CC's GreenSite Projects of the Year

2008

Contractors demonstrate green practices

By Kate Hamilton

Sustainable projects that push the limit of construction practices have been getting a lot of recognition lately. Projects such as CityCenter in Las Vegas, which is using a considerable amount of fly ash in specific concrete mix designs, and the St. Louis Community College, Wildwood, Mo., which employed recycled materials and sorted construction waste, not only use eco-friendly products but reduce construction time and integrate other construction industries and practices to create sustainable structures from the ground up. Although these buildings are amazing feats of design, they are just a sample of what sustainable construction can be.

Many different aspects involving a construction project add up to make a difference, to help make a project more sustainable. For example, collecting stormwater creates an easy way to irrigate local areas by reusing natural resources or employing decorative concrete eliminates the need to apply alternative flooring materials.

As part of our efforts to encourage sustainable construction practices, this year CONCRETE CONSTRUCTION, with our sister publication THE CONCRETE PRODUCER, introduced the GreenSite Projects of the Year contest. Honoring the concrete community's innovative contributions to green building, sustainable building practices were recognized that further establish concrete's role in creating long-lasting, eco-friendly structures that will stand the test of time.

Three projects were chosen as CONCRETE CONSTRUCTION's best projects of 2008. Each represent a specific category: Best Commercial Project, Best Residential Project, and Best Institutional Project.

Williamsburg Prime Outlets choose pervious concrete for its parking lot replacement and expansion. Photo: Blake King

PRIME PERVIOUS APPLICATION— BEST COMMERCIAL PROJECT

When owner Prime Outlet Malls began planning the Williamsburg Prime Outlets Expansion in Williamsburg, Va., it sought a sustainable design that would meet the parking demands of a shopping facility while creating an eco-friendly solution for the space. Stormwater collection—increasingly becoming the focus of many pavement construction projects—was also an important aspect of the business plan.

Pervious concrete met the business goals of the project by providing an alterative to traditional paving materials. With pervious concrete, the construction project was able to capture stormwater runoff and return it to the soil, reducing the cost of watering the outlets' landscaping features. Underground cisterns would store the stormwater temporarily until it was needed.

The project began by removing the existing asphalt and expanding the parking lot area. Due to impervious subgrade, cisterns collect the stormwater under the parking lot and funnel it through drain pipes for

4624 cubic yards of pervious concrete and 777 yards of conventional concrete were used throughout the 275,000-square-foot facility. Photo: Blake King

The GreenSite Projects of the Year contest is sponsored by CONCRETE CONSTRUCTION and THE CONCRETE PRODUCER. Winners will be featured on each magazine's Web site, accompanied by slideshows of the other project entries. Project winners also will receive special recognition at the GREENSITE exhibit at World of Concrete 2009.

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future use. A layer of open-graded stone aggregate acts as a holding reservoir between the pervious concrete and the storage structures. Once the stormwater reaches the cisterns, it is fed through a bio filter to remove hazardous materials, such as fertilizers, antifreeze, engine oil, and hydrocarbons. Once filtered, the gray water is used for irrigation around the outlet mall. Concave landscape beds helped to break up the pervious pavement and allow runoff to irrigate the surrounding vegetation.

Due to impervious subgrade, cisterns and drain pipes were placed underneath to help collect the stormwater. Photo: Blake King

In addition to being a solution for stormwater management, the pervious concrete contributed to reducing the heat island effect. Its lighter color helps reduce the ambient air temperature, as much as 10 degrees. Pooling water, sometimes found in parking lots, also would be eliminated. Upon completion, the project used 4624 cubic yards of pervious concrete, as well as 777 yards of conventional concrete. The 275,000-square-foot facility, now complete with a sustainable designed parking lot, optimally used the space it had to accomplish the project goals and provide an eco-friendly solution.

PROJECT PARTICIPANTS

PROJECT NAME:
Williamsburg Prime Outlets Expansion, Williamsburg, Va.

OWNER:
Prime Outlet Malls, Williamsburg, Va.

GENERAL CONTRACTOR:
Henderson Inc., Williamsburg, Va.

CONCRETE CONTRACTOR:
Magruder Construction, Sanford, Fla.

SHOWCASING DECORATIVE FLOORS—BEST RESIDENTIAL PROJECT

Contractor AMT Enterprises, Rocky Hill, Conn., wanted this 6000-square-foot model home in Middletown, Conn., to be special. With energy-efficient features, energy-star rated appliances, and luxury home amenities, such as a home fitness center, home theater, and sauna, this home would showcase the versatility of concrete. The natural benefits of concrete, as well as its decorative intricacies, lent itself well to this open-air designed home.

