard Wilson

Kelly Generator & Equipment, Inc. is the Mid-Atlantic distributor for Generac Industrial Power since 1992. We are a coordinated rapid response organization known for offering the proven reliability of a Generac industrial Power solution, backed by the quality of our service and reliability of our generators. Kelly Generator & Equipment, Inc. strives to provide our customers with quick and professional solutions to their electrical power needs. KG&E operates on three solid principals: Ensure optimum quality in every product sold; professional, honest, straight-forward relationships with our customers; and superior service for the life of our products.
3M Unveils New Innovation Center for Customers in Washington, DC

3M opened a new Innovation Center in Washington, DC at its offices near the Capitol to showcase how 3M science is solving some of today’s biggest challenges. The Center highlights solutions for specific customer needs and enables more convenient collaboration with key decision makers in DC and across the East Coast.

At a ceremonial ribbon-cutting and reception attended by government officials, diplomats and customers, 3M Chairman, President and CEO Inge Thulin addressed how 3M science and technology improves every life.

“The opening of our Innovation Center in Washington, DC reflects our Vision to improve every life through innovation,” said Thulin. “Everyone who has an opportunity to experience this Center can see the power of 3M science and how we apply science to life.”

The new Center brings 3M’s technologies and solutions to policy discussions, introducing lawmakers, regulators, diplomats and other stakeholders to the unique capabilities and technology platforms of 3M.

More information about the 3M’s Innovation Center, Washington, DC, including its components, functionality, and capabilities can be found online at www.3m.com/InnovationCenterDC.
More Member Charitable Giving

HGA Architects and Engineers

Employees of HGA Architects and Engineers have been actively involved in the greater Washington, DC community throughout the year by volunteering time and resources to a number of organizations.

Potomac River Clean-Up: HGA partnered with the Alice Ferguson Foundation and the City of Alexandria to clean up a stretch of the Potomac River adjacent to the Canal Center Plaza in North Old Town. In two separate events, 33 employees volunteered and collected approximately 30 bags of trash, 25 bags of recycling, 62 plastic grocery bags and an estimated total of 1,445 pounds of trash.

Canstruction: Each fall, HGA participates in the local AIA Northern Virginia Canstruction competition, where teams design and build structures out of canned food items. After several weeks of fundraising and developing the design, the team assembled the 3,619-can structure at Reagan National airport, where it was on display for a week. Afterwards, all food was donated to the Arlington Food Assistance Center where it will go to families in need. HGA has won the top two categories, Best Original Design and People’s Choice, for two years running.

Warrior Canine Connection: HGA provided pro-bono schematic design services for the Warrior Canine Connection, a non-profit organization that works with injured soldiers to train puppies as service dogs for other injured warriors. The project includes the re-purposing an abandoned, historic dairy barn into their new headquarters building.

Race for Every Child: HGA raised funds through a large team of runners and also provided several race day volunteers for the 5th Annual Race for Every Child in support of Children’s National Health System.

Salvation Army Angel Tree Program: HGA employees purchased new toys, gifts and clothing for 15 deserving children “Angels” in need during the 2017 holiday season.

HGA is an integrated architecture, engineering and planning firm that helps shape culture, business and society by consistently creating forward-thinking design solutions for clients & the communities in which they live.
Transparency is the key to greater energy and operational efficiency. Siemens Navigator powered by Sinalytics acquires and analyzes performance data for every building in your portfolio. The result: Comprehensive insights and powerful analytics combined in an easy-to-use cloud-based platform that tells you exactly what your building needs to deliver peak performance.

When smarter buildings drive smarter operations, that’s ingenuity for life.
In this section:

- 360 Cameras Can Do It All(most)
- Breaking Down Building Analytics: Putting Data to Work for You
- DC Water’s DC Clean Rivers Project
- Reality Capture in Construction – What, Why, and Where
- Lean Construction
- Practical Innovations Profile: W.E. Bowers, Inc.
The concept of an immersive image that allows you to look all around using a single click of a button is very enticing due to the amount of visual data that can be captured in a blink of an eye. But why do we need this technology? How can we apply it in the construction world? How much will it cost?

Panoramic images generated by cameras have existed since the 1840’s. I personally recall going to Epcot Center 30 years ago and standing in a room with the movie wrapping all around the circular space. It was impressive, but I never correlated how this may one day relate to my profession. 360 images/collateral are now everywhere. If you have shopped for a house lately, it is likely that you had a virtual tour that was generated in this method with the addition of publishing software to create the interface. Previously, the image was created using an array of cameras pointing in all directions from a central point and then stitched together using a manual or automated system for a seamless experience.

