

Technical Brief

Building strong and resilient for USACE projects



Above: Martin Army Community Hospital, Columbus, Ga.
Precaster: Metromont Corporation



The U.S. Army Corps of Engineers (USACE) takes on the difficult task of building and maintaining various military and government facilities and recreational American infrastructures around the world. This mission requires high-performance materials that can hold up to challenge. For this reason, USACE projects usually outperform most commercial buildings in terms of sustainability and resiliency.

continued

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From an exterior wall standpoint, USACE projects challenge architects to maximize a building's performance while providing long-term durability. In many cases, CarbonCast® can be an ideal solution. CarbonCast's energy efficiency, strength, versatility and overall cost effectiveness can provide buildings with a superior balance of performance characteristics. CarbonCast can be used to produce architectural and structural systems of many magnitudes for multiple end-use applications.

Sustainability

CarbonCast is designed to provide long-term sustainability and minimal environmental impact, consistent with the USACE's guiding principle to protect and restore the Nation's environment.

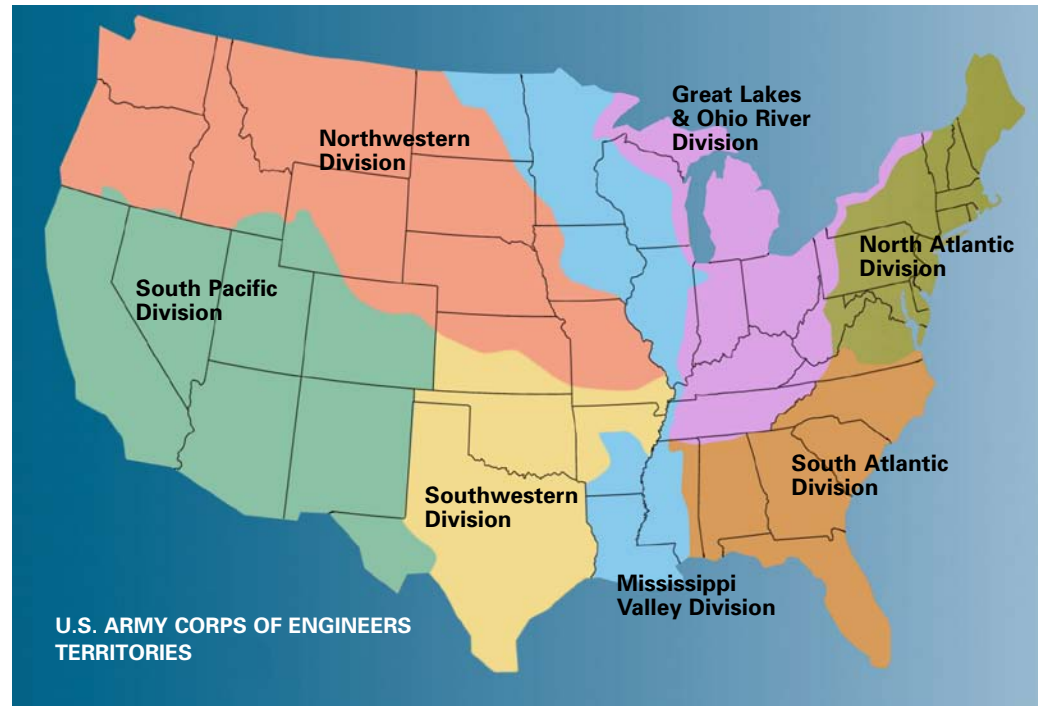
CarbonCast provides building systems with edge-to-edge continuous insulation with maximum R-value for the insulation depending on foam selection choice. The negligible thermal conductivity of the C-GRID® carbon fiber connectors virtually eliminates the possibility of thermal transfer through the panel. This creates a highly thermally efficient panel that can reduce HVAC system energy use and provide substantial long-term energy savings to heat and cool buildings.

CarbonCast panels can also weigh less than conventional precast products due to composite panel design.

CarbonCast Enclosure Systems contribute to LEED®, Green Globes and other certifications.

Resiliency

Although a USACE building must be sustainable, it must also provide reliability and security for the personnel, equipment or other assets it houses.



Above: AltusGroup precasters are located throughout the U.S. and have the design capabilities to meet the specific needs of each region.

CarbonCast is engineered to withstand extreme weather and seismic events. Its durability features provide long-term benefits including minimal maintenance beyond inspection of the joints and potential recaulking.

Taking the place of steel reinforcement, C-GRID is a stronger alternative. Acting as a wythe connector, C-GRID delivers shear support for designs with reduced concrete mass and virtually eliminates thermal bridges in insulated designs. In architectural cladding, because the carbon fiber grid can be placed closer to the surface, it can offer outstanding crack control and is not susceptible to corrosion.

