

Hotels Are Hot

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By William D. Palmer Jr.

The American Hospitality & Lodging Association estimates that there were 1.04 billion hotel room nights sold in the United States in 2006. That number has been steadily increasing at about a 3% rate for the past four years, and the average room rate has been increasing even faster. That has led to a boom in hotel construction. Reed Construction Data estimated in October 2006 that the value of hotel construction was up 102% at year to date over 2005, and that followed a jump of 22% in 2005.

“Hotel construction has been hot for the last several years,” says Marc Landry with American Hospitality Development Company, Bristol, R.I. “There’s a lot of high-end resort stuff that never really cooled off and there is a lot of ‘focused-service’ construction—that is, hotels that are less than full service, such as Spring Hill Suites or Holiday Inn Express.” And, of course, there continues to be hotel construction in urban areas across the country and in Las Vegas, where several mega projects are underway.

Although concrete has been a primary material in hotels for many years, there has been a shift toward newer techniques, especially for mid-rise hotels. Hotel construction today often uses tilt-up concrete and insulating concrete forms.

Hotel-building techniques

“There are several ways used in New England,” says Landry. “Because concrete and structural steel got more expensive, there are some developers that went to wood construction. We don’t do that, and I’m not in a hurry to go there. It’s a different kind of owner, one with a different timeline for holding the property. Block and plank is very popular here, but I just finished a 72,000-square-foot project this past summer that was CMU walls and cast-in-place decks—a four-story hotel with 360 yards of concrete for each slab.”

ICFs also are becoming popular for hotel construction—a method that until recently was restricted to low-rise, mostly residential applications. “We see more ICFs being used for hotel construction,” says Joe Lake, president of Eco-Block. “I think it is an optimal application for a variety of reasons. The first is, of course, energy conservation. But beyond that a lot of hotels are being built near freeways where there’s 24-hour noise that can infiltrate a typical frame structure. ICFs control the sound within a structure to provide a more enjoyable space—particularly in the extended stay type of hotels.”



Concrete has long been a part of hotel construction, as shown here at the Capital Hilton Hotel in Washington, D.C. completed in 1942. Photo: Portland Cement Association

Lake sees the best market in the three- to five-story hotels, where there is currently a lot of growth. And he notes that today there are more contractors with the expertise to build that size of a building with ICFs. “I think that the installers and contractors who are experienced and good at it can be very efficient and competitive with other wall systems. The guy who's trying to tackle something like this early in his career might not be successful, but today there are many fine contractors across the country who have the capability to do higher level work with ICFs,” says Lake.

Joe Lyman, executive director of the Insulating Concrete Forms Association sees ICFs being used mostly by the franchisees for the national chains—since it will be their building, they are willing to spend a little extra to get the energy efficiency. He also notes that ICF construction can be less intrusive. “A convention center that was being added onto a Ritz-Carlton hotel in Florida had intended to use tilt-up, but went with ICFs because they felt it would cause less disruption,” he says.

Tilt-up is another construction technique that is gaining market share in hotel construction. “Hotels are becoming a very attractive market for tilt-up,” says Jim Baty, technical director of the Tilt-Up Concrete Association (TCA). “For example, Red Roof Inn joined the TCA in the past year since they feel tilt-up offers them perhaps the best potential for efficiency and construction cost control. And, there have been a handful of hotels completed in the last two years in Florida using tilt-up.”

Traditional hotels

Despite the growing use of alternative construction techniques, traditional concrete construction hasn't gone away in hotel construction. As major renovation neared completion on the Denver Convention Center in 2004, Hyatt broke ground across the street on an 1100-room, 38-story hotel. With an all-concrete frame, builder Hensel Phelps Construction, Greeley, Colo., faced a tight site that created lots of problems in just moving formwork so that they would have room to maneuver. “A lot of the work was just material handling,” says superintendent Robert Berry. “About 70% of our accidents were back strains from moving things around the site. The biggest challenge was staying organized. It's always all about organization.”

