Residence Hall Scores Strong Marks in Sustainability at Georgetown

ECOPact
The Green Concrete

Georgetown University, anchor of the Washington, D.C. neighborhood that shares its name, is expanding into the heart of the city with a new residence hall on H Street near the US Capitol. The 12-story building will house 476 students, and the innovative design supports the university's commitment to both sustainability and creating a vibrant campus experience.

With ample glazing onto H Street, it includes 4,200 square feet of university space, 1,980 square feet of retail space, and large landscaped courtyards. Designed to exceed LEED Platinum status, the structure includes an energy-use monitoring system, extensive solar panels, exterior sun shading, rainwater collection, and many other environmentally conscious features.

HOLCIM

THE CHALLENGE

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Ben Fry
Project Manager
John Moriarty & Associates

The demanding construction timeline for the student residence hall required the completion of one post-tensioned concrete floor deck each week, which would be placed in three 3,000 square foot sections. To meet the construction cycle of the seven-inch thick slabs, the project team needed an advanced concrete mix that would achieve a specified 28-day design strength of 5,000 psi and reach a high-early strength of 3,000 psi in two to three days. This rapid strength gain would allow the work crews to start post-tensioning the floors and remove formwork in a short amount of time to keep the project moving on schedule.

Georgetown University is deeply committed to pursuing broad-based, practical approaches in sustainability and the built environment. "With the owner pursuing LEED Platinum designation of the residence hall and various aspects of the project surpassing certification requirements, we were committed to achieving high levels of sustainability in construction," said Ben Fry, project manager for John Moriarty & Associates. "Our challenge was to find a sustainable high-performance concrete solution that would come up to strength in a timely fashion in order to maintain our schedule."

THE SOLUTION

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Zachary Lovett
Ready-Mix Sales Manager
Holcim

In search of sustainable solutions that would provide the required strength and durability needed for the work, the project team reached out to the experts at Holcim to discuss various options. According to Zachary Lovett, ready-mix sales manager at Holcim, many of the building's LEED design aspects focused on long-term reductions in operational carbon emissions. "In taking sustainability to a higher level, we recommended the use of ECO-Pact concrete to reduce the embodied carbon in the up-front construction of the high-efficiency structure."

ECOPact is the industry's broadest range of low-carbon concrete for high-performing, sustainable and circular construction. ECOPact is sold at a range of low-carbon levels, from 30 percent to 100 percent less carbon emissions compared to standard (OPC) concrete. Where regulatory conditions allow, ECOPact products integrate upcycled construction and demolition materials, further closing the resource loop.

Holcim worked closely with the structural engineer and contractors in developing an ECOPact concrete for achieving the specified strengths in the time needed. The design of the low-carbon mix was based on Holcim extensive experience with high-strength concrete incorporating high levels of supplementary cementitious materials. As part of the quality-assurance process, the high-performance slab mix was used and tested in some of the below-grade structural foundation work to verify how quickly it would come up to strength and ensure schedules would not be affected.

THE RESULT

Upon completion of all the performance assessments, work got underway in placing the low-carbon concrete for the post-tensioned floor slabs in early 2021. Throughout the pours, cylinders were cast and tested for high-early strength attainment, as well as at 7, 14, 28, and 56 days.

ECOPact proved to be the ideal high-performance solution needed to meet the general contractor's speed of construction goals for the project. The low-carbon mix performed up to speed in hitting the specified high-early strength consistently, allowing work crews to stress and turn over the slabs quickly so that other trades can begin work on the building's façade.

When it opens in Fall of 2022, the 55 H Street resident hall will be a hallmark of sustainability in the heart of our nation's capital. The use of the low-carbon concrete in its construction will make a strong contribution to LEED Platinum certification, especially for the recycled building material content credit. Equally impressive is that the 7,000 cubic yards of ECOPact green concrete used in the project provides a 40 percent reduction in carbon dioxide emissions when compared to traditional concrete. This is the equivalent to taking a passenger car that drives more than one million miles off the road.

"Engineers, architects, and owners throughout the Washington, D.C. area are very interested in integrating sustainable building practices and how construction materials can help achieve their goals," said Fry. "This successful project using the ECOPact green concrete will be a strong testimonial for others looking to balance performance and sustainability in their construction projects."

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