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QUICK CONCRETE ECOLITE WALL SYSTEM GETS FORT IRWIN MOUT PROJECT RUNNING IN RECORD TIME

At Fort Irwin, Calif., the Army needed to build more than 50 buildings as part of a Military Operations on Urban Terrain (MOUT) facility.

About 150 miles northeast of Los Angeles, Fort Irwin is located in the California desert and houses the National Training Center, specializing in desert training for soldiers as they prepare for overseas missions. The MOUT facility at Fort Irwin provides lifelike training grounds that simulate urban environments found on the other side of the globe. With the numbers of troops moving through training, Fort Irwin needed the MOUT facility quickly and didn't have much money to pay for it.

The hitch? The project was design-bid-build initially, and the time schedule for construction was just 12 months.

The first price quoted was an unaffordable \$23 million. It just wasn't possible, according to George Rogers, CEO and president of RQ Construction, which eventually won the bid. It took six rounds of bidding, however, and a switch to design-build before the San Diego-based construction firm got the job.

"They do their value engineering process, which means they just take stuff out, and so they took a whole bunch of scope out, because they had a budget that they wouldn't tell us," Rogers says. "We re-bid it; it came in at \$16 million, then they go back, and after a month or two, they call us up and say 'Well, we've only got about \$12 million dollars, so what can you do?'"

The answer was that RQ would have to design it if it would be at that price. "And even at that, I didn't know how we were going to do it, and they had a very aggressive schedule of doing 57 buildings in the MOUT project and getting them done in 12 months."

But RQ did it. "We ended up designing it, offering to build it for \$11.8 million — in six months," Rogers says.

(It took eight months total, since the Army added some changes and extended the time, but saved four months in the end.)

To get the optimum price, some scope came out, Rogers says, such as a concrete roundabout and some roads that ended up as a separate asphalt project.

WHY SO FAST?

Crucial to RQ's execution was its use of Ecolite wall systems. Ecolite walls are steel-framed, lightweight cellular concrete walls that are assembled offsite and then put in place.

"We committed to this innovative wall system ... [but] the problem was we saw the product, but it didn't have an operational factory," Rogers says. "So we committed to the Army Corps [of Engineers], but part of that commitment internally was that we had to build a factory."

As a result RQ built what Rogers calls an R&D warehouse, but it was tough under the time constraints. Although Rogers admits that it wasn't any more difficult than operating and putting up walls in 40 mph winds at Fort Irwin.

"We had to design and engineer it and at the same time build a factory where we could build it," Rogers says.

"What we tried to do is get down to the goal, and the goal was to have a facility that's going to last 30 years, whereas originally, they were thinking their goal was to have eight-inch cast-in place or masonry walls."

The wall system, however, solved all of their issues about construction and re-focused the goal. The assembling of the walls, once complete, took no time at all.

The 57 buildings, says Rogers, were assembled in just about three and a half months. At one point, a 24' by 48' two-story building went up in just 11 hours. "We're putting up a wall panel every 20 minutes with a crew of only four people," Rogers says.

Brian Smith, founder and chairman of Ecolite says he's known the benefits of lightweight concrete for years but had some structural challenges with it.

"Every time you try and change the shape of a panel, it really penalizes you in the plant. So there's a lot of limitations and ... to do precast and deliver it to site: you're going head to head with tilt-up and you really needed a small site where you couldn't have a lot of the layout area for tilt to be competitive," he says. "When I discovered the automation of steel framing, I just got goose bumps, I thought, 'That's the secret to lightweight concrete,' because the steel can hold all the loads."

Once that was solved, they just needed to find a way to attach the lightweight concrete skin to steel frame panels. The panels would then be extremely versatile and could accommodate a variety of designs. "As long as the steel's holding the load, who cares what the structural strength of the concrete is," Smith says.

"The operation goes from the ... drawings that the architect gives us, and we model those into shop drawings and the instructions go from the desk of the modeler straight to the roll former, which measures and cuts the steel studs, so there's no human involved in that," Smith says, and then the studs are assembled. "We pour the cellular concrete in and it 'self levels' and next they just lift them up and cure them a couple of days and then take them to site."

This process, he says, removes a tremendous amount of labor from any project, they can mold the walls into virtually any shape.

At Fort Irwin, for example, there was a large cost reduction in the slabs and footings, Rogers says. The speed of the project also contributed to savings.

"We saved four to six months of general conditions, and that's in the hundreds of thousands of dollars," Rogers says. "We're constantly looking at how to increase quality, decrease cost and reduce cycle time; it's part of our vision statement, so this product did all three of those things."

Along with Ecolite's versatility and lower cost, Ecolite is "green," made from Portland cement and post-consumer waste and contributes to LEED® certification in five different categories, according to Rogers.

"Green was not a goal on this project, but they got green walls anyway," he says.

Military projects are a good fit for this process, as speed is crucial. RQ is currently designing a hotel at Camp Pendleton, Calif., an 82,000 square-foot facility for which Rogers says he believes will save about four months.

"Four months of revenue is somewhere between six and seven hundred thousand dollars of additional revenue for the Marine Corps that they don't have to pay out to hotels," he says. "We're going to hit LEED Silver at least on this hotel."

At Fort Irwin, Ecolite was particularly beneficial.

"The benefit in the long term is this may not have even been built," Rogers says, "in which case you don't have the training facility and the tertiary effect is that it may end up saving lives because a project was delivered that might not otherwise have been built."

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