

Workability-Retention of Concrete

Binghamton University East Campus Housing, Phase Two



In August 2009, Binghamton University embarked on a project to replace its aging dormitories with new, up-to-date facilities. One of the objectives for rebuilding rather than retrofitting was to modernize the campus dormitories and boost curb appeal, an important factor for colleges in their efforts to recruit prospective students. Construction Manager LeChase Construction enlisted High Concrete Group LLC of Denver, Pa., as their supplier of precast architectural wall panels for the three, five-story, steel-frame buildings.

Project:

East Campus Housing, Phase Two,
Binghamton University

Location:

Binghamton, New York

Owner/s:

Dormitory Authority,
State of New York, Albany, New York

Concrete Producer:

High Concrete Group LLC

Construction Manager:

LeChase Construction

Architect:

Burt Hill, Philadelphia

Requirements:

6,000 psi compressive strength

Products Used:

MasterSure® Z 60

workability-retaining admixture

MasterGlenium® 7710

high-range water-reducing admixture

Market Sector:

Precast concrete

Project Profile

Binghamton University East Campus Housing, Phase Two



The Challenge

To achieve the desired aesthetic qualities, the performance of the concrete mixture had to be highly consistent. Due to the required mixture proportions and the time required for placement, slump loss during casting was a concern. Slump loss is an undesirable property for architectural concrete as it can alter concrete's response to consolidation and cause irregularities like pour lines, color mottling and bug holes in the final appearance of the wall panels. If experienced, these irregularities may require on-site patching and repairing or recasting of the concrete panels.

In order to meet the extremely high surface finish quality standards set by the Dormitory Authority for the State of New York and avoid additional costs or delays, High Concrete needed to ensure that the fresh properties of the concrete remained consistent from the beginning to the end of the load.

The Solution

To achieve this objective without compromising early compressive strength development or rate of hardening, High Concrete Group LLC utilized MasterSure Z 60, a first-of-its-kind workability-retaining admixture from Master Builders Solutions. The resulting concrete mixture maintained its properties consistently from start to finish, allowing the production and placement team to efficiently consolidate the concrete without issues. In addition, the flexible dosage range of MasterSure Z 60 workability-retaining admixture helped High Concrete effectively respond to changing temperatures through the spring, summer and fall. Strengths were consistent, and the finished product was well-received by the owners.

Project Facts

- Total volume of concrete: 2,500 yd³ (1,900 m³)
- Average dosage of MasterSure Z 60: 2 fl oz/cwt (130 mL/100 kg)
- Target slump: 8 in. (200 mm)
- Average measured slump (356 measurements): 8 in. (200 mm)
- Average measured air content: 6.6%
- Slump retention: 90 minutes
- Target 28-day compressive strength: 7,000 psi (48 MPa)
- Actual 28-day compressive strength: 8,700 psi (60 MPa)

Benefits

- Excellent slump retention eliminated the need for redosing of admixtures
- MasterSure Z 60 workability-retaining admixture helped eliminate pour lines, mottling and bug holes
- Consistency in placement reduced labor costs
- Minimal rework resulted in additional savings. It was not necessary to remake any of the panels
- Finished surfaces were aesthetically pleasing, with uniform color

About Master Builders Solutions

Master Builders Solutions is a leading global manufacturer of concrete admixtures, as well as other sustainable solutions for the construction industry, focussed on delivering its vision: **Inspiring people to build better**. Master Builders Solutions provides value-added technology and market-leading R&D capabilities to improve the performance

of construction materials and to enable the reduction of CO₂ emissions in the production of concrete. Founded in 1909, Master Builders Solutions has ca. 1600 employees operating 35 production sites globally, supporting their customers in mastering their building challenges of today – for a decarbonised future.

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