Today, 360 camera technology has evolved to allow for two wide angle lenses mounted on a single device to generate an image or a movie at an affordable entry price. An entry-level camera costs $200 to $500 for models from LG 360CAM, Ricoh Theta V, and Samsung Gear 360 to Nikon KeyMission360. Each feature tripod mounting and remote connectivity that allows the user to take a picture using a mobile device like an Android phone or iPhone. Beyond that you can pick a camera based on other features that are important to you—ease of use, connectivity type, capacity, resolution, image quality, etc.

So why is this good for construction? Construction personnel are constantly documenting existing conditions, progress,
or the completed product. We typically use traditional cameras, and it is very difficult to capture every item one might be interested in reviewing at a later point. Inevitably, the one area you need to review is just outside the frame of view in your site photos. Let’s face it—most of us are not professional photographers, so the photo quality is not always spectacular. If you want to capture a room or a space from a single point a view with a traditional camera, you would need to take a minimum of six images, most likely much more. Shooting and organizing these pictures becomes a monumental effort.

A few clarifications might be in order here. First, users need to keep in mind that a 360 photo is typically a larger file, and lacks the resolution of a standard camera. And, while the 360 cameras suggest an immersive experience if viewed in a viewer headset (such as Samsung Gear VR, Google Daydream), they lack the sense of depth associated with the stereoscopic image human eyes produce. To achieve this you would need a much more robust system, or a rig with two 360 cameras to produce an image for the left and right eye. This technique is called stereoscopic imaging, which is relatively easy to produce in computer model based renderings.

While 360 images offer a more efficient workflow for a basic quantity of images, they are also being adopted as a standard format for project management systems like Procore and PDF editing like Bluebeam Revu. The latter solution allows a low technological threshold to create a graphic layout of the images on a plan. Through a markup link of a single photo or a series of images we can create a timeline of the project progress. Capturing multiple images over time allows the end user to have better documentation of work put in place for future renovations. This article only scratches the surface of how 360 images can be used, but I suspect that as this format becomes more ubiquitous, we will see this as a standard feature on your next smartphone.
Breaking Down Building Analytics: Putting Data to Work for You

By Nathan J. Pritchett, Pritchett Controls, Inc.

What is Building Analytics?

Building Analytics is a rules based software platform that evaluates building data to determine whether or not the building and its equipment are operating properly.

The biggest challenge I have seen in the 10+ years since the label of analytics has been given to the above-mentioned process is the ability to articulate what it is and how it operates to key decision makers in the building industry. The data used in building analytics comes from automation systems throughout buildings such as HVAC Control systems, Electric Metering Systems, lighting control systems, and access/security systems. In most commercial construction projects, these systems (or at least some of these systems) are in place and operate independently of each other, generating mountains of underutilized data. The analytics software platform extracts this data from the systems to build a picture how the building is operating as a whole. Once the data is pulled, the software provides actionable information regarding anomalies in the building (fault detection), prediction for upcoming problems, prioritizes maintenance tasks, or even recommends system modifications.

Why Consider Analytics?

When it comes to technology and innovation in the building industry, building analytics is at the top of the list of ROI driven technology that contribute directly to reducing energy costs. Automation and efficiency are fantastic ways for building owners to achieve sustainability credit. But let’s face it, if there isn’t a financial benefit at some point in the sustainability chain of development, no sustainability projects would actually be completed. If you are a commercial real estate owner, would saving 20% of your annual utility costs be attractive to you? How would that impact the bottom line of your entire portfolio? The Department of Energy has invested heavily in building analytics and is a great source of product-neutral information on the topic. The DOE’s Smart Energy Analytics Campaign promotes the use of energy efficient technologies like fault detection and building analytics technologies in the commercial building sector.

Every piece of mechanical or electrical equipment draws energy, which increases costs. Using analytics, the building operator can realize the direct cost of energy associated with the operating trends of the building and make adjustments to minimize those costs. If you know how much you pay for energy, how much energy your equipment uses, and when that equipment is in use, the building operator will have ultimate control over the utility costs of that facility.

Breaking Down Building Analytics:

Putting Data to Work for You

By Nathan J. Pritchett, Pritchett Controls, Inc.

The three boxes shown above are examples of the fault detection anomalies working. They are actually pop up boxes that are accessible through the web interface of the BAS. Box 1 shows the rule. When clicked, it flips to Box 2 showing the possible problems (when there is a problem it will turn red). Box 3 shows various actions that can be taken to correct the problem. These boxes are a small example of one of the basic algorithms used in analytics.
The immediate financial benefit of implementing a continuous building analytics strategy also creates a ripple effect of positive benefits. Most importantly, analytics provide the ability to predict issues before they present themselves and maintain peak operational performance. Reducing problem calls is critical to maintaining tenant satisfaction/retention, especially in this competitive real estate market. Additional benefits include maintaining peak efficiency, identifying possible building system modifications, automated system commissioning, and providing the data to maintain energy efficiency requirements like Energy Star or LEED certifications.

