PROJECTions

From American Constructors

Winter 2006

Advances in Concrete

Concrete has always been one of the primary materials used in building construction. Depending on the ultimate use of the structure or component, it can be used for many different methods or applications - such as for foundations, floor slabs, structural framing, utilities, parking decks, machinery pads and retaining walls. Additionally, it can play a key role in energy management based on its sheer mass thermal qualities. For aesthetics, concrete can have a wide range of textures and colors by varying aggregates, stains and form materials. For all of these reasons concrete is a very popular material.

Several different concrete textures and colors were used to vary the design.

One unique application of concrete that captures many of the benefits listed above is tilt wall construction. In the recent past, concrete tilt wall construction has made significant advances in quality and applications. Tilt wall construction today can be used for buildings reaching four and five stories, can be cast with insulation embedded between the two concrete panels for excellent insulation ratings, can be cast with a wide range of masonry to give it a very elegant look and it can be cast at varying thicknesses for structural or thermal requirements. Tilt wall is competitive cost wise with other structural and wall systems. In addition, in almost every situation, tiltwall is the fastest method of construction.

American Constructors has developed an expertise in concrete and tilt wall methods over the past five years. We have spent considerable time visiting other parts of the country to see different techniques, attended technical trade seminars such as World of Concrete and Tiltwall Construction Association, and have had industry experts come to Austin and give presentations on the proper techniques for many of these procedures. This has culminated in our construction of facilities using these concrete methods and our ability to advise Owners, Architects and engineers on the advantages, the proper technical details of tiltwall construction, and concrete application over all. In this newsletter we will highlight some of the projects recently completed using these techniques.

The new Burnet High School has so far won two awards - ABC's Excellence in Construction and Texas Construction Magazine's Best K-12 Building Project

Burnet High School Tilt-Up Construction

American Constructors was chosen as the Construction Manager to build the Burnet CISD new 250,000 square foot high school. The two primary challenges were similar to many projects: building the best facility possible within the given budget and be ready for school on the committed date.

Originally, as a result of the budget limitations it was anticipated that the high school would consist of a pre-engineered building (PEB) with a combination of brick veneer and metal panels, along with standing seam roofs. However, during the design phase, American Constructors recommended the use of insulated tiltwall panel system in lieu of the PEB concept. To incorporate this superior system into the limited budget, American Constructors worked with the architect throughout the entire design and construction phases to identify and implement a multitude of value engineering items to reduce cost and maintain the original budget and schedule.

The use of insulated concrete tiltwall panels played a key role in meeting the Owner's expectations. First, the insulated panels were used in the several buildings which were originally designed using conventional tiltwall concrete panels with interior metal studs, batt insulation and drywall. This system meets the energy code, but also presented a potential maintenance concern for these high use areas where the walls receive a great deal of abuse. By using the insulated panel concept consisting of insulation board sandwiched between a face panel and a structural concrete panel, the energy code was met and it provided a durable, virtually indestructible interior surface, while significantly reducing costs.

An expansive cafeteria overlooks additional outdoor seating in the amphitheater.

Secondly, this project was constructed during the wettest period in the last 100 years in Burnet. Forty inches of rainfall resulted in over 3 months of delay and left only 15 months to complete this $27 million dollar project. Dry-in of the main buildings and completion was achieved only through the tiltwall construction process, innovative sequencing and careful coordination and site activities.

The Burnet High School gymnasium has both stadium and bench seating to maximize space.

The use of concrete tiltwall panels and the innovative ideas incorporated by the entire team resulted in a beautiful new high school for Burnet CISD that was completed within the original budget and opened on schedule in August 2005.

Rutledge Elementary Overcomes to Win

Leander Independent School District's goals were clear: provide a new 100,500 sq. ft. elementary school for this fast growing Austin area suburb that would be energy efficient, highly resistant to mold, have at least 50 year durability and express the style and stature of the existing structures in the district. In addition, the new school had to be ready for the August 2005 school year – less than 10 months construction time.

American Constructors as Construction Manager, in association with the Architect, Tew Associates traveled to Florida, North Carolina and Ontario, Canada to find the right solution: *Site Cast Tilt-Up Wall Panels with Integral Composite Insulation and Thin Brick Veneer*.