Winters in Connecticut can be harsh, so it was important for the Country Club Road Residence to be as solid and airtight as possible. All of the solid exterior walls are made of insulating concrete forms (ICFs) creating a seismic-, hurricane-, sound-, fire-, mold-, and insect-resistant home. Where needed, a open-cell urethane spray foam was used for insulation. The basement and garage floors are lined with a 2-inch-thick rigid foam board insulation, and sand and 10-mil poly vapor barrier underneath the concrete to provide further insulation and waterproofing protection. The remaining floors used fire-resistant steel joists and steel decking, complete with a layer of open-cell urethane spray foam. Radiant heating is carried throughout the home andgarage to maintain a comfortable living environment.

A key feature of the floors is a unique acid-stained design. The floors were diamond ground to a smooth finish and applied with a white polymer cement overlay. The patterns used were created by making cuts with a worm drive saw and vacuum attachments. The floors also received two coats of 100%-solids high-build ultra-clear epoxy and two coats of high-solids urethane. Floors throughout the home used a number of colors, from marigold, mahogany, powder blue, and green. Sawcuts separated the colors to add emphasis.

In the kitchen, amber-colored acid stain was applied over the floor. Onyx

This concrete model home employs ICF construction to create an airtight, energy-efficient home. Photo: Michael Osgood/AMT Enterprises LLC

Floors throughout the house were acid stained and featured custom designs. Photo: Michael Osgood/AMT Enterprises LLC

was hand-brushed in many layers to create small squares, and black grout was layered between urethane coats.

The master bath featured a glass mosaic design set into a thin layer of seamless texture overlay. After lightly diamond grinding the surface, the green and amber broken glass was set off by an earth tone stone color.

The small squares on the kitchen floor were hand-brushed with multiple layers of onyx-colored stain to reach a deep color. Black grout creates the tile look and coats of urethane create a shiny, glossy sheen. Photo: Michael Osgood/AMT Enterprises LLC

The 5x5-foot shower stall was hand-troweled with integrally colored polymer cement and sealed with applications of epoxy and urethane. Artwork of ivy was hand-painted on top of the surface.

An airtight structure was an important aspect of this New England home. Doors, windows, and other penetrations were sealed with expandable foam. In addition, the attic rafters and roof sheathing also are insulated. The use of concrete is carried outside with stamped concrete patios and walkways, and a stone and stucco veneer on the front of the house.

Further plans for the home include a 50-yard concrete driveway, a built-in grilling area, a rock-landscaped waterfall, fire pit, and hot tub spa.

The entire project used 214 1/2 yards of conventional and decorative concrete.

PROJECT PARTICIPANTS

PROJECT NAME:
Country Club Road Residence, Middletown, Conn.

OWNER:
Michael & Kimberly Osgood, Middletown, Conn.

DESIGNER:
Michael Osgood/AMT Enterprises, Rocky Hill, Conn.

GENERAL CONTRACTOR:
AMT Enterprises, Rocky Hill, Conn.

CONCRETE CONTRACTOR:
Michael Osgood/AMT Enterprises, Rocky Hill, Conn.

All of the solid exterior walls are made of insulating concrete forms (ICFs) creating a seismic-, hurricane-, sound-, fire-, mold-, and insect-resistant home.

