From virtual reality to growing interest from startups, Silicon Valley tech now has its eyes on revolutionizing construction

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In the entrepreneurial, tech-heavy Silicon Valley, no industry has been immune from startups looking — for better or for worse — to “disrupt” the status quo, except maybe one: construction.

Save for the advent of taller cranes, construction has largely been left to its old devices for the past five or more decades. But industry insiders say change is coming.

“The amount of investment in technologies and startups coming into this space in the past three to four years has exploded,” Sean Doolan, director of Suffolk Construction’s Smart Lab in San Francisco, said in an interview last month. “Tech has kind of gone through all these industries … and now they are getting to construction and they are trying to find the next unicorn companies to create around the construction problem.”

In 2018 alone, more then $942 million has been pumped into construction-related startups, almost double the investment for all of 2017, according to PitchBook Data. Indeed, it’s fair to say the Bay Area has a “construction problem” ripe for problem-solving.

A study by the Urban Land Institute earlier this year estimates construction costs are rising by about 6 percent annually in the region, though most professionals in the industry argue costs are rising at a rate nearly double that amount.

Meanwhile, it’s not rare to hear developers and contractors lament the challenges of attracting and keeping skilled trades workers in Silicon Valley’s booming development market.

Suffolk Construction opened its San Francisco Smart Lab in October 2017 in an attempt to share ideas and streamline internal processes for the Boston-based company across all of its offices around the country. Now Michael DiNapoli, Suffolk’s general manager in Northern California, says VR and the Smart Lab has helped address both cost and labor issues.

“The first two projects we did it on, we did return seven figures in contingency to both of those clients,” DiNapoli said. “We feel like we are running our projects with fewer people on them because we have fewer problems that we are trying to solve for.”

Inside the smart lab, Suffolk tests ways to put new technology to work and can monitor the progress at active job sites. A rotating wall gives way to a VR cave where clients can strap on a headset and walk in and around a building that doesn’t exist yet.

Like Suffolk, other construction, development and design companies are latching onto virtual reality to combat rising costs and reduce construction time — both critical ways to get a leg up in busy and expensive places like the Bay Area.

“The seed has begun to grow,” said Jeff Birdwell, president of the commercial division at prolific developer Sares Regis of Northern California. “It’s beginning to be an inflection point almost, and I think we are going to see rapid iteration and change.”

Virtual reality is a piece of the tech world that has in the past been relegated primarily to entertainment and video games. Now, contractors and designers are using the technology to help real estate developers and end users of buildings to virtually step into new projects and test out ideas that might otherwise have popped up as a costly change order later in the construction process.

At Nvidia Corp.’s growing Santa Clara headquarters, where one of three planned buildings was completed late last year, the company’s IRay technology played a major role in shaping the final product, helping to meet an aggressive construction timeline and reduce costs, company officials told the Business Journal in a tour shortly before its completion.

When the project began, Nvidia’s 525,000-square-foot triangular headquarters was slated to be lined with 660 windows. Through testing out the light conditions with IRay, that number shrank to 220 in the final product.

“There were shade and shadow studies and we had a lighting consultant and some of the older technologies but none of them predicted the outcome the way IRay was ultimately able to tune it,” Birdwell said. “We would have built it one way and then they would have been adding all kinds of shade devices and blinds.”

VR parlays to prefabrication

As VR technology becomes more sophisticated, it's not only creating nearly photorealistic images of what a building will look like when completed, but also offering hyper-detailed information for measurements.

As visualization, simulation and artificial intelligence starts to work its way into the modeling of new buildings, "that lets prefabrication coming into a whole new world of its own," Birdwell said.

Indeed, companies are using VR and advanced modeling technology to shape components of a building while contractors ready the site for construction. The prefabricated pieces can be waiting in a warehouse outside of the pricey Bay Area to be shipped out at the right moment and put together like enormous puzzle pieces.

That's something West Sacramento-based Clark Pacific specializes in.

While working on Stanford's four-building Escondido Village graduate housing project in Palo Alto, which will house more than 2,400 students in about 1.8 million square feet when complete in 2020 or 2021, the company has moved 65,000 worker construction days from the construction site to its factory in Woodland, California, said company President Don Clark.

To keep up with demand, Clark Pacific in 2013 launched its own training program known as Clark Pacific University to attract and train more people, and has worked on a bevy of high-profile projects in the Bay Area.

The biggest of the bunch is Apple Inc.'s new 2.8 million-square-foot Cupertino headquarters, which is the largest prefabricated concrete building in the world. Clark Pacific created the pre-cast concrete panels for the building.

The key to saving time and money in projects, Clark said, is getting contractors involved right at the start. That's a departure from the typical construction process where general contractors and specialty contractors are brought in later in the design stage of a project.

"We are in a very, very fragmented industry where you have architects, engineers, various general [contractors], subcontractors, and you've got different owners," Clark said in an interview this month. "It's very hard to change a system that affects everybody, but … you can't do things the same way that it has been done from the ownership down and create the same results."

VR as a tool for leasing

Meanwhile, some are even using the technology to market buildings for lease before construction is completed, ideally shortening the time that a completed structure sits empty.

Santa Clara-based Vantage Data Centers uses Concept3D, a three-dimensional mapping company, to render still-under-construction buildings for virtual reality — a tool that Steve Lim, vice president of marketing at Vantage, said has been a "revelation" in marketing to companies that are looking to expand its data storage space.

"Our customers and prospects were kind of going 'OK sure, fine, why don't you call me next summer when it is almost done and then we can talk?'" he told the Business Journal last year in an interview about the company's Santa Clara expansion. "Obviously, from a business standpoint, that doesn't work."

Meanwhile, Valley Fair Mall, which sits on the border of San Jose and Santa Clara, is currently undergoing a $1.1 billion expansion and renovation, and virtual reality has played a major role. Retailers potentially looking for a home in one of the busiest shopping centers in the state can use a virtual reality tool known as Tripod3D to see their company name in front of a shop — a useful tool in courting high-demand retailers, according to Scot Vallee, vice president of development in the northwest at Westfield.

Planning the project in a VR headset is also a cost-saving tool, he added in an interview about the project last year, noting that the company had made changes to tiling and other details before ever starting construction.

"It doesn't really cost you much to change it in virtual reality, but it costs you a lot to put it down in real life and then tear it back up," he said. "I can't imagine doing a project without it now that I've had it."

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