

[CS502238]

VDC Tools and Techniques Used Throughout Project Timeline

Benjamin Peek
Director of VDC – New England Region
Gilbane Building Company

Ian Carney, AIA
Sr. VDC Manager – New England Region
Gilbane Building Company

Learning Objectives

- Integrate revised strategies for MEP Coordination
- Predict problems during preconstruction using design model coordination reports
- Minimize risk along coordination processes
- Assess current procedures to identify more efficient processes within entire VDC Department

Description

Gilbane VDC (Virtual Design and Construction) utilizes many tools and tips throughout the entirety of a project to support project needs. From conception to completion, we'll share one of our projects to explore the process and procedures we use to create various deliverables and report on the outcomes realized. We'll identify valuable lessons learned that have become part of our standard operations, and we'll highlight the resulting challenges and successes. Starting with preconstruction, we'll share our design model coordination reports, touch on 4D scheduling, move on to coordination and drawing submissions, and end with verification to tie it all together. This presentation will educate participants on Gilbane VDC's proven processes and spark ideas for the future innovation.



Speaker(s)

Benjamin Peek, CPHB

Benjamin Peek is the VDC Director of Gilbane's New England region. For 10 years has embedded himself at the intersection of design and construction in search of new innovative technologies and processes. His applied design research has laid the groundwork for much of his success in system-based processes, model-based workflows, and ultimately finding new ways of constructing buildings. Benjamin holds a Masters of Architecture degree from the University of Kansas and researched mass timber construction at Harvard's Graduate School of Design. His most recent research is grounded on the idea of built manifestation as media, where he investigated iterative methods for the integration of forestry, construction, and heat transfer feedbacks into mass timber buildings; part design build experimentation, part thermodynamic inquiry. He is also currently an adjunct professor at Northeastern's School of Architecture.

Ian Carney, AIA

Ian Carney is a registered architect in the State of Massachusetts. Prior to entering the CMAR industry, Ian worked as a carpenter/furniture builder with a focus on digital fabrication and computational design. The common theme that drives his work is a desire to connect the strengths that technology affords with the builders, fabricators, and craftspeople that bring design and construction projects to life. Ian holds a Bachelors of Architecture degree from California Polytechnic Institute San Luis Obispo.

Tools and Techniques - It's the users that matter...

A key differentiator of Gilbane is the utilization of BIM on all our projects. Our dedicated Virtual Design & Construction (VDC) group based out of our Boston office is an extension of our preconstruction and operations team and will be extensively involved on this project.

Gilbane VDC utilizes many tools throughout the lifespan of our projects. We have refined our processes to effectively strategize our involvement. This presentation explores that it is not just the tools or technologies that set us apart but rather the team's variety of skillsets that have proven valuable to our VDC successes. The users of the tools has become the leveraging piece to our processes. We will breakdown our team's involment through three main processes– Proconstruction, Model Based Shop Drawings, and Verification.

Preconstruction

Our VDC team is structurally tied to the support operations entity of Gilbane. This alignment allows for cross pollination across departments and project teams in preconstruction as we embark on projects. Whether it be project team start up logistics planning or design model interrogation with Design Model Coordination Reporting (DMC) or visual scheduling or leadership in design assist processes, VDC ties together how project success is set up. We will explain how individuals of our VDC team involve themselves within each one of these preconstruction processes and describe the analysis they deliver.

Design Model Coordination Reporting (DMC)

As part of our standard preconstruction process, our VDC team conducts early constructability analysis to identify issues well in advance of construction documents being put out to bid. These issues are communicated to the architect and engineer of record via an interactive Procore report, enabling Gilbane and design team to collaboratively resolve each issue. This process becomes imperative with this project's complex systems coming together

Model Based Shop Drawings

Our VDC team champions all model based coordination. Once all subcontractors are on board, VDC begins the production of consolidating a 3D working fabrication BIM that can help our teams with:

- Overhead MEPF routing
- Accuracy checks of the 2D design documentation
- Visualization of constructability conditions at key locations

Our model-based effort is translated into 2D drawings which are tracked and documented. In working with the design team and our trade partners through this process, our innovative model based shop drawing process approach is utilized in order to reduce design variances. We will describe how this impacts overall schedules to significantly increase prefabrication of systems, the near elimination of re-work, unnecessary field coordination, and more generally, reduced construction headache in the field. Our VDC team ensures that the right amount, size, and capacity of material is being ordered from our model to shop drawing process.

Verification

On our projects, VDC begins with the capture and analysis of the site conditions. Our drone capture capabilities allow for us to produce 3D point clouds and orthomosaic images, a highly accurate measurable 3D and 2D image, that is used for site tracking and analysis at a scale not typically seen by the human eye. This capability allows for rapid analysis of base conditions as well as monthly tracking mechanisms that go hand-in-hand with onsite work. This facilitates efficient material layout tracking, site soil removal tracking, foundation placement verification, progress tracking, etc. for all critical on unique and logistically challenging sites.

Like the drone, Gilbane's laser scanners are utilized by VDC individuals to produce a detailed point cloud of conditions to verify locations and use within the model. Laser scanning is done in multiple stages – documenting existing conditions before construction starts, during installation, or post-installation to ensure systems were properly installed. VDC's use of this technology has proved extremely beneficial and is crucial in identifying issues and analyzing them before they are detrimental.

The VDC Team

Gilbane utilizes a full breadth of resources, expertise, and capabilities of our VDC department. The extensive VDC team is embedded throughout our project from preconstruction all the way through close out. The VDC team consists of architecturally trained individuals that work with design teams to provide specific inputs into issues by use of BIM in order to convey design intent along the project's life cycle. In turn, this enhances the construction process and helps reduce RFIs and change orders while helping remain budget and schedule conscious. We will ultimately reveal how each individual of the VDC team is strategically inserted to provide consistent value on the project with their use of the tools.