The Martin Army Community Hospital in Greenville, S.C., found the sustainable, low-maintenance, durable, and quick-to-erect solution the owners were looking for in high-performance insulated wall panels. Courtesy of AECOM.

Carbon-fiber-reinforced panels bring energy efficiency to new Army hospital

In a project that required a commitment to sustainability, speed, and durability, Metromont Corp. of Greenville, S.C., manufactured CarbonCast high-performance insulated wall panels for the Martin Army Community Hospital, a 745,000 ft^2 (69,200 m^2) replacement hospital at the Fort Benning, Ga., Army Base. Metromont's wall panels helped contribute to the energy savings required for the facility to receive LEED silver certification.

"Turner Construction, which was the construction firm for the project, put us on the design team immediately because we have done other CarbonCast high-performance insulated wall panels with them before," says George Spence, business development manager for Metromont. "They knew the product and liked it, and they also knew that we could handle the job."

Turner Construction required three things of the Metromont precast concrete panels. First, they had to be sustainable. "Our carbon-fiber panels offer the best thermal performance possible because they have continuous insulation and thermal mass, which puts the panels into a special category in ASHRAE 90.1 for energy efficiency," Spence says.

Second, the panels had to possess low maintenance and high durability. "Of course, precast in general is low maintenance and durable, and our CarbonCast high-performance insulated wall panels are even more so," Spence says.

The third requirement was speed. "The challenge for Turner and the design team was to put this project together in a tight time frame," Spence says. "As a result, everyone was under schedule pressure to perform, and we were able to do this. In fact, we can put these walls up faster than any other system."

Turner ended up installing 200,000 ft^2 (18,600 m^2) of precast concrete panels. The panels are 9 in. (230 mm) thick. They have a 3 in. (76 mm) thick exterior concrete wythe, 3 in. thick interior concrete wythe, and 3 in. thick expanded polystyrene (EPS) continuous insulation in between.

The continuous insulation meets the requirements of ASHRAE 90.1, and the walls are designed to deliver an *R*-value of 12, which exceeds code by 50% and also eliminated the need for batt or other insulation.

The continuous insulation was enabled by carbon-fiber wythe connectors. "With continuous insulation, you have to tie the wythes together, which are cut at a 45-degree angle, with some kind of shear grid," Spence says. "Some people use metal, but that conducts heat. Others use fiberglass pins, but they don't have the same structural properties as our C-Grid carbon-fiber connectors do." A benefit of the carbon-fiber connectors is that they have a low cross-sectional area because they are five times stronger than steel. In addition, they offer low conductance, meaning that there is no thermal bridging in the panel.

The panels themselves weigh less than conventional precast concrete wall systems, helping to reduce embodied energy by using less cement and other raw materials, as well as less energy to produce, ship, and erect.

—William Atkinson

The insulated wall panels provide an *R*-value of 12 and helped the building receive LEED silver certification. Courtesy of AECOM.