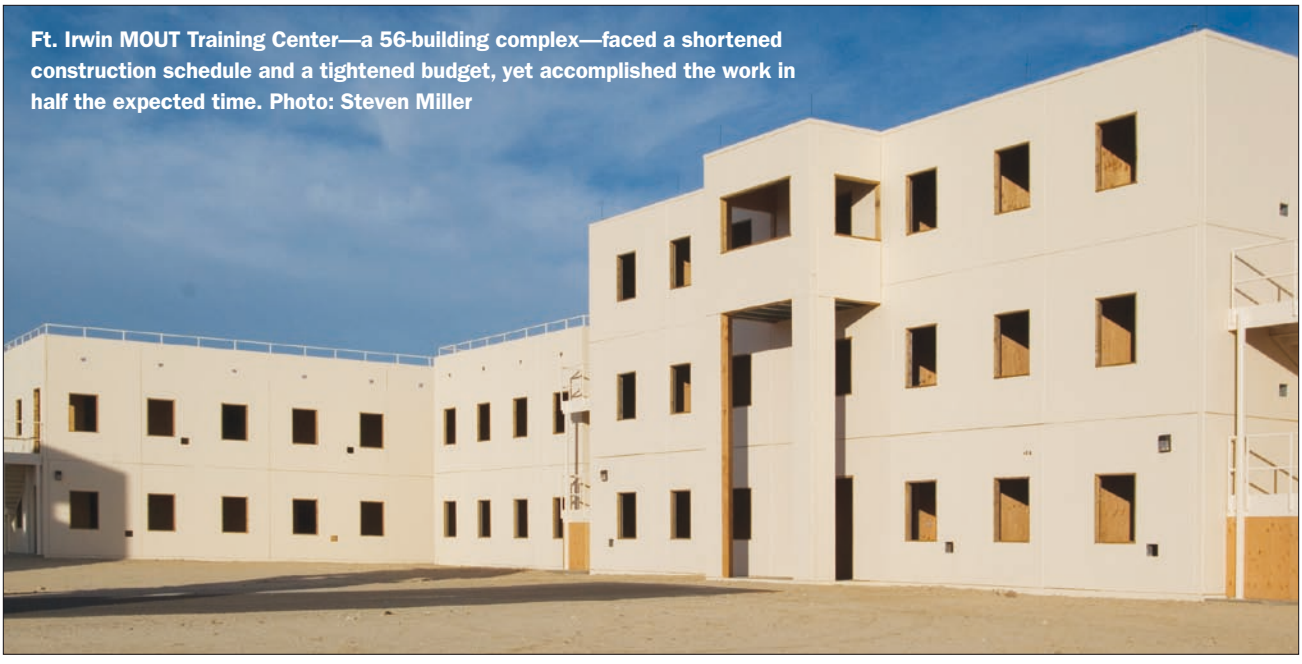
MILITARY-APPROVED MIX—BEST INSTITUTIONAL PROJECT

Undertaking a 56-building compound is no easy task, especially when time is of the essence. The new Department of Defense Ft. Irwin Military Operations in Urban Terrain Training Facility used a unique concrete/steel hybrid to reduce the construction time in half, and minimize energy costs. The construction site situated in the Mojave Desert also posed an obstacle in maintaining a productive workforce facing extreme heat conditions.

General contractor RQ Construction Inc., Bonsall, Calif., chose a system that combines cellular precast concrete with cold-formed steel framework. These lighter panels helped reduce energy and labor costs. The precast panels are installed using teams of four and a forklift that would lift them into place. Each 2-inch panel achieves an R-value of 4 yet only weighs 60 to 70 pounds per cubic foot.

With typical concrete weighing 150 pounds per cubic foot, these lighter panels allowed the construction team to use smaller cranes then the typical panel would have needed. The foundation requirements also were less because of thinner panels, thus reducing the strength and size of the foundation needed to withstand the load of the walls. Again this reduces the amount of materials and energy required to build. The panels also hold up to wind and seismic forces, passing the Miami/Dade County Windblown Missile Impact Test.

Cellular concrete—which uses air bubbles in place of aggregate—requires less materials. It also increased the insulation value, while reducing the overall weight of the structure. The concrete mix includes Type I or II portland cement, Type F fly ash, and a foaming agent. Using steel framework, the cellular concrete is pumped



Ft. Irwin MOUT Training Center—a 56-building complex—faced a shortened construction schedule and a tightened budget, yet accomplished the work in half the expected time. Photo: Steven Miller

Less materials and thinner wall panels allowed for more usable space within the structure, thus reducing the building's overall carbon footprint.

The lightweight precast panels were easy to construct and helped reduce energy and material costs. Photo: Steven Miller

into the pre-assembled panel frames. Each panel is labeled, and has the necessary holes and notches already in it. The framework also provides furring space for insulation, electrical conduits, and other utilities. Panels then are delivered to the jobsite for easy and efficient installation. The construction system can be used in multistory applications, up to six stories tall.

Less materials and thinner wall panels allowed for more usable space within the structure, thus reducing the building's overall carbon footprint. In addition, this energy-efficient construction method helped RQ Construction complete the project within six months, instead of the projected year time frame, because on average teams were enclosing a building a day. This freed up time for ancillary trades to access the structure and complete other elements of construction.

To view a slideshow for each GreenSite Project of the Year, as well as the other entries, visit www.concreteconstruction.net.

The unique concrete/steel hybrid construction system features cellular concrete that uses air bubbles as aggregate, creating panels that are lighter yet just as strong. Photo: Steven Miller

PROJECT PARTICIPANTS

PROJECT NAME:
Ft. Irwin Military Operations in Urban Terrain (MOUT) Training Facility, Ft. Irwin, Calif.

OWNER:
Ft. Irwin National Training Center, Ft. Irwin, Calif.

GENERAL CONTRACTOR:
RQ Construction Inc., Bonsall, Calif.

ARCHITECT/DESIGNER:
SEI Group Inc., Huntsville, Ala.