



AUTODESK CONSTRUCTION CLOUD™



## How Mark III Reduces Waste and Increases Productivity with Lean Construction

Construction waste is a significant problem for the environment and contractors' and owners' bottom lines. However, lean construction promises to reduce waste and increase construction productivity, and Mark III is leading the way.





### Customer Snapshot

FIRM SIZE: <500  
FIRM TYPE: SPECIALTY CONTRACTOR  
REVENUE: 27 MILLION  
FOCUS AREA: INSTITUTIONAL,  
COMMERCIAL  
HQ: SACRAMENTO, CA, US

### PHASE:



### PRODUCTS:



### VALUE DRIVERS:



## Lean Construction Means Continuous Innovation

Since 1976, Mark III has evolved from a single-trade electrical contractor to an MEP construction and service company delivering projects across California. With a culture steeped in the idea of always getting better, Mark III is on a continual quest to evaluate and implement new technology and processes to improve outcomes and transform project delivery. And has embraced lean construction principles to improve the way projects are delivered.

“With a turnkey solution in place for all MEP services, we wanted to continue our journey and take manufacturing for construction to the next level by finding a way to have greater predictability on projects to eliminate waste and increase quality,” says Makayla Oei, Project Executive at Mark III Construction.

## Cloud-based Collaboration Enables a Futuristic Vision Put Into Practice

In line with Mark III’s mission of “leading the evolution of construction,” the firm developed Project Mountain – a self-funded research and development initiative that aims to streamline and improve how projects are planned, designed, and built. Project Mountain models and tests lean construction and construction automation practices before implementing them in the field.





There have been two iterations of Project Mountain so far.

For Project Mountain 1, Mark III delivered a model hospital corridor using two approaches. The first was the “stick-built” method, where skilled craft laborers would install each system individually. The second method utilized offsite fabrication, modeling, and detailing to install fully manufactured multi-trade racks onsite.

For Project Mountain 2, Mark III teamed up with Sutter Health to establish a standardized kit of parts and pieces to assemble a typical exam room – like one that you’d find in a medical office building. The project relied on construction automation technology, kitting, offsite manufacturing, and onsite assembly instead of the traditional method.

These exam rooms were constructed in Mark III’s facility. The team created kits that contained all the instructions, materials, tools, and safety documents required to do the job on site. These kits, known as “build boxes,” were then used by non-trade-specific mechanics to assemble the room.

“With Project Mountain, our approach was, ‘How do we think outside the box in a way that we can prefabricate

the majority of the work offsite and mitigate as much risk onsite as possible?’ That’s what inspired the Project Mountain approach to projects,” explains Justin Tucker, VDC Division Manager at Mark III Construction.

Mark III’s commitment to innovation and out-of-the-box thinking allowed the company to be more agile, productive, and economical with its construction projects. The initiatives that leveraged Project Mountain’s approach were completed with less waste

“

We’re able to use virtual design and construction (VDC) workflows to conceptualize the construction and detect errors beforehand, which saves time and resources that would be required if we had to rework the issue.”

**-Justin Tucker**  
VDC Division Manager,  
Mark III Construction



and ahead of schedule, which led to repeat business, greater trust with general contractors and owners, and more invitations to bids.

## Technology Plays a Critical Role in Cloud-based Collaboration for Lean Construction

As a core value to the company, innovation is celebrated and encouraged to evaluate and adopt technology to change workflows. Mark III relies on the Autodesk AEC Collection and PlanGrid within Autodesk Construction Cloud™ to enable cloud-based collaboration, increase construction productivity, reduce waste, and enable lean construction.

“With a connected ecosystem, we could break down data silos to change our approach to building, and change how projects are organized from design through manufacturing and installation,” says Tucker. “That approach is what led to more offsite fabrication and planning, which is when the idea of Project Mountain started to become a reality.”

## Lean Construction Reduces Waste

Transparency Market Research reports that construction waste will nearly double to 2.2 billion tons by 2025. Waste in construction is one of the main issues that Project Mountain aims to solve.

“What it comes down to is how do we build a project as efficiently as possible and eliminate as much waste as possible?” says Tucker.

To explain their approach, Tucker discussed Project Mountain 1, where they compared how traditional construction methods stacked up to their new strategy.

“We did an exercise where we fabricated one portion offsite in our manufacturing facility, and then the other half, which was an identical build, used the traditional stick-built method.”

With Project Mountain, they saw firsthand how the approach of planning and building offsite then assembling onsite, is the better way to build. “We’re able to use virtual design and construction (VDC)



workflows to conceptualize the construction and detect errors beforehand, which saves time and resources that would be required if we had to rework the issue,” says Tucker.

In terms of timing, Oei says that the stick-built site took three weeks to complete, while the site that implemented Project Mountain finished manufacturing in four days and took less than four hours to install.

### **Lean Construction Improves Construction Productivity**

Thanks to the benefits of offsite fabrication and increased construction productivity, Mark III was able to meet accelerated schedules for complex projects.

As part of their work for Sutter Health, the Mark III team put together a recipe of parts and pieces and instructions to construct a typical exam room with a two-person crew of non-trade specific mechanics.

“We gave them all the information they needed to complete the job, from metal framing through painting, casework and final MEP finishes. They constructed the entire exam room space,” explains Oei.

About halfway through, the Mark III team evaluated their process and decided to increase the manufacturing element by prefabricating the wall panels, which shaved three days off the original ten day schedule.

That level of efficiency brought about by Project Mountain also helped Mark III win the UC Davis Campus

Clinic project. The project had an accelerated timeline and by bringing the production offsite to Mark III’s manufacturing facility, the team was able to step up and complete the project in the aggressive timeline.

### **Construction Automation and Cloud-based Collaboration is the Way of the Future**

Project Mountain gives Mark III a creative outlet to change the traditional approach to construction and expose the world to a new way of building. By automating construction tasks and creating deeper collaboration across teams, Mark III can add more value to improve project outcomes and develop stronger partnerships with GCs and Owners.

“Our company serves the medical industry, and our number one measurement of success is to lower the cost of construction by 16-20% over the next five years while increasing quality and predictability for each facility we produce,” says Dan Carlton, Partner/President at Mark III Construction.

The team at Mark III is excited to bring more innovation to the industry. With a sky’s the limit attitude, the team is continuing to drive change and adopt technology to deliver better projects to clients.

“Project Mountain provides an avenue to challenge yourself and test your limits,” says Oei. “There are days when I am scared, and I don’t know how things will go, but if you’re not scared, you’re not challenging yourself enough. And that’s what yields the greatest results.”

“

Project Mountain provides an avenue to challenge yourself and test your limits. There are days when I am scared, and I don’t know how things will go, but if you’re not scared, you’re not challenging yourself enough. And that’s what yields the greatest results.”

**-Makayla Oei**  
Project Executive,  
Mark III Construction

