



Beneficial Use Case Study

ACAA Wilshire Grand Center

Coal Combustion Product Type

Class F Fly Ash

Project Location

Los Angeles, California

Project Participants

Headwaters Resources (now Boral Resources), California Portland Concrete, AC Martin Partners, Thomas Properties Group LLC, Brandow & Johnston Inc., Thornton Tomasetti, Turner Construction

Project Completion Date

2016

Project Summary

Wilshire Grand Center, which opened in 2017, sits on the site of the former Hotel Statler on Wilshire Boulevard in downtown Los Angeles. Redevelopment of the site started with a deconstruction, rather than demolition, of the original hotel and the recycling of considerable volumes of both concrete and steel. Development of the 3.5-acre site involved construction of an 1100-foot-high, 73-story skyscraper—the tallest west of the Mississippi River—to house the 890-room InterContinental Los Angeles hotel, 265,000 square feet of Class A office space, and 45,000 square feet of restaurant and commercial space.

Project Description

Given the height of the building and its location within an active earthquake zone, engineers wanted to ensure the highest levels of structural support. To that end, they stipulated a continuous placement of concrete for the building's foundation with a 25% substitution of Class F fly ash in place of portland cement. Headwaters Resources (now Boral) supplied 1800 tons of fly ash to California Portland Concrete from its Pomona, California, distribution terminal that originated from power plants in Utah and Arizona. The mix was designed to achieve a compressive strength of 6000 psi in 90 days.

On the day, crews placed 21,200 cubic yards of concrete for the building's foundation—the largest concrete placement in world history to that point, as attested by Guinness World Records. The feat required a fleet of more than 200 trucks, which made 2120 trips over 19 hours to place the concrete. To mark the occasion, the USC marching band escorted the first truck to the building site. Eight batch plants—two of them ready-mix and all within 20 miles of the job site—were utilized to ensure continuity of operations. On site, 13 pumps were used to convey concrete from the trucks to the pit where the foundation was being placed.



Credit: Wilshire Grand Center.



Credit: Wilshire Grand Center.

Although the placement was carried out in the middle of February, given the size of the placement—roughly 82 million lbs. of concrete was placed to create a 17.5-foot-thick foundation—heat of hydration was a concern. While the use of 25% fly ash helped to mitigate the heat gain, engineers achieved further thermal control by pumping chilled water through 0.5-inch-diameter plastic piping for two weeks following the placement. In addition to controlling the overall heat gain of the concrete, engineers added thermal insulation to the top of the mat to keep the temperature difference between the foundation's core and its exterior to a maximum of 35 degrees.