



ACAA

# Beneficial Use Case Study

## W Philadelphia Hotel

### Coal Combustion Product Type

Fly Ash

### Project Location

Philadelphia, Pennsylvania

### Project Participants

Cope Linder, O'Donnell & Naccarato, Tudor Perini, TP Carney, Silvi Concrete

### Project Completion Date

Spring 2018

### Project Summary

The W Philadelphia Hotel, located at 1414 Chestnut Street in Philadelphia, is a 51-story, 773,500-square-foot building that, upon its opening in 2018, is the largest concrete structure in Philadelphia's history. The facility features meeting and banquet facilities, food and beverage venues, an outdoor pool bar and terrace, retail space, and parking for 171 cars.

### Project Description

To support the structure—which houses both the 295-room W Philadelphia and the 460-room Element Philadelphia Hotel—general contractor Tudor Perini teamed up with concrete contractor TP Carney and Silvi Concrete on the largest continuous concrete placement in Philadelphia's history. Upon completion, the nine-foot-thick foundation covered 20,000 square feet and contained 25.2 million pounds of concrete.

At the outset, project engineers were concerned with the potential for thermal cracking due to high core temperatures and low exterior temperatures. This eliminated the use of more

commonly used high-strength cementitious products such as slag or silica fume. Instead, fly ash was specified for its ability to slow down the hydration process, which reduces the total heat generated in the core of the concrete. Ultimately, Silvi was called upon to perform the project with less than two weeks of notice, as they were the only supplier with enough fly ash.

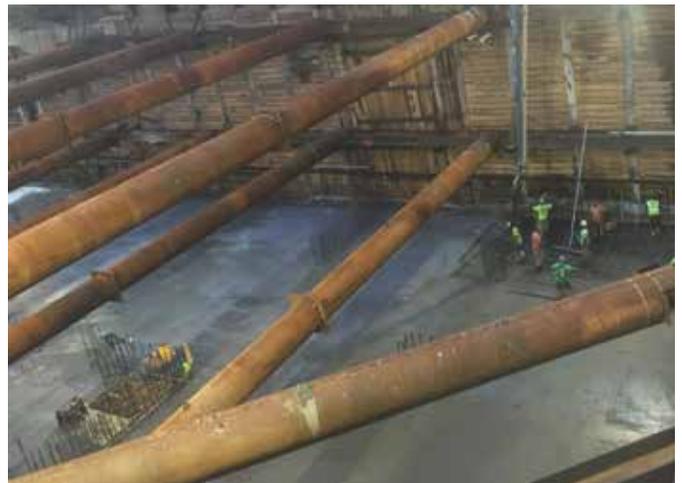
Engineers determined that the core of the slab had to be limited to 154° F. Silvi was required to create a 10,000-psi mix containing 50% fly ash (356 pounds per cubic yard) and deliver it at below 90° F in the peak of summer. To further combat concrete's natural heat-of-hydration process, Carney placed six miles of cooling tubes throughout the rebar that ran chilled water for one week following the completion of the pour.

In order to complete the monolithic placement per the engineer's specification, Silvi committed to deliver 5868 cubic yards over a 28-hour period. The company employed 136 trucks and drew on four 12-yard central mix concrete plants. Since the mix contained almost as much fly ash as it did cement, Silvi stockpiled fly ash in portable blimps for days in advance to meet the demand.

At 2 am on the day of the placement, mixer trucks began feeding four pump trucks strategically staged around the foundation, including two 53-meter pumps. The hole in the ground was 54 feet below street level and thus required very large pumps to reach all the corners of the mat foundation. The combination of narrow one-way streets and open sidewalks for pedestrian foot traffic limited the number of pumps Carney could use for the pour. With only four total pumps and two smaller pumps, which required 300 feet of hard piping, the team was limited to pouring only 205 cubic yards per hour, resulting in the unusually lengthy placement.



SOURCE: Silvi Concrete



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