Versatility

In addition to being highly functional, CarbonCast offers the versatility needed to build the diverse portfolio of USACE projects. CarbonCast has a variety of finishes and aesthetics, giving the design team virtually limitless options when designing the exterior of a building or infrastructure including design projections, reveals, bullnoses

and other articulations, as well as finishes ranging from thin brick to terra cotta and dozens of other options. CarbonCast enclosure systems can help fulfill a large variety of wall panel sizes, colors and finishes to fit the aesthetic needs of a building depending on its intended use.

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Precast project success stories



Fort Carson Division Headquarters, Fort Carson, Colo.
Precaster: EnCon United

Fort Carson Division Headquarters

The \$5.6 million, 141,000-square-foot Fort Carson Division Headquarters in Fort Carson, Colo., is a military building constructed with CarbonCast High Performance Insulated Wall Panels showcasing energy efficiency and design performance.

The first structure on an Army installation to achieve a LEED Gold Certification for new construction, it also pioneered use of carbon fiber wythe connection materials in this region of the country and served as a prototype for future United States Army Corps of Engineers buildings of this type, verifying environmental performance, occupant health and financial return.

A total of 57 insulated composite wall panels used C-GRID epoxy-coated carbon fiber grid shear connectors. The 8" CarbonCast panels satisfy AT/FP blast requirements and maintain continuous EPS insulation for an R-13 value, the minimum required by the Army Corps of Engineers. Although the architectural skin was composed primarily of inset, red-brown, thin brick to resemble hand-laid brick, a contrasting white brick was chosen to offset the entrance.

Armed Forces Reserve Center

The United States Army Corps of Engineers chose a fully integrated, design-build approach for the \$4 million, 109,000-square-foot Armed Forces Reserve Center, which will be used as a training facility in San Marcos, Texas. The structure boasts a total precast building system including solid and insulated walls, columns, beams, double tees and hollow-core.

It took just 14 days to deliver and erect the CarbonCast High Performance Insulated Wall Panels on all three buildings despite limited site access.

The exterior walls consisted of 54,000 square feet of CarbonCast High Performance Insulated Wall Panels with C-GRID carbon fiber grid for shear transfer. Each load-bearing panel is comprised of two concrete wythes separated by 3-1/2" of continuous EPS insulation that delivers a steady-state R-14 value. The energy-efficient building was designed to achieve LEED Silver certification. It meets U.S. Army AT/FP requirements as federally mandated.



Armed Forces Reserve Center, San Marcos, Texas
Precaster: Heldenfels Enterprises, Inc.



Government Services Administration, Savannah, Ga.
Precaster: Metromont Corporation

Government Services Administration

The Government Services Administration (GSA) building located in Savannah, Ga., is a 35,870-square-foot structure with 25,892 square feet of CarbonCast High Performance Insulated Wall Panels with C-GRID carbon fiber grid, non-load-bearing walls. The building was designed with high insulation power, giving a minimum R-value of R-12 with about 20% of the precast walls receiving an R-18 due to a special cooling requirement.

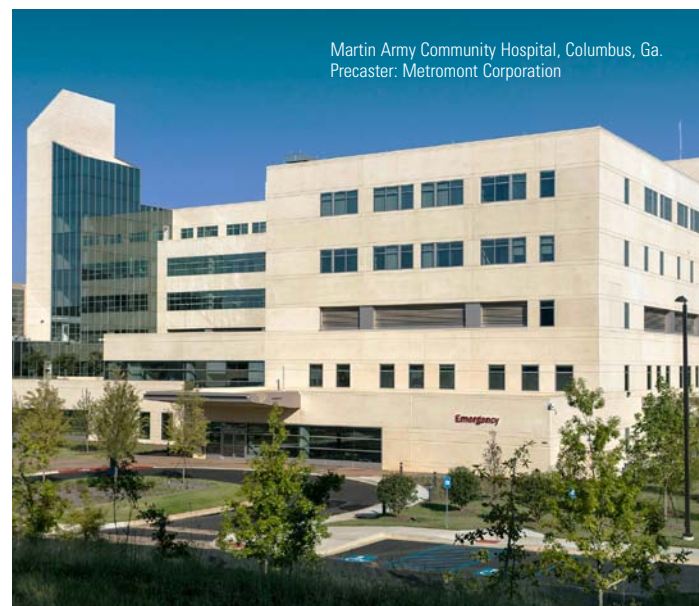
The structure consists of two colors of precast with random board finishes. The architect first considered a tilt-up design for the walls, but C-GRID panels outweighed this design in terms of environmental and erection advantages. The use of precast panels ensured easy control over the wall panel schedule and the fast erection of the panels cut 20 days from the original job schedule.