**How does it Work?**

Once the data is collected, the analytics platform uses software algorithms to determine if the building is operating properly and if there are faults in its operation that should be addressed. A few basic examples of this are listed below.

- Equipment operating when buildings are unoccupied
- Simultaneous heating and cooling
- Excessive electric/gas usage of equipment outside of design intent
- Failure of economizing (free-cooling) operation
- Inability of equipment to maintain setpoints (temperature, pressure, humidity, etc.)
- Lights being left on when unoccupied
- Short cycling of equipment
- Valves stuck open or closed
- Prediction of clogged coils in HVAC equipment

These faults are just a small sample of the capabilities. The full list varies based on the infrastructure and needs of the customer's portfolio. Identifying issues early will reduce catastrophic failures, reduce the cost of repairs, prioritize maintenance tasks, prioritize asset life cycle replacement schedules, and minimize the threat of tenant complaints.

In most cases the organization that provides and installs the analytics package will provide key decision makers with a monthly report summarizing the actionable data provided by the software. These reports are designed to provide enough technical data for the operating staff to take swift action while also providing a layman’s description for the C-level executives who monitor portfolio performance. Analytics packages do an excellent job of taking complex data, summarizing it, and generating tangible action items that can be addressed.

**Next Steps**

If you are responsible for commercial property and have interest in exploring the feasibility of Building Analytics, the easiest place to start is inquire with your incumbent Building Automation service provider. Most of the software platforms available to perform building analytics are designed to work directly with the major BAS providers. Some of us actually build the analytics elements into the BAS already, so reaching out to them is a great place to start. Of course, the energy team at Pritchett Controls will gladly help anyone with this (regardless of system manufacturer) so please do not hesitate to reach out directly to us as well.

Technology is a truly amazing thing and embracing it throughout the commercial real estate industry is necessary to stay competitive. There’s no time like the present to put that technology to work for you.
“Well, would you look at that – it works!”

That was the response from an attendee after seeing newly constructed permeable pavement infiltrating water at DC Water’s kickoff event on October 23, 2017. The event marked the beginning of a nearly $27M project to implement green infrastructure (GI) that will improve water quality in the District of Columbia’s rivers. Mayor Muriel Bowser, DC Water’s General Manager and CEO George Hawkins, Councilmember Brandon Todd, and District Department of Energy and Environment Director and DC Water Board Chair Tommy Wells were among the speakers celebrating the event.

Like many older cities in the United States, portions of the District of Columbia (District) are served by a combined sewer system that manages stormwater and wastewater together in the same pipes. During rain events in the District, the capacity of the combined sewer system can be exceeded, resulting in discharges of untreated combined sewer water into the waterways. DC Water is responsible for the mitigation of CSOs and is under a federal consent decree to reduce CSO volumes. The Rock Creek Project A (Project) contract is being constructed as part of DC Water’s DC Clean Rivers Project (DCCR), a $2.7B program that will reduce combined sewer overflows to the Anacostia and Potomac Rivers and Rock Creek by 96% by 2030.

DC Water’s consent decree requires the construction of GI to manage the volume equivalent of 1.2 inches of rain running off of 498 acres to be implemented over the course of eight GI projects. The goal of DC Water’s GI implementation is to reduce and slow down stormwater before it reaches the combined sewer system. The vast majority of this volume will be managed by GI constructed within and along the District’s streets and alleys, through bioretention in curb extensions and within tree planter strips and permeable pavement in alleys and parking lanes.

The work being implemented is the first of the eight projects and includes 79 GI facilities in the right-of-way, from Oglethorpe Street NW to Gallatin Street NW and 3rd Place NW to First Place NE. In addition, bioretention and permeable pavement will be constructed at two triangle parks on Kansas Avenue at 2nd Street NW and 3rd Street NW, which will enhance the existing green space and provide community benefits such as outdoor classroom space for nearby schools.

DC Water’s focus is to implement the GI projects with an emphasis on:

- **Performance**: The GI must manage stormwater for CSO control to meet the consent decree requirements. Rather than a focus on improving quality of stormwater through filtering, treating, and cooling runoff as in a separate sewer system, GI for CSO mitigation must focus on detention of stormwater to mitigate for peak flows to the combined sewer system. Retention and in situ infiltration provide additional benefits where possible.

- **Cost effectiveness**: DCCR’s program is ratepayer funded through an impervious area charge, so decisions at all phases of the project (including planning, design, construction, and maintenance) are made with a strong emphasis on cost-effective solutions to the consent decree requirements.

