

Project:

The Citadel Military College – Padgett-Thomas Barracks, cadet housing

Location:

Charleston, SC

Owner/s:

The Citadel Military College

Concrete Producer:

Ready Mix Concrete Company

Concrete Contractor:

Ellis Don Corporation

Architect:

Davis & Floyd, Inc.

Requirements:

Compressive Strength:
4,000 psi (28 MPa) @ 7 days
5,600 psi (39 MPa) @ 28 days

Products Used*:

MasterGlenium® 3030 – high-range
water-reducing admixture

MasterMatrix® VMA 358 – viscosity-
modifying admixture

MasterPozzolith® 80 – water-reducing
admixture

Market Sector:

Ready-mixed concrete

Project Profile

Self-Consolidating Concrete

Padgett-Thomas Barracks, Cadet Housing



Photo courtesy of Russell K. Pace, The Citadel

The Background

Constructed in 1922, the Padgett-Thomas Barracks was the oldest building and the largest student housing facility on campus. For eighty years, it served as perhaps the best-known symbol of the military college and a model for all other barracks on the campus. By 2000, the venerable structure, with its narrow dorm rooms, high ceilings and hardwood floors, was declared a safety hazard with collapsed ceilings, fallen concrete, backed-up sewer lines and structural instability. In the early part of 2000, the decision was made to demolish and replace the Padgett-Thomas Barracks. The goal was to design a new structure, identical in appearance to the landmark building but incorporating modern conveniences. The plan delivered was a four-story building that is a work of art and a showcase of excellence.

Pagett-Thomas Barracks, Cadet Housing



Photo courtesy of Russell K. Pace, The Citadel

The Challenge

On previous campus construction projects of buildings with a similar design, contractors battled severe placement challenges and unacceptable finished appearance that required patching and ultimately led to cost overruns. Placement was another challenge. Narrow wall forms, 12 ft. (3.6 m) high and 80 ft. (24.4 m) long, and filled with reinforcement were to be filled with concrete by pumping. For this reason a higher slump concrete mixture was required.

The Solution

BASF introduced the concept of self-consolidating concrete (SCC) and helped develop a mixture using MasterGlenium 3030 polycarboxylate-based high-range water-reducing admixture used in combination with MasterMatrix VMA 358 viscosity-modifying admixture. These ingredients produced a highly stable 27 in. (685 mm) spread SCC mixture that was able to overcome segregation issues and create finished surfaces resembling glass, without vibration. Concrete was placed from a single point and the SCC mixture flowed into place, transporting the aggregate around reinforcement, utilities, and blockouts.

Project Facts & Benefits

- Placement time was significantly reduced
- Finished surfaces were extremely smooth and aesthetically pleasing
- No vibration was required
- Nearly half of the construction was 6 in. (152 mm) thick, 12 in. (3.6 m) high walls requiring intricate forming to create nearly 1,000 doorways, window casings, archways, and blockouts for utilities
- From September 2002 until September 2003, more than 6,500 yd³ (4,970 m³) of SCC was used to construct the 112,000 ft² (10,405 m²) Padgett-Thomas barracks facility

- Pour times for 40-80 yd³ (31 m³ to 61 m³) wall placements were cut in half, and labor on the wall construction was reduced by one third
- Throughout the project, strengths of nearly 4,000 psi (27.6 MPa) @ 7 days and 5,600 psi (38.6 MPa) @ 28 days were consistently achieved
- All tested mixtures met or exceeded projects specification requirements
- The project was such a success, BASF has been asked to participate in a second project already under construction

More Information

The Master Builders Solutions brand brings all of BASF's expertise together to create chemical solutions for new construction, maintenance, repair and renovation of structures. Master Builders Solutions is built on the experience gained from more than a century in the construction industry.

The know-how and experience of a global community of BASF construction experts form the core of Master Builders Solutions. We combine the right elements from our portfolio to solve your specific construction challenges. We collaborate across areas of expertise and regions and draw on the experience gained from countless construction projects worldwide. We leverage global BASF technologies, as well as our in-depth knowledge of local building needs, to develop innovations that help make you more successful and drive sustainable construction.

The comprehensive portfolio under the Master Builders Solutions brand encompasses concrete admixtures, cement additives, chemical solutions for underground construction, waterproofing solutions, sealants, concrete repair & protection solutions, performance grouts, performance flooring solutions.

*Effective January 1, 2014, the names of BASF's Master Builders Solutions brand products have changed:
Glenium 3030 NS became MasterGlenium 3030
Rheomac VMA 358 became MasterMatrix VMA 358
Pozzolith 80 became MasterPozzolith 80

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