

Project Profile

4x4™ Concrete System

Airport Aprons and Taxiway Replacement – Philadelphia International Airport



The Chemical Company

Project: Philadelphia International Airport

Location: Philadelphia, Pennsylvania

Owner: City of Philadelphia

Concrete Producer: SJA Paving

Concrete Contractor: SJA Construction, Inc.

Requirements:

- High early strength, durable concrete
- 550 psi (3.8 MPa) flexural strength
- Air-entrained concrete

Products:

4 x 4™ Concrete System

MB-AE™ 90 air-entraining admixture

Glenium® 3030 NS high-range water-reducing admixture

Pozzolith® NC 534 accelerating admixture



Photo courtesy of Richard McMullin, Philadelphia Airport System

Background

The Philadelphia International Airport, like many airports in the United States, had concrete aprons and taxiways in need of repair. In the fall of 2002 the decision was made to repair the damaged concrete areas. The project took approximately two months to complete.

Challenge

The repairs consisted of replacing different concrete pavement sections. The construction took place in the evening to minimize disruption to the airport operations and the traveling public.

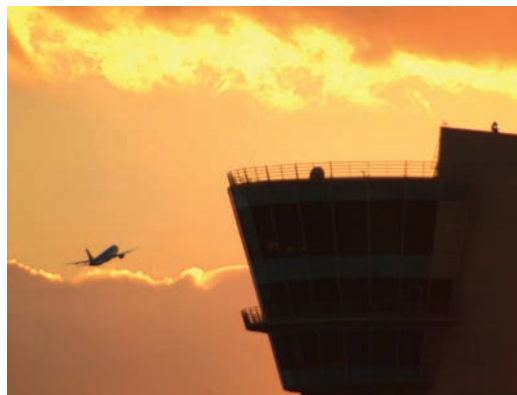


Photo courtesy of Richard McMullin, Philadelphia Airport System



Solution

To meet the challenges of repairing the apron and taxiway sections at the airport, a field trial evaluation was conducted to choose a concrete mixture that suited the needs of the contractor. Three different sets of mix proportions utilizing Glenium 3030 NS high-range water-reducing admixture and Pozzolith NC 534 accelerating admixture were evaluated to determine the best performing and most economical design. To facilitate rapid repair, a concrete mixture utilizing the 4x4 Concrete system was developed. The mixture, capable of achieving 3,500 psi (24 MPa) in eight hours, was selected and further developed by SJA Paving.

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High Early Strength Concrete Mixture Proportions

Cement Type III	800 lb/yd ³ (475 kg/m ³)
Water	275 lb/yd ³ (163 kg/m ³)
w/cm	0.34
s/a	0.35

Ambient Temperature: 80 °F (26.7 °C)

Products

- 4x4™ Concrete System
- MB-AE™ 90 air-entraining admixture
- Glenium® 3030 NS high-range water-reducing admixture
- Pozzolith® NC 534 accelerating admixture

Plastic Properties

- Slump: 7 - 8 in. (180 - 200 mm)
- Air Content: 6 - 9%



Apron Formed



Apron Placement

Project Facts and Benefits

- The concrete was mixed in a central mixer and placed at night to minimize inconvenience to airport operations
- 20 minute haul time
- Consolidation of the concrete was achieved using an internal vibrator
- Finishing was accomplished by using a truss screed

Compressive Strength

@ 7 h: 3140 psi (21.7 MPa)

@ 28 days: 6820 psi (47.0 MPa)

Flexural Strength

@ 7 h: 545 psi (3.8 MPa)

@ 28 days: 850 psi (5.9 MPa)

- The airport was opened to traffic shortly after concrete was placed
- Airport operations were minimally affected using the 4x4™ Concrete System
- 500 yd³ (382 m³) of 4x4™ Concrete was placed

More Information

For further information or assistance, contact your local sales representative.

The Admixture Systems business of BASF Construction Chemicals is a leading provider of innovative additives for specialty concrete used in the ready mix, precast, manufactured concrete products, underground construction and paving markets throughout the NAFTA region. The Company's respected Master Builders brand products are used to improve the placing, pumping, finishing, appearance and performance characteristics of concrete.

BASF Construction Chemicals, LLC Admixture Systems

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