Hensel Phelps used various form-work systems for the project: PERI forms for columns and beams, Forming Concepts self-climbing forms for elevator shafts and stairwells, and Meva's MevaDec with the plastic composite Alkus panels for the floors. “We like using the Meva forms for the decks because there are so few parts and pieces versus frame and brace systems,” says Berry. The decks are 9-inch-thick post-tensioned flat plates. Pours were from 12,000 to 18,000 square feet and workers applied half the post-tensioning stress in 24 hours, after the concrete reached 1500 psi compressive strength. Full stressing was done at 48 hours when the concrete reached 3600 psi, 80% of its ultimate strength.

The concrete mix included a corrosion inhibitor and ultrafine fly ash for the lower decks, which will be a parking structure. These decks were built during the winter months, so Hensel Phelps heated them from below to keep the concrete setting on schedule. They also installed IntelliRock maturity meters to check strength gain for post tensioning, although they had a little trouble calibrating the readings at first due to all the additives.

Hensel Phelps found that the MevaDec formwork went up quickly and allowed them to progress rapidly with the job.

There's no reshoring with this system, since the shores stay in place as the form panels are dropped out from below. “The craftspeople have really taken ownership for this,” says Berry. “They have learned it quickly and really like how it makes them more productive.” The resulting decks are very smooth across the bottom due to the Alkus panels. To complete the floors, workers returned after 28 days to place the final pour strips after all shrinkage had occurred.



The hotel opened to rave reviews in December 2005.

This hotel deck in Plymouth, Mass. was built with a poured deck rather than the more typical precast plank. Photo: American Hospitality Development Co.

Tilt-up for stairwells

The Polaris Hilton Hotel and Conference Center, in Columbus, Ohio, recently nabbed the number five spot in the TCA's list of the tallest panels ever built. The facility is a 253-room, nine-story hotel with a 40,000-square-foot conference center that will open in April 2008. The tall panel, part of the stairwell shaft, measured 85 feet high, 11 feet 3 inches wide, and weighed almost 54 tons. A large area was used for the casting bed and a 300-ton Liebherr crane was used to lift the big panel. Other panels on the project also are noteworthy, measuring in at 84 feet tall.

The tall panels presented several challenges, including the determination of how to brace them. According to Scott Collins, assistant chief engineer at Meadow Burke Products, each stairwell shaft for the nine-story hotel had an overall height of 95 feet 8 inches and inside dimensions of 12 feet 7 inches by 20 feet 4 inches. Erection began by tilting up a shorter 20-foot-4-inch-wide panel, which was braced to a deadman. Then its opposite panel was placed and braced. "Then we placed a tall 84-foot piece to form the third side and the connections were welded," says Colin Smith, project coordinator for tilt-up subcontractor Lithko Contracting. "Then the opposite tall panel was placed and its connections welded. At that point we had a box, so the bracing could be removed and we didn't need to brace any more panels in this core to complete it. We just added the additional panels on top and welded the connections all the way up."



On this congested inner-city site, workers are building the first below-ground parking garage level. In the background one-third of the deck is being finished while deck forms are being positioned for the middle third. Photo: Hensel Phelps

In addition to the stairwell shafts, tilt-up also was used for the elevator shafts, which were even taller than the stairwells. "The elevator shafts had an overall height of 101 feet 5 inches," explains Collins. "Six 84-foot-tall panels were used to construct the three elevator shafts (two for each shaft)." After the box had been built, Lithko placed 17-foot-5-inch panels on top of the 84-foot panels to get the shaft to its ultimate height.

According to Eric Messerly, P.E., an associate for structural engineering firm Shelley Metz Baumann Hawk, the main reason for using tilt-up panels for the shaft walls was the schedule. "This project was on a tight construction schedule and using tilt-up panels saved valuable time," says Messerly. "In addition, the cost of constructing the walls using tilt-up was less than cast-in-place."

