

PIVOTEK BATHROOM PODS AND CROSS LAMINATED TIMBER (CLT) HELP LEND LEASE MAKE A DIFFERENCE (A REALLY BIG ONE).



Lend Lease, an international leader in property and infrastructure development and management, became the first public business in 2009 to begin operations under the U.S. Army's Privatization of Army Lodging program. Today, Lend Lease owns and operates more than 11,600 InterContinental Hotel Group-branded hotel rooms on 39 military installations across the country.

Doing More with Less

“Doing more with less is the underlying mantra of the construction industry,” said Bill Tobin, Master Superintendent and Vice President of Project Management & Construction for Lend Lease. “This is particularly challenging during a time when developers are asked to build stronger, more sustainable buildings when traditional building materials and labor are more expensive and there is a shortage of construction specialists.”

In the summer of 2013, Lend Lease began planning a new 62,000 square foot, four-story, 95-room Candlewood Suites for transient soldiers and their families at Redstone Arsenal, Alabama. During the early stages of the planning, the group identified several ways that it could save time and money on the project. Inspiration came from Lend Lease's Australian team who in 2012 built the world's tallest high-rise apartment building made with Cross Laminated Timber (CLT) and modular bathroom PODS. On-site construction of the 10-story, Australian complex started in February 2012 and was completed in December 2012. The combination of sustainable and pre-fabricated materials improved worker safety, reduced construction time, saved 1,450 tons of carbon, and dramatically eliminated onsite waste.

An Ideal Test Bed for CLT and Bathroom PODS

While CLT is a common building material in Europe, it is still relatively new in the United States. In fact, it wasn't until 2015 that the International Building Code recognized CLT as an approved material for several building types. CLT has been used in several smaller projects across the country, but the combination of CLT and pre-fabricated, fully finished bathroom PODS had never been attempted in the United States. With tighter budgets and a shortage of materials and labor, the U.S. Lend Lease team was challenged to once again do more with less.

KEY HIGHLIGHTS

- Ninety-five (95) fully finished, prefabricated bathroom PODS;
- Seven percent (7%) larger structure than comparable hotels built with Cold Formed Steel (CFS);
- Forty-three percent (43%) fewer people to build the superstructure;
- Forty-four percent (44%) fewer man-hours.
- Thirty-seven percent (37%) less time and delivered four months ahead of schedule

Charles F. Starck, RA, AIA, Senior Architect and Design Manager, Project Management & Construction for Lend Lease stated, “As a company, we have done wonderful things with CLT around the world and we were challenged by our leadership team to bring it to America. We are under budget constraints and pressures, and a hotel with programmatic rooms and floor plans made the Redstone project an ideal test bed for the combination of CLT and pre-fabricated bathrooms.”

A Willing and Engaged Partner

In its research of bathroom pod suppliers, Lend Lease identified four companies, ultimately narrowing its search to two, including PIVOTek. The team looked at each supplier’s value chain, flexibility and interest in doing custom work because of the unique requirements for this project. The four-story Candlewood Suites included three floors with the same layout and design. The fourth floor, which is reserved for distinguished guests, includes suites that required multiple custom bathroom PODS.

“This was the first time we were going to use PODS, and we needed a willing and engaged partner to meet our needs,” said Jeff Morrow, Construction Program Manager for Lend Lease. “After understanding how each company worked, we tried to match the supplier with how we operate, and PIVOTek came out on top. PIVOTek captured our imagination, and offered the full package of service, design, support and innovation.”



Planning and Coordination Key to Success

Guiding the project were the benchmarks, criteria and constraints established by the IHG brand and the U.S. Army. Lend Lease and PIVOTek immediately began working on the set of documents that would take the Candlewood Suites project from concept to construction. With the design documents, building and shop drawings in place, the teams could begin the process of coordinating the construction, delivery and installation of the PODS.

Morrow noted that the PODS success is dependent on the coordination and timely decision-making long before the PODS are even delivered.

“Throughout this project, Lend Lease and PIVOTek have to be in constant alignment with what needs to happen,” said Morrow. “If an error occurs in one pod, it is likely to be replicated in all of them. We had to be sure that the design was clean to eliminate mistakes down the project timeline. We had to have it built on paper exactly the way we needed before PIVOTek could start assembling PODS. If you do it right, it is profound how fast things come and how well things work.”

Tobin added, “We started coordinating with PIVOTek early in the project. While it may require a little bit more time up front, the early collaboration made for proper execution in the field.”

PIVOTek provided a dedicated CAD professional to work with Lend Lease to transform the design into a pre-fabricated bathroom. PIVOTek also provided a project manager whose role was to proactively work with Lend Lease to ensure that the pod production and delivery schedule matched the project timeline.

PIVOTek started to gather materials based on the design plans in the summer of 2014. Each pod is a complete bathroom with fixtures and finishes, mechanical, electrical, and plumbing systems, and other wiring and piping. The company began assembling PODS in December 2014 with the first shrink-wrapped units shipped to the construction site in March 2015.



Building in a Different Way

Using CLT and bathroom pod is a different way of building. A normal framing crew for a hotel of Candlewood Suites' size consists of 20-30 people. Lend Lease framed the superstructure with CLT using a crew of only 11 people, which was comprised of two experienced construction managers and nine military veterans. The final CLT superstructure consisted of 1,557 CLT panels, 10 glulam beams, 17 glulam columns and more than 201,000 fasteners.

