

## Building on BIM for the Future of Construction

What seemed like pipe dreams 20 years ago — connected equipment and tools, mobile apps, autonomous heavy equipment, drones, robots, augmented virtual reality — are either routinely used at construction sites today, or just around the corner. “Adaptation is one of our real strengths,” Alvarado says.

In the current technological wave, the widespread use of Building Information Modeling (BIM) has played a critical role. BIM refers to the use of three-dimensional digital models with information about the building to create construction documents as well as other documents and processes, rather than two-dimensional blueprints. Huge rolls of paper construction documents on the job site are being replaced by tablets, smartphones and head-mounted technology and augmented reality displays.

### Welcome to Immersive Reality

Now, the Wall And Ceiling Alliance (WACA), the organization of Northern California union-signatory drywall, lathing, and interior and exterior plastering contractors, has pushed the BIM process to a new level with the Collaborative Ultimate Building Environment (CUBE).



Marlin Chappell, a member of Local 9109, working with Cody Nowak, with the Wall And Ceiling Alliance (WACA), in the Collaborative Ultimate Building Environment (CUBE). Chappell works for California Drywall using this new BIM-based technology on several projects.

Located in WACA’s Pleasanton office, the CUBE is basically a movie theater for BIM where construction documents, virtual three-dimensional BIM models and other files can be blown up on adjoining walls on a large scale. Owners, contractors, subcontractors and workers can meet in the CUBE and make changes “on the fly, in real time,” in the words of developer/consultant Cody Nowak.

Participants can literally walk through a rendered virtual 3D model of the project in a 1:1 human scale as a collaborative group. Or one user can walk through with a more immersive virtual reality headset on, as the rest of the team sees what that person sees in virtual reality projected on the walls in a near 1:1 human scale. The team can then make changes that will immediately be reflected in the construction documents, and instantly see the changes put into place in the rendered three-dimensional walkthrough.

This immersive visualization, made possible by virtual reality and augmented reality, paired with BIM, will lead to better collaboration and communication. General contractors, with mechanical, plumbing, electrical and drywall subcontractors, for example, can actually meet in a CUBE, agree on plan changes, visualize them and change the construction documents accordingly. The bottom line: increased efficiency and productivity, and a dramatic reduction in the number of expensive change orders.

While early versions of this immersive technology were clunky and proprietary, the CUBE is an open technology, which means parties can come to the WACA office, input their BIM models and actually visualize and adjust the structure itself at a 1:1 human scale as a collaborative group in real time, without headsets.

“We basically advanced the application and made it more collaborative,” Nowak says.

### WACA Steps Up

With the support of the WACA Board of Directors, composed entirely of union-signatory contractors, WACA staff directed and worked with Nowak to begin setting up the CUBE — complete with a near-personal supercomputer, a surround sound system, a projection mapping system, virtual reality head-mounted display and other new technologies — at the association’s office.

“We’re pushing the envelope,” says WACA CEO Frank Nunes. “Our Board agreed that this was the direction the industry was going, and we needed to get out in front.”

The WACA directors were particularly attracted by how the CUBE can facilitate dry-wall and framing subcontractors being able to get on project preconstruction planning early on, Nunes says.

WACA affiliates can now bring their own BIM models to the CUBE, and in a few minutes they are in the software. From there, they are walking through the model on a 1:1 scale, in real time. The CUBE software can even simulate day or night lighting for the appropriate season.

California Drywall has been one of the first of the wall and ceiling specialty contractors to buy in to the new technology. “Our company’s culture is all about identifying and using new technologies to improve our performance and product,” says Marlin Chappell, a member of Local 9109 and a part of California Drywall’s BIM team. “We plan on using the CUBE on an upcoming hospital project in Santa Rosa and a hotel project in San Francisco as we experience the value it brings.”

Chappell, who came into the industry as an apprentice in 2009, is employed by California Drywall — where he used his computer and BIM skills on the CPMC Van Ness Campus Hospital Project, where subcontractor coordination was particularly important.

“Recently, Steve Eckstrom, our company president, got together with Cody and had me run some BIM projects through the CUBE,” Chappell says. “Bringing it to WACA was a way to move the whole industry forward. It’s setting a higher bar for all of us.”

The CUBE is just the beginning, Chappell says. “There’s a definite wow factor with the CUBE when you’re working with it,” he notes. “We’re starting to use it on some of our projects and with them we will start seeing the real value.”

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