Martin Army Community Hospital

The Martin Army Community Hospital located at Fort Benning Army Base in Columbus, Ga., used 9" thick CarbonCast Insulated Architectural Cladding for the exterior of the hospital. The original concept called for C-GRID CarbonCast panels to provide continuous insulation and was designed with an R-value of R-12 that exceeds code by 50%. This eliminated the need for batt or other insulation inside the wall system.

The structure's finish consists of a white cement and light-colored aggregate with a sandblast mix. A total of 1,230 pieces, comprising 210,000 square feet of architectural precast concrete were erected.

In addition to the architectural precast, two 1,000 car parking decks were furnished and erected with the same architectural finish on the exterior spandrels and walls.



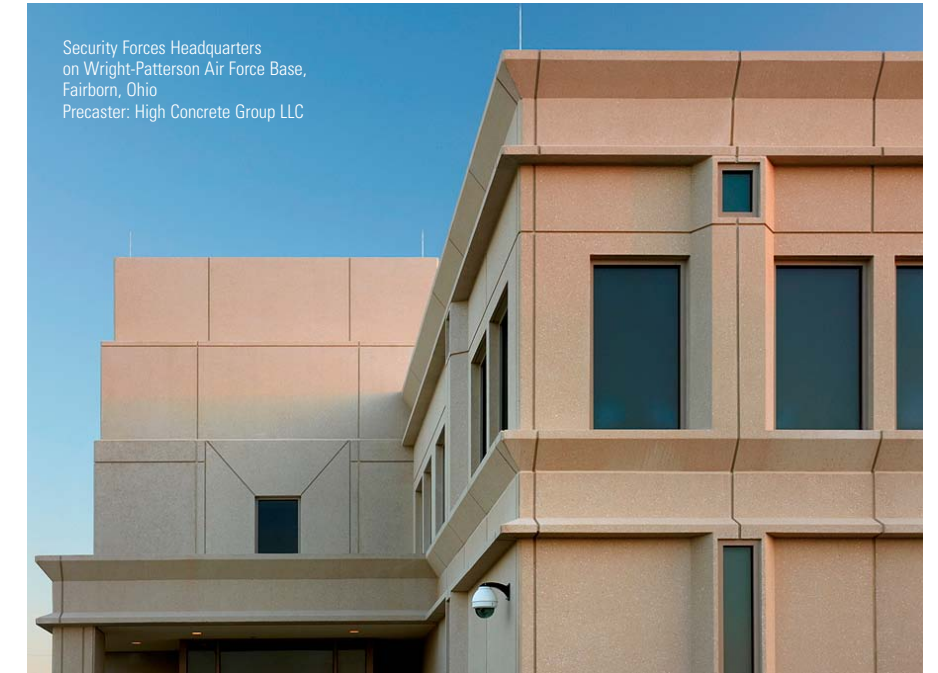
Martin Army Community Hospital, Columbus, Ga.
Precaster: Metromont Corporation

Security Forces Headquarters on Wright-Patterson Air Force Base

The \$14 million, 52,000-square-foot Security Forces headquarters on Wright-Patterson Air Force Base, Fairborn, Ohio, used CarbonCast High Performance Insulated Wall Panels for thermal efficiency, durability and aesthetics.

The new facility includes base-wide security for its armory, office space, dispatch center, detention area and warehouse. Thermally efficient CarbonCast High Performance Insulated Wall Panels encapsulate a 2" layer of rigid XPS foam insulation for continuous insulation as defined by the ASHRAE 90.1 energy code. Panels contribute to sustainable performance since the building was designed for LEED Silver Certification and R-10 value in this application.

Reveals in the precast formwork were combined with real and false panel joints to create a block-like image that suggests limestone. First-floor blocks are scaled, giving the illusion of height to the two-story section. The second story is set back to enhance this effect. Exterior walls are highly articulated to match the adjacent precast building completed by Emersion Design 10 years ago.



Security Forces Headquarters on Wright-Patterson Air Force Base, Fairborn, Ohio
Precaster: High Concrete Group LLC

CarbonCast panels can also weigh less than conventional precast products due to composite panel design.

Conclusion

AltusGroup precasters have the capability and experience to work with the USACE and supply a variety of CarbonCast building solutions. The USACE designs and builds some of the strongest structures around the world. To continue the high standard of building, CarbonCast offers durability that can outperform conventional precast while maintaining the sustainability and versatility the USACE desires.



AltusGroup
PO Box 1449
Bethlehem, PA 18018
866.GO-ALTUS (1.866.462.5887)

For more information, go to altusprecast.com and learn how CarbonCast® can deliver LEED points for your project as well as lasting performance results that generate positive ROI.

Call us today to speak with a technical representative or request a lunch-and-learn program.

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