



Project Profile

Self-Consolidating Concrete

Trump International Hotel & Tower



The mat foundation for the Trump International Hotel & Tower in Chicago measured 198 ft (60 m) in length, 60 ft (18 m) in width and 10 ft (3 m) in depth, and required approximately 5,000 yd³ (3,800 m³) of concrete. The designers opted to use self-consolidating concrete (SCC) following the successful use of this technology during construction of the Burj Khalifa building in Dubai.

Project:

Trump International Hotel & Tower –
Mat Foundation for 92-story building

Location:

Chicago, IL

Owner/s:

The Trump Organization

Concrete Producer:

The Prairie Group

Concrete Contractor:

James McHugh Construction Co.

Architect:

Skidmore, Owings & Merrill LLP

Requirements:

Compressive Strength: 10,000 psi
(69 MPa) at 56 days

Products Used:

MasterGlenium[®] 3030
high-range water reducing admixture

MasterMatrix[®] VMA 362
viscosity-modifying admixture

MasterSet[®] R 100
set-retarding admixture

Market Sector:

Ready-mixed concrete



The Requirements

The concrete temperature was limited to a maximum of 80 °F (27 °C) at the time of placement and 170 °F (77 °C) in-place. A 56-day compressive strength of 10,000 psi (69 MPa) was specified for the SCC.

The Challenge

While each of the specification requirements for the SCC could be met easily, their combination and the need for consistency in performance for this continuous placement posed a significant challenge.

The Solution

Concrete producer Prairie Material Sales, Inc. along with Master Builders Solutions, collaboratively designed a concrete mixture that would adhere to the strict specifications. Testing was conducted at the project site. The slump flow of the SCC ranged from 27 to 29 in. (680 - 740 mm), maximum concrete temperature as delivered was 72° F (22 °C), and the heat signatures show that the concrete reached a maximum temperature of 160 °F (71 °C). Over 30 ready-mixed concrete trucks from Prairie Material's Plant #32 made 600 trips to the Trump Tower site for a continuous placement of the SCC. The concrete was conveyed into place and flowed as far as 40 ft (12 m) without segregating. The mixture was extremely consistent throughout the placement, even when the trucks were backed up entering the site. An average compressive strength of 9,100 psi (63 MPa) was achieved at 7 days and the 28-day strength was well over the design 56-day strength of 10,000 psi (69 MPa).

Project Facts

- Over 30 ready-mixed concrete trucks were used making 600 trips to the site
- Placement lasted 23 hours and used 4,680 yd³ (3,580 m³) of concrete
- Over 180,000 yd³ (137,620 m³) of concrete will be used
- Project Completion Date: 2009

- The building will consist of 2.6 million ft² (241,550 m²) of gross building area, 92 stories tall, 360,000 tons
- Amenities will include 472 super luxury condos, 286 five-star luxury condos, 60,000 ft² (5,575 m²) health club and spa, grand and junior ballrooms, 90,450 ft² (8,400 m²) of boutique shopping and fine dining, restaurants, 20,000 ft² (1,860 m²) of conference center space, meeting rooms and an executive lounge, 1,000 indoor parking spaces
- Trump Tower is made from concrete instead of steel so it would fit in the space available. Concrete enables a structure to be taller without having to be wider
- Trump Tower is the second tallest building in the U.S.

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