- **Triple bottom line benefits**: Triple bottom line benefits, defined as environmental, social, and economic, are among the important benefits that GI will provide the local community where the GI is being constructed.
DCCR Director Carlton Ray and Anchor representatives, Dan Buckley and Raymond Coates, also participated in the kickoff event and highlighted the partnership between the two organizations. Anchor Construction Corporation, a local certified business enterprise in the District, is constructing the GI work under a design-build contract with DC Water with the joint venture design team of Nitsch Engineering and AKRF. The construction scope of work includes utility marking, protection, and relocation; demolition of existing pavement and subgrade at the GI sites; excavation; installation of perforated underdrains, aggregate, bioretention soil, and native plantings; and installation of permeable pavement. The permeable pavement facilities in the parking lanes are being installed with porous asphalt and alleys are being installed with pervious concrete and pervious pavers.

In addition to the environmental benefits of constructing GI, the project will provide additional triple bottom line benefits (social and economic) such as local, green jobs for workers who install, inspect, and maintain the GI facilities. DC Water has committed that at least 51% of new hires on the project will be local, District residents and has committed to the use of trained and certified workers through the National Green Infrastructure Certification Program (NGICP).

DC Water and the Water Environment Federation partnered with 14 other jurisdictions nationally to develop and implement NGICP to train and certify GI inspection, maintenance, and construction workers to support performance of GI facilities and create a career path for individuals. Earlier this year, Raymond Coates successfully completed the GI training program and became certified under NGICP. He was hired by Anchor Construction to work on the Project, supporting DC Water’s commitment to local, green jobs through the GI implementation. At the kickoff event, Mr. Coates highlighted his experience being trained and certified saying “The enthusiasm, the “can-do”, “we will succeed and we will succeed with you” attitude permeated throughout this whole program.”

After the construction is completed in early 2019, post-construction monitoring will be conducted by collecting rainfall and measuring stormwater runoff in the sewer system to compare to the existing conditions before the GI was constructed. Additionally, DC Water has committed to the maintenance of the facilities after they are constructed and will include activities such as inspection of underdrains and cleanouts within the facilities, removal of sediment and debris from inlets, vacuuming permeable pavement, and weeding and mulching bioretention.

In addition to the project highlighted at the kickoff event, DC Water has worked with other District partners to implement cost-effective GI. This year, DC Water worked with the District Department of Transportation to include permeable pavement in the District’s AlleyPalooza work, an initiative for construction, improvement, and repairs of alleys, and as part of the Kennedy Street Revitalization Project. DC Water also launched the Drain the Rain program in 2017, in partnership with Rock Creek Conservancy. Drain the Rain is a free, voluntary program to disconnect downspouts in residential areas. The program is available within a targeted area of the combined sewer system and offers free rain barrels to residents who participate.

For more information, please visit the following webpages: dcwater.com/green; dcwater.com/rockcreekgreen; dcwater.com/greenchallenge; dcwater.com/draintherain; ngicp.org.
Technology and Innovation

Reality Capture in Construction – What, Why, and Where

By David A. Stone, Director, Virtual Construction, HITT Contracting Inc.

First, let’s define reality capture as a way to document the environment around us in a digital, 3D format. In the construction and design fields, we refer to this as the as-built condition; in this case, reality capture provides a true as-built versus an outdated set of drawings. As-built drawings may show a close representation of the built project, but more often than not, they lack some of the constructability elements and cumulative changes by owners to truly give accurate guidance for renovating an existing space.

Why do we need it?

Renovations and/or additions of existing spaces require a specific sequence of events to take place to allow a successful outcome. Ideally an as-built model of the structure and other MEP elements that will remain is available, allowing new renovation or addition to seamlessly be added. But frequently this model is unavailable. Typically general contractors receive a 2D blueprint of the space or CAD drawings of the original design. Sometimes the design team creates an as-built model based on the best information available. All of these scenarios include a certain degree of risk that general contractors need to account for in the schedule, cost, or change orders due to unforeseen conditions.

In the best case scenario, the project team can scan the space after demolition and leverage the scan data in the design and construction coordination phases. Very seldom do general contractors get sufficient time to allow efficient scanning and coordination workflow desired, but we find hybrid approaches to achieve scanning just in time to allow coordination and fabrication to proceed on schedule.

