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SPOTLIGHT

Tilt-Up Sandwich Succeeds

In Austin, Texas, officials at Leander Independent School District wanted a facility that would be energy efficient and mold-resistant. They also wanted it to have a long lifespan and tie in with the style of existing structures.

There were some obstacles to building the school on schedule, including site changes, foundation redesign and bad weather (more than 20 workdays were lost to rain). But nonetheless, the school's opening date remained the same.

To expedite the schedule, two separate crews fabricated the panels — one on the two-story classroom wing of the school and the other on the one-story multipurpose/cafeteria/library wing.

The exterior tilt-up panels feature 2-inch-thick expanded polystyrene insulation, integrally cast into the panels, minimizing the potential for mold growth.

The project also incorporated water source heat pumps on a mechanical mezzanine. The units are sized so that each classroom has an independent air comfort supply.

As Tim Cahalane, project director with American Constructors, notes, the selection of site-cast tilt-up, and in particular of architecturally insulated concrete sandwich wall panels for the Rutledge Elementary School design, occurred after administrators considered their economy, quality, aesthetics and thermal properties.

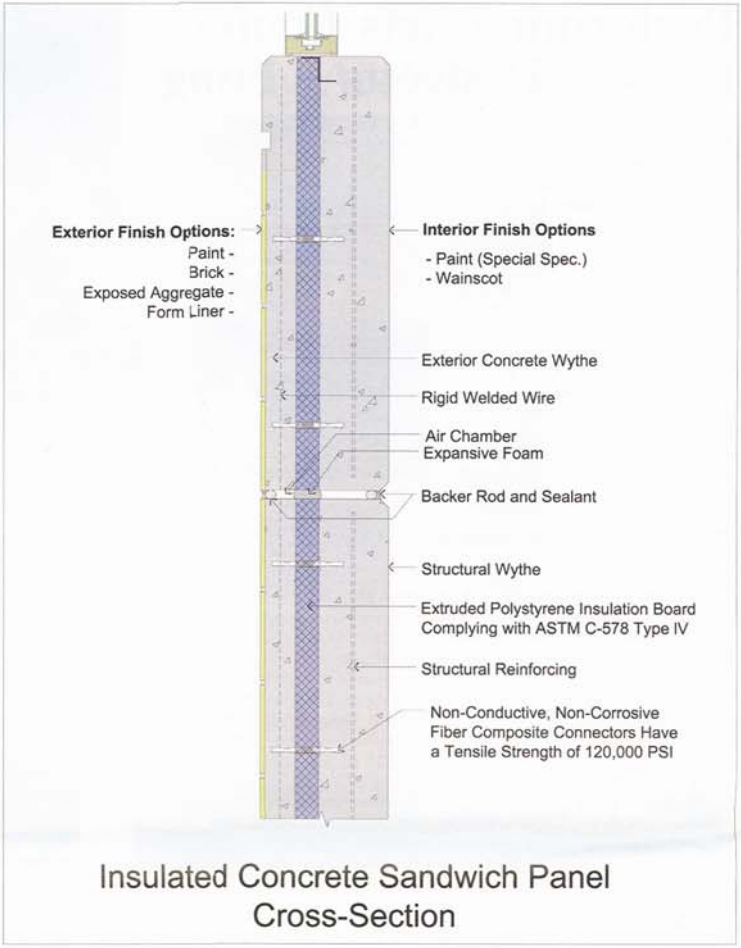
Economy

• Concrete is a functional and available material that is adaptable to the demands now placed on designers by energy conservation requirements. "We realized an approximate $400,000 cost savings utilizing its load-bearing capabilities, reducing structural steel over the previously-designed elementary school by 34 percent," says Cahalane.

• The additional R-value of the thermal mass resulted in a reduction in size and operating cost of the mechanical systems. This will result in significant cost savings over the building's life span as energy costs continue to increase.

• Tilt-up has proven itself as a construction method that saves time, and therefore saves construction dollars. For example, a 100,000-square-foot elementary school can be constructed in nine months, a 170,000 square-foot middle school can be constructed in 12 months, and a 400,000-square-foot high school can be constructed in 19 months, notes Calahane.

• Additional on-site savings were realized in general conditions and indirectly, with items



Insulated Concrete Sandwich Panel Cross-Section

RUTLEDGE ELEMENTARY SCHOOL

Size:	100,478 square feet
Cost:	$12.6 million
Construction Time:	279 calendar days
General Contractor/Tilt-Up Contractor:	American Constructors LP
Architect:	Tew Associates
Engineer:	L. M. Swayze Engineers & Associates
Consultant:	SiteCast Construction Corp.
Insulation:	Thermomass by Composite Technologies Corp.
Form Liner:	Innovative Brick Systems LLC
Lifting Hardware:	Dayton Superior Corporation

such as safety, clean-up, trash removal, exterior sub coordination and foundation cost.

Quality

- Because the air cavity and cellulose material of the exterior wall and interior finishes is deleted, the current and future indoor air quality is enhanced. This system, designed to reduce the potential for mold, is already specified in hospital construction, and will gain a stronger foothold in the education market, especially in Texas, where mold concerns are common.
- The system eliminates migration of water vapor.
- Fire- and noise-resistance are built-in features.
- Concrete and embedded brick materials make the system both durable and long-lasting.

Aesthetics

- Designers can select various architectural finishes from approximately a half-dozen brick suppliers, with dozens of samples and patterns to choose from.
- Selections include an exposed concrete surface with sandblasting at varying depth, incorporating integral concrete colors, if desired. There's also an option to vary the concrete aggregate. The exterior may also incorporate a variety of reveals and form liners.
- Site-cast concrete offers flexibility and is usually limited only by the imagination of the designers.

Thermal

- The sandwich panel is designed to control the flow of air, heat, sunlight, radiant energy and water vapor, in addition to limiting the entry of rain. The end result is a building that conserves energy.
- The non-conductive carbon ties between the exterior architectural concrete wyeth and the interior structural wyeth eliminate thermal bridging.
- The extruded polystyrene between the two wyeths creates a complete envelope around the exterior of the building, eliminating several trades in previous construction methods and complicated details, including thermal leakage as demonstrated by thermal imaging photography of masonry cavity wall vs. tilt-up sandwich panel construction. ■

Tallest Panel:	44 feet
Largest Panel:	898 square feet
Heaviest Panel:	112,000 lbs.

AWARDS

Tilt-Up Concrete Association
- 2006 Tilt-Up Achievement Award Winner — Educational Division

Association of Builders and Contractors
- 2005 Excellence in Construction — K-12

Texas Construction Magazine
- Best of 2005 Excellence in Construction — K-12