

Quick Deployment

▶ An innovative, cellular concrete framing system speeds construction.

By Kate Hamilton

Planning and building a new 56-building compound is not easy, especially when time is of the essence. Add to the challenge the tough conditions of the Mojave Desert, and the project becomes almost impossible.

But in true can-do spirit, the designers of the U.S. Department of Defense's new Ft. Irwin Military Operations in Urban Terrain Training Facility found a way. They selected a unique, precast concrete system that halved the construction time, reduced employee exposure to excessive heat, and offered long-term energy savings.

Lightweight, precast panels were easy to build and helped reduce energy and material costs.



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The architect first benefited from the system's lightweight properties. Each structure features a design that uses fewer materials and thinner wall panels. The system allows for a final structure with more usable space, reducing the overall carbon footprint. The architect also was able to create foundation design requirements that were smaller than conventional buildings.

General contractor RQ Construction Inc., Bonsall, Calif., also benefited from the Ecolite Concrete system that combines cellular precast concrete with cold-formed steel framework. RQ Construction completed the project in six months, instead of the projected one-year time frame.

On the jobsite, these lighter panels helped reduce the contractor's energy and labor costs. Precast panels were delivered to the jobsite and identified for easy and efficient installation. In place of large cranes, employees installed the precast panels with a forklift or telehandler. Bonsall erection crews enclosed one structure per day on average. Ancillary trades gained faster access to the structure's shell and completed other elements of construction.

Weight reduction

Cellular concrete was key to the project's success. In place of aggregates, the

concrete hardened structure uses the shape of the hardened air bubbles to provide a matrix. The result is a concrete element that requires less material, has a high insulation value, and reduces the structure's weight. The concrete mix includes Type I or Type II portland cement, Type F fly ash, and a foaming agent.

Each 2-inch-thick panel achieves an R-value of 4, yet only weighs 60 to 70 pounds per cubic foot, or about one-half the weight of standard concrete.

The cellular concrete is pumped into the pre-assembled panel steel frames. Each panel is uniquely batched and labeled. During casting, the producer, following the designer's plan, can preposition all voids and connection tunnels. The panel also can be designed to provide furring space for insulation, electrical conduits, and other utilities to speed onsite construction.

Based on the success at Ft. Irwin, Ecolite Concrete hopes designers and precasters nationwide adopt the system. The panels should comply with all building codes, as they have been proven to withstand wind and seismic forces, passing the Miami/Dade County (Fla.) Windblown Missile Impact Test. Designers can use the construction system in multistory applications up to six stories tall.

Kate Hamilton is associate editor for **CONCRETE CONSTRUCTION** magazine, whose editors chose Ft. Irwin as a GreenSite award winner for Best Institutional Project. To learn more about the project and to view construction photos, visit www.concreteconstruction.net.

To learn more about the Ecolite Concrete system, visit www.ecoliteconcrete.com.