So let’s explore some of the alternative reality capture methods. The most common use involves using a terrestrial scanner, like Faro, Leica, Top-Con, etc. Similar to a surveying instrument, the scanner shoots a light beam that bounces off the objects and back to the scanner based on line of sight to determine the distance for each point. The scanner creates millions of points per scan location to generate a 3D model called a point cloud. This process needs to be repeated several times to capture the entire space.
times to capture the entire space under consideration. While this method is the most accurate way to create an as-built, it is also the most labor-intensive due to the multiple static locations needed to produce a complete record of the space. The scanning typically includes an additional time-consuming process called registration, where all the static scans get integrated into one complete model. Some newer scanners allow for the registration process to occur simultaneously with the scan process. Terrestrial scanners are ideal for vertical construction and civil work due to the high accuracy (typically ¼-inch or better), range (about 1,000 feet on the high end), and ability to support sufficient data granularity for floor levelness heat maps.

The next method leverages photogrammetry and an optical scanner such as the Matterport, which uses a 3D camera to capture spaces and uploads the photos onto the Matterport cloud. Once the spaces are uploaded, users can perform a virtual walkthrough of the project at each capture point. We can now gather 360 degree photos of existing conditions to more accurately price fit-outs or renovations. These views of the existing conditions are also pertinent to ensure no damage was done to areas surrounding construction projects. As construction continues throughout a project, the progression can be tracked using 3D scans. This method is more cost effective than terrestrial scanning, but is limited in range/distance, is primarily for interior work, and lacks the accuracy of a terrestrial laser scanner.

Lastly we have LiDar scanners. These scanners are the newest to the industry and bring some significant benefits. They work similarly to a terrestrial laser scanner but allow the user to scan and navigate the space simultaneously. This method eliminates the need to register the scans, reducing the time and effort to produce an as-built. The most common application for this is to generate 2D as-built plans, or repeatable QA/QC models to compare construction progress with minimal effort. LiDar is comparable in price to terrestrial laser scanners. This method trades speed for accuracy (typically +/-1/2 inch at best) and is limited in range (about 60-100 feet).

Many project managers who have not had the opportunity to leverage laser scanning to create an as-built model for coordination will question its value, and this is the initial challenge due to cost and time constraints. My response starts with the importance of finding unforeseen issues such as drop beams or column heads, floor levelness, missing mechanical shafts or storm drains, and the potential MEP/FP to remain. Additionally, we discuss the value of certainty, quality, and safety. From a client/stakeholder perspective, the more we know about the existing space before we build allows us to proactively engage with the design team to address issues in a more efficient manner. Laser scanning has the potential to save the owner significant costs due to last-minute changes that typically are costlier and not the ideal solution due to time constraints, cost, and/or construction progress.
Lean Construction

By Sree Kala B Kadiani, Manager, Integrated Projects, Balfour Beatty

WHAT is Lean Construction
Lean Construction adapts Lean production thinking coined by Toyota to the Construction industry. The Lean Construction approach to construction project delivery focuses on maximizing the value while minimizing waste. It encourages project teams to standardize processes that provide predictability and encourage continuous improvement. Lean projects better integrate teams through the use of collaborative tools and processes that improve trust.

WHY: Value of Lean
Construction industry studies have shown that 50% or more of the effort required to deliver a built environment is non-value-added effort or waste in the eyes of the customer. Lean Construction encourages the use of processes and techniques that eliminate this waste and increases overall efficiencies in the industry. It results in predictability and accountability that will help measure project performance at regular intervals. These metrics form the foundation for continuous improvement.

HOW: Tools and Techniques Implementing Lean Construction
Some of the processes that are most commonly practiced in Lean construction are:

Last Planner System ®
Last Planner is a production planning system that helps create a predictable work flow with reliable promises promoting communication between different team members performing the work. It also promotes dialog and builds trust between various team members on the project. Using lean planning, monitoring and control systems, such as Just-In-Time (JIT) delivery and value stream mapping (VSM), and Pull Planning,
Technology and Innovation

**Last Planner® System Overview**

**Should-Can-Will-Did Planning**

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<td><strong>Master Planning</strong></td>
<td><strong>Make-Read Planning</strong></td>
<td><strong>Weekly Work Planning</strong></td>
<td><strong>Learning</strong></td>
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<td>• Milestones</td>
<td>• Look-ahead Plan</td>
<td>• Daily coordination</td>
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<tr>
<td>• Master Schedule</td>
<td>• Make work ready</td>
<td>• PPC</td>
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<td>• Establishes promise of project</td>
<td>- Identify constraints</td>
<td>• Ract rapid learning</td>
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<td>- Commitments to remove constraints</td>
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<td>- Constraint Log</td>
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<td>• Phase Schedule</td>
<td>• Reliable promising</td>
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<td>• Collaboratively built plan</td>
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<td>• Focus on handoffs</td>
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Creating and maintaining reliable workflow

the Last Planner system can be adopted during both design and construction.

The goal of system is to continually improve the reliability of our commitments and thus the reliability of the flow of information and production on a project.