Casual observers passing the site assume that the handsome building is masonry construction. Actually it's made of 5/8th inch thin brick cast directly into the tiltup wall panels. The school evokes images desired by the school district: strength and durability with a modern look that connects to the values of the past.

Multi-finish exterior tilt-up wall.

The exterior tilt-up wall panels also feature 2-inch thick extruded polystyrene insulation integrally cast into the panels. A key benefit is the elimination of cavity wall construction that can contribute to the growth of mold in buildings. This system also provides an equivalent insulation value of R-24 when calculated to account for the thermal massing properties of the wall system.

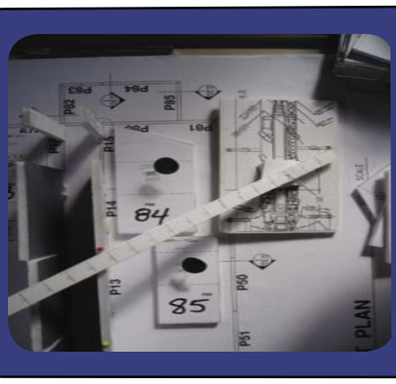
Early in the project development the decision was made to maximize the use of tilt-up wall panels. Not only were tilt-up panels used for the exterior enclosure, but the bearing interior corridor walls are also tilt-up panels. This reduced the structural steel required for the building by 34%. As market forces have driven the price of steel higher and higher, the tilt-up wall panel approach has proven to be ever more economical.

Rutledge Elementary has won three awards - ABC's Excellence in Construction, Texas Construction Magazine's Award of Excellence and TCA's 2006 Achievement Award.

Ground was broken on November 6, 2004 with a completion date set for July 2005. The winter of 2005 was one of the wettest in recent years. More than 20 work days were lost to rain, but the school opening date remained unchanged. For American Constructors however, rain days were not wasted days. Each of the 156 panels was completely detailed by the American Constructors Project Engineer utilizing AutoCAD. Every feature of each panel was dimensioned and all reveal strips, brick coursing, mechanical openings, embedded plate locations, door and window openings were precisely located. The work of all the trades was closely coordinated to ensure that every electrical box, steel connection, flashing reglet, mechanical penetration and door and window opening was in the right place.

As the project progressed and the panels were erected some unexpected benefits of the tilt-up system became apparent. When compared to bearing masonry wall systems the time required to achieve a dried-in building was reduced. This enhanced the indoor air quality of the finished building by reducing the possibility of water infiltration and mold growth. The tilt-up wall system provided a much more durable finished wall surface, more so than drywall and metal stud partitions. By using an etching gel and gripper primer we provided a painted wall surface that looked great and was student and teacher resistant.

With the incredible effort of our great team - owner, design team, subcontractors and material suppliers - and our dedicated field staff and tradesmen, we were able to overcome the site change, foundation redesign, and rain, rain, rain and still get the District into the building in time for the start of school.



Tech Tips

Concrete Durability

Concrete surfaces around facilities, including parking structures and sidewalks, often leave a strong first impression on visitors, so proper maintenance is essential in protecting these areas.

Concrete is a tough, long-lasting building material. But its porosity makes it vulnerable to chemicals, oil-based materials, stains and water. Sealers protect against these intruders, and they allow the concrete to breathe to release moisture.

The proper materials, used following a good inspection procedure to identify repairs needed and materials to use, applied using recommended application procedures, will result in more permanent, higher-quality repairs, at a lower cost.

Inspection and repair: When are repairs needed? In large cities subject to moderate winters, inspectors for departments of public works check concrete in high-density pedestrian areas every three years. The inspection frequency changes depending on weather severity.

They use the following conditions to signal when repairs are needed:

- trip hazards due to settling/lifting
- greater than 1/2-inch displacements in adjoining sections
- greater than 1/2-inch cracks
- broken or displaced curbing
- spalling
- permanent replacement of temporary asphalt patches.

Fore more information, please visit www.facilitiesnet.com.

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Tools for Accuracy

As a planning tool, a 1/8" = 1'-0" scale cutout of each panel was mounted on foam board. The construction team placed the panel models on a scaled floor plan of the building and planned the optimal location to cast each of the panels, taking into account the capacity of the crane and the final location of the erected panels.