

Jointless Slab with Crack-Reducing Admixture

Midwest Research Farm Laboratory Expansion



Master Builders Solutions needed additional office, storage, and laboratory space at their Midwest Research Farm. Klein Farms worked with Master Builders Solutions to expand their facilities, which included a new equipment storage building and upgrading the existing Master Builders Solutions facility. It was important for the upgraded facility to include an open floor plan with radiant heating. This required a new foundation, relocation of the columns to allow for the open floor plan, and a new slab-on-ground.

Project:

Master Builders Solutions Agricultural Solutions – Midwest Research Farm Laboratory Expansion

Location:

Seymour, IL

Owners:

Klein Farms

Contractor:

Graber Buildings, Inc

Concrete Producer:

Blager Concrete Company

Requirements:

Compressive Strength = 4,000 psi [27.6 MPa] in 28 days

Slump = 7-9 in. [180 – 230 mm] slump

Workability retention = 60 minutes

Joints = None (jointless slab); no saw cutting due to radiant floor heating system in the slab

Cracking = Minimize significantly (potential for cracking and crack width should cracking occur).

Products:

MasterGlenium[®] 7500
high-range water-reducing admixture

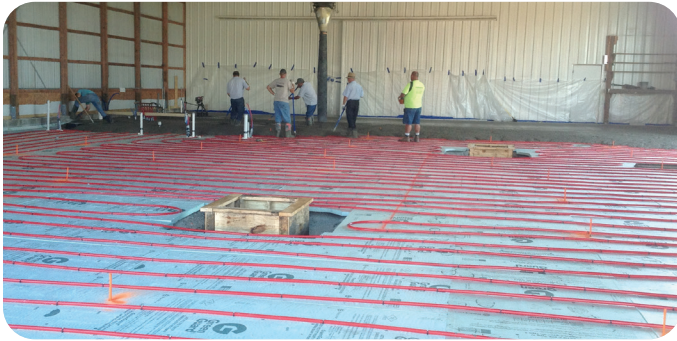
MasterSure[®] Z 60
workability-retaining admixture

MasterFiber[®] MAC Matrix
macrosynthetic fiber

MasterLife[®] CRA 007
crack-reducing admixture

Project Profile

Midwest Research Farm Laboratory Expansion



The Challenge

The requirement for radiant floor heating created two challenges. First and of most concern, there was a risk of damaging the underlying radiant floor heating system during saw cutting of contraction joints. Second, with the radiant floor heating elements in place, concrete trucks would not be able to access the placement area. As a result, the concrete would have to be pumped or placed by conveyor. Another logistical challenge was the 45-minute drive time from the batch plant to the jobsite. Due to the travel time, the concrete mixture needed to be highly workable for at least 60 minutes to facilitate consistent placement. Finally, because the slab, measuring 60 ft x 90 ft [18.3 m x 27.4 m], would not be jointed, cracking was a concern that had to be addressed to meet the expectations of Klein Farms.

The Solution

Blager Concrete and its admixture partner, Master Builders Solutions, developed a concrete solution that met the challenges of this project. Part of this solution incorporated MasterSure Z 60 workability retaining admixture that allowed the concrete to remain consistent and workable from the batch plant to the project site. To eliminate the need for joints and meet the owner's requirement, Blager Concrete and Master Builders Solutions included MasterFiber MAC Matrix macrosynthetic fiber in the concrete. Additionally, the innovative MasterLife CRA 007 crack-reducing admixture was utilized to reduce drying shrinkage and minimize the width of any cracks that might develop.

Results

The concrete was delivered to the jobsite with virtually no slump loss during transit, as expected, and placed at a very consistent slump of 7 - 9 in. [180 - 230 mm]. The compressive strength was over 5,700 psi [39.3 MPa] at 7 days and exceeded 7,000 psi [48.3] at 28 days. Within 12 hours after placement, two small, hairline cracks were noted. One hairline crack developed at a reentrant corner and the other crack, which was located in a doorway area and exposed to the sun, was believed to have been caused by thermal differential stresses. Nevertheless, neither of the crack widths exceeded 0.005 in. [127 μ m] nor did they detract from the aesthetically-pleasing floor as they were virtually invisible. The owner was pleased with the results.

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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