**Target Value Design**

The Lean Construction Institute (LCI) defines Target Value as Delivery as follows: “A discipline management practice to be used throughout the project to assure the operational needs and values of the users, is delivered within the allowable budget, and promotes innovation throughout the process to increase value and eliminate waste.”

Target Value Design (TVD), offers the potential to ensure that owners get what they pay for. Owner plays a key role in defining and establishing the values for the project such as sustainability, staffing, square footage, operations and life-cycle costs. Design team can use these established values as the criteria to develop design within project’s budgetary constraints. The driving force of TVD is to increase value while decreasing cost for all team members.

**BIG Room /Co-Lo**

The term Big Room refers more to the behaviors and actions of the team than the physical space. The Big Room is more than co-location of people; it is about collaborative behavior and the work they are producing.
Big Room environment fosters team collaboration across function and disciplines. It provides an opportunity for the team to discuss project-wide concerns that effect multiple clusters of workgroups.

This helps ensure all project stakeholders are up to speed on progress of activities of other groups or individuals. It also eliminates the waste generated (Time and Resources) through complex hand-off of information. Ideally the Big Room behaviors start as early in the project as possible. The duration and frequency of Big Rooms will vary from project to project based on the stage and complexity of each project. The nature of the Big Room is expected to change several times throughout the project life. The focus of a Big Room should be continuous improvement that helps increase efficiencies for the project, each cluster group, companies involved and each individual.

For the success of a Big Room, it is essential that all team members are empowered to provide input and communicate any concerns. Trust and respect for the people in a Big Room environment will help teams rapidly advance work in a relatively short amount of time with less rework.

Daily Huddles/ Kanban

A daily huddle helps project teams focus on short term goals and tasks of each team or individual for the day. As the name suggest, these are conducted daily and limited to 10-15 min duration.

The three components discussed in a daily huddle are:

1. What did I complete yesterday?
2. What will I do today?
3. What are the constraints effecting my work?

The idea of a daily huddle is not to solve any project issues but to highlight possible constraints that may affect the progress on the project. This helps project team prioritize their work based on the workflow. This is a quick communication tool that brings a wholistic approach to the project progress and keeps the team moving forward.

Lean Construction Institute (LCI)

Lean Construction Institute is a non-profit organization, founded in 1997. The Institute operates as a catalyst to transform the industry through Lean project delivery using an operating system centered on a common language, fundamental principles, and basic practices. LCI has 31 operating Communities of Practice (CoPs) dedicated to advancing the mission of LCI within the industry.

Continuing education is the core for each Community of Practice. By offering education programs throughout each year, at both national forums and local Communities of Practice, we share new learnings and address questions and methods. Seminar topics include the tenets of Lean (Project Definition, Lean Design, Lean Supply, Lean Assembly, Production Control and Work Structuring) as well as specific topics such as safety, contractual agreements, cost control and implementation approaches. LCI offers education courses presented by instructors for: Business Case for Lean, Introduction to Lean Project Delivery, Introduction to Last Planner System, Target Value Design, Mindset of an Effective Big Room. Our education sessions are known for facilitating some of the best conversation in the industry.

Upcoming LCI Events:

**National Events:**
- **20th Annual LCI Congress**
  
  
  October 15-19, 2018
  
  Orlando, Florida

- **2018 Lean in Design Forum**
  
  
  May 30-31, 2018
  
  Chicago, IL

**DC Metro Community of Practice Events**
- **A Lean Coffee – March**
  
  March 16th, 2018
  
  AGC, 2300 Wilson Blvd, Suite 300, Arlington, VA

- **A Lean Coffee – April**

- **A Lean Coffee – May**

- **A Lean Coffee – June**
  
  Mindset of an Effective Big Room
  
  July, 2018

**Additional Resources**

- **Lean Construction Institute Website**
  
  [https://www.leanconstruction.org](https://www.leanconstruction.org)

- **Lean Learning Videos**
  

- **Lean Articles**
  

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As the earth’s population of over 7.6 billion people continues to grow, our society continuously seeks to develop sustainable practices with our limited resources and reduce emissions of greenhouse gases. With population growth, naturally comes construction of more buildings and renovations of existing buildings. These construction projects are the most opportune time to integrate energy efficient designs and practices to achieve a Net Zero Energy Building (NZEB).

The concept of a Net Zero Energy Building is to produce as much energy onsite as it consumes over the course of a year, without the use of onsite combustion. These buildings are still connected to the grid and typically have a main source of energy generation from a form of renewable energy such as solar or wind. Most importantly, NZEBs deploy energy efficient design strategies to minimize consumption as much as possible. To properly execute and maintain these highly efficient buildings, all of the systems within the building need to be tightly integrated which include the electrical, lighting, shading, and HVAC systems.