The time advantage also was extremely helpful to the tilt-up subcontractor Lithko Contracting. Colin Smith, project coordinator for Lithko, says using tilt-up for the stairwell shaft enabled the concrete work to be completed before the other trades (structural steel and prefabricated walls and floors) started on the project, which eliminated the safety issue of workers below the formwork and fighting for crane boom time. With a cast-in-place method, Smith says, two cranes would have been needed, one for each pair of shafts for the duration of the core construction. "Using tilt-up construction allowed us to finish before any of the subs started," Smith says. "We were safer and more cost effective, and we were able to beat the weather." The casting beds went in on December 4 and the shafts were completed on January 12.

In addition to speed of construction, tilt-up also resulted in fewer connections since the panels were so tall, and a smooth interior face on the shaft wall because the panel does not contain construction joints at each floor. If the walls were cast-in-place, Messerly says, construction joints typically would occur at each floor and these joints can be ugly due to formwork misalignment. The cores provided most of the shear resistance needed for the hotel and the embedded connection plates were designed to transfer this load. And since the shaft walls are structurally stable after the panels are connected, the wall bracing can be removed to allow the floor framing to take place unencumbered.

"Although I have used tilt-up as a solution for office buildings and other structures before," says Messerly,

“this project opened my eyes and will prompt me to consider tilt-up panels on future projects.”

ICF advantages

The Mainstay Suites in Casper, Wyo., will be a four-story, 120-unit hotel. It is about to break Hidden Valley Builders with ICFs. “We’re going to do the hotel, the pool house, and even some of the interior structural walls,” says Eco-Block’s Bob Kupersmith. “We’re using a Hambro floor system, a steel truss system that incorporates concrete decking to create a composite deck. It works perfectly with ICFs and is about half the cost than some of the insulated decks. We researched this to see how we could use poured concrete floors with less cost and it’s worked out well.”

Kupersmith notes that experienced hotel owners go with ICF manufacturers that have the experience and flexibility of configurations to facilitate construction of taller walls. “Architecturally, if someone wants a certain configuration, we can form the blocks to meet that. And we have lots of code approvals for commercial construction,” he says.

This customer has built other hotels using ICFs, notes Kupersmith, so they are convinced. “They chose ICFs for the fire rating, the sound deadening, and the energy efficiency. If you are going to own the hotel, ICFs can save you a bunch of money on heating and cooling. It will cost a little bit more upfront, but relatively speaking it’s not much money.”

ICF construction for low-rise hotels has a great future, although Lake notes that compared to the demand there are still relatively few experienced contractors and that this is holding back the growth of ICF construction. “The industry has a lot of growth potential as more contractors gain experience. ICF construction is really just now getting traction and it’s going to be a fascinating transition to watch,” says Lake.

Designing in concrete

Concrete has big potential in hotel construction, although promotion needs to continue. “The chains will draw up a prototypical set of drawings,” says Landry. “The plans will say this brand needs to incorporate these basic features—room layout, size of rooms, etc.—but they don’t get into the materials, because it might vary across the country and the cost in one area might dictate the material.”

Green construction might motivate hotel owners and developers to choose concrete, but Landry doesn’t see that as an issue. “The national chains have architects who are closely aligned with the design and construction folks and they work hard to find green building methods that are appropriate for the hotel industry. But we don’t see development companies focusing on green construction and when they do it’s usually heating systems or energy-efficient lighting.”

Landry remains optimistic about the hotel industry noting that if interest rates stay low, hotel construction will stay hot. “If you’d asked me six or eight months ago, I would have said that a lot of air’s been taken out of this balloon because of the cost of construction, but now I think we’ve weathered that storm. It’s still expensive to build hotels, but what’s allowed it to continue to make sense, is that the economy has remained strong—business travel has stayed strong—so hotels have been able to increase their rates.”

— William D. Palmer Jr. is a freelance writer in Lyons, Colo. He can be contacted at wpalmer@greenspeedisp.net.



The stairwell box had two panels on each side. The panels on the wider side were about half of the total height, while the tall panels on the narrower sides were added onto with a short 10-foot section. Photo: White Cap Construction Supply