CONSTRUCTIVE ADVICE

A PUBLICATION OF HIGH CONSTRUCTION COMPANY Vol. 6/No. 1

The Low Down on Tilt-Up

You can almost imagine the awe and envy of the ancient Romans if they were able to watch a tilt-up concrete building going up today. Although they invented the basic idea of tilt-up for masonry walls, they no doubt toiled mightily to erect each wall section using muscle-intensive labor and large crews.

Tilt-up concrete construction is growing in popularity in the Northeast. Shown above is Appalachian Insulation Supply's 200,000-square-foot warehouse under construction in Elizabethtown, PA.

Nowadays, ready-mix trucks churn out a massive amount of concrete, huge cranes easily lift wall sections, and the work is performed by relatively small crews.

Interest in tilt-up languished for centuries after the Romans. There was a limited, early 1900s resurgence involving the use of a "tilt table." However, two World War II-era inventions promoted more widespread use: ready-mix concrete trucks and mobile, mechanized cranes.

Today, more than 15 percent of all industrial buildings are tilt-up projects. Between 1995 and 2000, in fact, the use of tilt-up grew 111 percent. Although a common use is warehouses, modern technological advances are making the process more attractive and economical for office buildings, schools, churches, hotels, and other uses.

Bill Brinser, owner of Appalachian Insulation Supply, Elizabethtown, PA, considered many factors before constructing a new warehouse facility recently. "Both the overall quality and the aesthetics sold me on tilt-up," he says. "I'm interested in long-term use. In 20 years we can repaint it, and it will look like a brand-new building again."

As Brinser knows, tilt-up has almost unlimited exterior aesthetic possibilities, with painting a very common option. The experience of Craig Willcut, president and CEO of Nevada-based United Construction Company, has shown that "you can make tilt-up look like anything. There are so many methods and veneers to use that you never know if a building is tilt-up construction or not."

Experts can show that economics is really driving the move toward tilt-up. QproQ Engineering, Inc., of Wilkes-Barre, PA, designed Brinser's building. As President Jim Kerns, P.E., has learned, "Owners want a durable building that can be economically constructed with reasonable finance, start-up, and maintenance costs. Tilt-up can provide that."

Based on United Construction Company's 20-plus years of using tilt-up, Willcut states that "tilt-up is faster and it saves money. If someone tells us they want a block building, we can show them through a cost analysis how tilt-up will cost them less."

Steve Schuetze, president of Metropolitan Contracting Company in San Antonio, TX, can easily tout statistics. "A tilt-up building is generally 20 percent faster than other construction types and saves 20 to 25 percent of overall costs. Without a doubt, this is the most widespread and economical way of building warehouses in our region, and office building use is quickly increasing."

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- **Compare construction costs** for tilt-up panels and precast concrete panels when building an insulated facility.
- **Check to see if your building meets the requirements of Pennsylvania's Act 222** for using uninsulated walls. If so, then tilt-up panels will probably save you money.
- **Plan construction of slabs and panels for your tilt-up project when temperatures are warm.** Constructing tilt-up panels in freezing temperatures will add significant costs.
- **Make sure your site provides easy access for cranes and trucks.** It should be relatively flat, with no buildings or other obstructions such as power lines or railroad tracks close by.

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For example, Benedict says that a retail company may want to be in a center with other retail businesses, where the only option is leasing. On the other hand, a manufacturer probably does not need traffic flow to support the business, so building may be the best option, even if other space is available.

"Building is particularly beneficial if you have specific or unique needs in terms of space. It can be difficult to find an existing building with the needed configuration. Rarely is there a building that is just right for you on the market at just the right time."

Economic conditions also are an important element in the decision. Today's low-interest climate is a double-edged sword, according to Benedict. On one hand, cheap financing means you can afford more—a new building that might have been beyond reach before or a bigger building that you originally envisioned. On the other hand, you may have a greater dollar-for-dollar tax write-off with a lease.

Lease payments are a total tax write-off. With ownership, though, you can write off only the portion attributed to interest cost. Lower interest rates means less to write off. Also remember, however, that if you've built a quality building, it will continue to appreciate in value even as you depreciate it for tax purposes.

The owner of the Lancaster advertising agency is still reviewing his options. "It's everyone's dream to build and own your own facility. I want to make the best business decision that will also demonstrate the creative nature of our work. It's a delicate balance."

In the end, you've got to put your money where you'll get the greatest return. ■

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Tilt-up has been gaining in popularity in the northeastern United States, as well, over the past decade, but caution should be taken when building in states with seasonal temperatures that drop below freezing for extended periods. "In this region, the economies are not always in favor of tilt-up," says Jeffrey Sterner, senior vice president/general manager of High Construction. Sterner explains that if the building is going to be insulated, the most popular and most durable concrete wall panels for industrial uses involve building a "sandwich" panel, where rigid insulation is inserted between an outer and inner shell of concrete. "While this can be done on-site, precasting these panels off-site in a precast manufacturing plant is often more cost-effective," Sterner says.

How it's done

A tilt-up concrete building begins with footers and a floor slab tailored to the building's construction method. The tilt-up panels are cast in wood forms on the floor as close as possible to their final position. Several panels can be cast on top of each other, with approximately 24 hours drying time between each layer. For a practical reason—the discharge method of ready-mix trucks—panels are usually stacked three feet high or less during casting. Once the panels are completed, crews use a crane to lift them in place, easily setting and bracing 20 to 30 panels a day. From the time the floor slab is completed, the typical elapsed time from initially forming the panels to completing the building shell is four to five weeks.

Because the roof structure acts as a diaphragm to horizontally support the wall at the top and the footing curb supports it laterally on the bottom, the panels are generally not connected to each other. This allows for expansion and contraction without making the buildings difficult to heat or cool.

Limitations

What are the restrictions? Generally, buildings under 10,000 square feet are not economical, and walls with many large openings—more than 50 percent of the surface area—are not practical.

"Tilt-up rapidly loses its economy when engineers or subcontractors don't know what they're doing or when panels are improperly designed," says QproQ's Kerns. "At every step of the way, from site selection, to design, and through to the rigging crew, you must have people who are experienced with tilt-up." ■

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development standpoint—sewer permits, PennDOT permits for access to the site, and so forth," Freet said. "Currently the plan is in for a building permit review. This should be finished in the next couple of weeks."

The latter part of February was given over to planning for "mobilization"—the time when all of the various trades and subs physically show up to begin work on the site. There's a lot of coordination involved "so nobody's walking on each other," Freet said. He said he expected further mobilization to occur in mid-March as more subcontractors were added and work progressed on the project. "Everybody's going to hit the site then—and we're going to hit it hard!" ■

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