PIVOTek's PODS are built using an assembly line system that produces consistent, high quality products in a fraction of the time vs. conventional onsite construction methods. For each project, PIVOTek creates QA/QC manuals and installation guides. The PODS are inspected and punch listed prior to being delivered to customers. Installation training is minimal, and PIVOTek representatives are on-site for the initial installs.

The crew built the hotel superstructure one floor at a time, framing the CLT floor and the wall panels prior to installing the PODS. In many projects that use bathroom PODS, developers will traditionally bring the PODS in from the side and use hand dollies to set them into place. To meet the aggressive timeline, the PODS were built in one piece at PIVOTek's facility, and shipped five per truck to Alabama. The PODS were then lowered into place with a crane.

"Not only are the PODS innovative, PIVOTek also created an installation method specifically for this project that ensured that the bathroom PODS could be quickly and easily aligned," said Tobin. "Using two alignment pins, the crane operator was able to guide the big PODS within ¼ of an inch of its location. A crew on the ground then guided the pod into place. When we got to the top floor bathrooms, PIVOTek's customized PODS came with templates to match the floor offsets. They brought great practices and innovation to this project."

Lend Lease was able to install an average of 12-15 PODS per day for the lower floors, and as many as 18 PODS per day for the upper floors.

Accelerating the Construction Schedule

CLT floor, wall and ceiling panels offered Lend Lease the opportunity to build faster and safer than traditional concrete and steel framing. The team expected that incorporating bathroom PODS would help reduce costs and labor requirements while cutting waste and further accelerating the schedule.

“I like the idea of PODS because it accelerates the work that needs to be done in the field,” said Morrow. “The amount of work it takes to build out a hotel room is minimal especially when you take out the bathroom. It’s safe to say that 80-90 percent of the work for each room is centered around the bathroom as every trade has a hand in its completion, from the plumber and the carpenter to the electrician and HVAC experts. If you develop the bathroom pod in a factory setting, you remove the coordination and build-out required on-site, which really accelerates the schedule.”

The Redstone Candlewood Suites was seven percent larger than similar hotels built with cold-formed steel, yet Lend Lease used 43 percent fewer people to build the superstructure. On an average day, the project required 40 percent fewer employees and 44 percent fewer man-hours. Even with fewer employees, productivity increased, as the crew produced 64 percent more square footage per day than traditional methods. In total, the hotel was built in 37 percent less time.

“We have built these exact same hotels with much larger crews and it took us four months longer,” stated Tobin. “We reduced general condition costs, increased productivity, and the owner will open the hotel four month earlier. Not only did the hotel cost less to build, it will also start generating revenue much faster.”

Tobin added, “We willingly raised the bar in terms of speed and costs of construction by marrying together CLT and PIVOTek’s PODS. Time is money, and if we can do it faster with less, than the developers benefit. Because of PIVOTek, we gained more time on the superstructure, and 25 percent more time over the entire project.”



Manufactured PODS Reduce Field Work

PIVOTek delivered 95 bathroom PODS for this project, 69 of them were identical. The rest were custom designed. Manufacturing the systems at PIVOTek’s facility and shipping them as needed reduced a significant amount of fieldwork and onsite coordination typically required when multiple trades need to work on the same area.

“PIVOTek had the right attitude from the beginning, and were very creative about solving problems,” stated Starck. “Even as our hotel partners were throwing us curve balls, changing the upper floor unit counts and locations, PIVOTek was helping us solve problems. They never said no we don’t do it that way. While other suppliers said they would only componentize things that were repeatable, PIVOTek came with a solution to componentize everything. That is the kind of open mindedness that we were looking for in a partner.”

As a result of the careful planning and coordination, PIVOTek and Lend Lease hit every date on their schedule.

Tobin commented, “We removed a lot of the what ifs and problems early, which allowed us to build at a rapid rate. We are accustomed to a fairly contentious environment when it comes to third-party vendors, but this build ran smoother than any other project in the military lodging program, and PIVOTek had a lot to do with that.”



Better Materials, Less Waste, New Standards

Because of the choice to use timber and PIVOTek’s pre-fabricated bathroom PODS, the Candlewood Suites hotel is rated LEED Silver. Timber is an environmentally sensitive material that reduces CO2 while building the PODS offsite helped to reduce construction waste. In fact, the only things that had to be thrown away were the PODS’ shrink-wrapped covers.

“This project set new standards for how programmatic buildings will be completed in the future, in terms of materials, coordination, labor,

costs and waste,” said Morrow. “We had high expectations for the PODS, and throughout the project, PIVOTek did what they said they would do and things came out the way we planned. Given what we learned at Redstone, the next project we do together will be even better.”

Starck added, “We were planning to break internal ground with this hotel, so we had to have a real team, not subcontractors and independent consultants. We had to have people and partners that understood the significance of this project and were committed to its success. We found the right partner with the right attitude, and PIVOTek performed better than we expected. We have 10 more hotels in the pipeline and most of them, if not all, will use the combination of CLT systems and PIVOTek’s pre-fabricated bathrooms.”

Escalating the Pace of Change

The U.S. construction industry has been doing the same thing for years and is now under significant pressure to build faster and reduce costs even as material costs climb and skilled labor becomes harder to find. Innovative technologies such as CLT and PIVOTek’s pre-fabricated bathroom PODS provide an opportunity to escalate the pace of change needed to overcome the industry challenges. PIVOTek allow developers to apply manufacturing best practices to the building process, ensuring consistent high-quality products in a fraction of the time. The PODS contribute to a cleaner and safer work environment, help reduce labor, materials, waste and costs and increase the speed to occupancy.