A great example of a NZEB up and coming in the Washington DC area is the American Geophysical Union (AGU) HQ. It is the first building renovation in the area with a NZEB design. AGU is utilizing a rooftop solar PV array for its renewable energy source and is approximately a 250kw system according to the information on its project site. This solar system along with the building’s efficient design strategies will potentially generate 100% of the building’s annual energy consumption.

Some of the design strategies that the building is deploying are a radiant cooling system, municipal sewer heat exchanger, electrochromic glass, DC Electrified Grid, and a smart lighting system. The radiant cooling system, like a chilled beam system, requires less energy to run compared to a forced air system because the temperature of the chill water has to stay above dew point to prevent condensation. This allows the main plant to run at a lower load, lowering energy consumption.

For the condenser water system, AGU is utilizing a municipal sewer heat exchanger in place of a traditional cooling tower. This system utilizes the sewer water to cool or heat the condenser water feeding a water to water heat pump system, so there is no energy spend on a cooling tower fan and more room on the roof for solar panels.

The electrochromic glass that will be utilized all around the exterior of the building will be able to automatically tint as needed to block out solar heat when it is unwanted in the cooling season and can be fully transparent to allow solar heat in the heating season. The dynamic glass will allow the aesthetic design of the building to maintain its true form as no shades or blinds are required, while contributing to the energy efficiency of the building.

Since most LED lights, appliances, and computers are powered by Direct Current, and the solar PV array generates Direct Current, AGU is implementing a DC electrified grid to deliver DC voltage directly without AC to DC conversion. This strategy eliminates the energy efficiency loss when converting AC voltage to DC, which can be up to 20 percent.

With all of these systems and strategies that will be in place, complexity increases when it comes to operations and maintenance. To holistically operate and monitor a building with these systems, it becomes necessary to integrate them together to ensure the building continues to operate as designed to meet NZEB requirements. Many building automation vendors and contractors have naturally taken on this role to be the system integrator. Having all of the smart systems within a building integrated into one robust user platform will allow facilities like AGU HQ to be a shining example in the DC area that Net Zero is achievable and sustainable. As more buildings in the area are being constructed and renovated, a Net Zero design should be considered to take a step further towards sustainability.
PRACTICAL INNOVATIONS PROFILE:
W.E. Bowers, Inc.

By Melissa Nelson, Carrier Sales Engineer,
Melissa.m.nelson@carrier.utc.com

How colleagues in the AECO industry are implementing technology to benefit the business of building.

As a supplier with Carrier Commercial HVAC Equipment, I have a firsthand understanding of the importance that the mechanical contractor plays in successful HVAC project execution. Their work in the field, from building and running piping and ductwork, to rigging and installation of complex machinery, to controls and systems interface, and much more, is the lynch pin in the whole process. The mechanical contractor workers are the boots on the ground that turn the job from lines and code in a file, and disparate pieces, into a functioning system that comfortably heats and cools these class-A office spaces in DC and beyond.

When the WBC Regional Development Committee invited the Innovation group to come along on a tour at WE Bowers, I saw it as a great opportunity for an inside look on the process that I thought I knew. What I found out was that the team at Bowers has instituted a build process that is taking advantage of the leading Building Information Modeling technologies and off-site coordination to gain tremendous efficiencies and ultimately a competitive advantage on projects. Pat Bowen, the WE Bowers Sales and Marketing Manager, and member of the WBC Regional Development Committee, provided key insights into the “practical innovations” that are driving everyday work at their fabrication and assembly facility in Beltsville, Maryland.

Q. After I took the tour of the Bowers facility, I wanted to tell everyone how expansively your team is leveraging technology in each step of your work. At a very high level, can you give us a picture of the ideal digital workflow practice at WE Bowers from job start to finish?

A. Upon contract award, Bowers management will meet and determine our construction strategy for the project. Construction strategies discussed during this meeting include, but are not limited to:

- Coordination department requirements
- Prefabrication percentage goals
- Material storage and laydown options
- Document management plan
- Project staffing plan and schedule

The digital workflow plan for the project is developed based on the five factors listed above. For a larger, more complex project, Bowers would perform full BIM modeling of the piping and duct systems for
When I visited, I saw the “racks” that you had built for modular installations on job sites. They are impressive! Can you describe the rack and the objective behind building them?

Bowers led the effort in the construction of over 2,000 linear feet of “rack” construction at Sibley Hospital. These racks were multi-trade assemblies which consisted of a structural steel frame, drywall walls, mechanical piping, medical gas piping, plumbing piping, electrical conduit, insulation, ductwork, HVAC equipment and fire protection. Each rack was approximately 8’ wide, 20’ long, and 3.5’ high and were installed as the corridor ceilings of the hospital. The racks were fabricated in the Bowers Prefabrication Shop, shipped complete to the field, and hung as an assembly. The corridor ceilings of a hospital are some of the most congested areas of construction. By prefabricating these assemblies, Bowers and the project team were able to eliminate the field stacking of trades, damage to work due to insufficient working space, as well as save significant time on the overall construction schedule.

The WBC has a cross section of building industry members who will be reading this article. What advice would you give them in order to make the BIM process for effective and efficient for the mechanical contractor?

The BIM process has revolutionized how we manage and prefabricate a project. As a project team, we are now able to virtually build the project before a single piece of pipe is delivered to the field. By using this method, we can virtually resolve almost all of the construction conflicts. Prior to BIM, these conflicts would have to be resolved in the field and at a much higher cost and more significant impact to the project schedule.

As with most things, the more effort that is put into the model, the more accurate it will be. Adequate time needs to be given by the General Contractor to properly complete the model, and all trades need to buy in and support the process. Architectural and structural features need to be accurately modeled, and maintenance access for mechanical and electrical equipment needs to be considered. With proper scheduling and support of all the trades, an accurate model will assist the General Contractor in ensuring a smoother running project and will improve the overall quality of the project being turned over to the Owner.
Donohoe Construction Company hosted a “Topping Out” celebration in January for 100 K, a 13-story, luxury apartment building in Washington, DC’s NoMA neighborhood. Developed by Equity Residential, the project is conveniently located two blocks from the NoMA-Gallaudet Metro and three blocks from Union Station. WDG Architecture designed 100 K with 222 residential units, below grade parking, and several amenities, including a rooftop pool and terrace, a courtyard, fitness center, and a private bar and lounge. The project is expected to reach substantial completion in Fall 2018.

Donohoe Construction’s Brandywine Living at Alexandria project has received its Certificate of Occupancy,
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marking an important project milestone. Brandywine Living at Alexandria is a six-story, 116-suite community with ground floor retail space and two levels of below grade parking. Located in the Camden Park development in Alexandria, this senior living community includes a therapy pool and gym, indoor and outdoor courtyards, a movie theater, beauty salon, a pub, patios, and private dining areas. Architect Niles Bolton and Associates designed the building to achieve a LEED silver certification.

Lendlease will be providing construction services for two high profile projects with Monument Realty — One M and Avidian, both located at the Capitol Riverfront in Washington, DC. One M will be an 11-story office building that will serve as the new headquarters for the National Association of Broadcasters when completed. One M, designed by HOK, will feature a rooftop, two-story conference center with unobstructed views of the U.S. Capitol and Washington’s monumental core.

Avidian, a 14-story residential condominium, designed by Gensler, is located adjacent to One M — just outside Nationals Park. The project will feature a diverse mix of unit types, as well as a fitness club, zen garden and rooftop terrace with swimming pool, fire pits, club lounge and outdoor seating with sweeping views of the monuments.

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WBC Calendar & Advertising Information

April 2018
- April 12, 10:00 & 11:00 a.m.
  U.S. Capitol Dome Tours
  Hammerhead's Committee Members
- April 24, 5:30 to 8:00 p.m.
  Silver Line Corridor Evening Program
  Sheraton Tysons Hotel – Tysons, VA
- April 28, 8:30 a.m. to 4:00 p.m.
  Rebuilding Together Workday
  Fairfax County, VA

May 2018
- May 2, 8:30 to 10:00 a.m.
  Buy America Act Seminar
  WBC Conference Room
- May 4
  Hammerheads Potomac River Cruise
- May 23, 4:00 to 5:00 p.m.
  WBC Member Testimonial Forum
  Spring Networking Pre-Event
  Location TBA
- May 23, 5:00 to 7:00 p.m.
  Spring Networking Event
  Location TBA

June 2018
- June 6, 5:30 to 8:00 p.m.
  Healthcare Industry Panel Evening Program
  The Sunset Room By Wolfgang Puck
  National Harbor, MD
- June 11
  Golf Outing
  Golf Club at Lansdowne and Belmont
  Country Club, Leesburg, VA.

August 2018
- August 22, 5:00 to 7:00 p.m.
  Summer Networking Event
  Cactus Cantina – DC

The Bulletin covers issues of importance to the building industry, news about WBC members and information about upcoming events. The topics listed below will be covered as feature articles in upcoming issues of the Bulletin. Persons interested in contributing information or advertising should contact WBC before the third week of the month preceding the issue. The Bulletin is published ten times a year by WBC.

To place an ad, submit material or for more information call (202) 292-5922.

The covers include:

- December/January: Member Charitable Giving
- February/March: Technology & Innovation
- April/May: Craftsmanship Awards & Hall of Fame
- June/July: Rebuilding Together Workday
- June/July: Marketing & Business Development
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