



Beneficial Use Case Study

Georgia Port Authority Mobile Gantry Crane Runway

Coal Combustion Product Type

Class C fly ash

Project Location

Savannah, Georgia

Project Participants

Ceratech USA, Port of Savannah, Argos USA, Georgia Port Authority

Project Completion Date

2012

Project Summary

In 2018, the Port of Savannah handled over 3.4 million loaded twenty-foot equivalent units (TEU), the fourth-heaviest volume among all ports in North America. Massive wheeled gantry cranes are used to lift the 20-foot shipping containers on and off ships, subjecting the concrete beneath to loads of up to 123,000 lbs. In 2012, the Georgia Port Authority undertook reconstruction of a failing portion of the concrete runways that support these overhead cranes.

Project Description

Owing to the enormous loads and the heavy cargo volume that the Port of Savannah handles on a continual basis, the Georgia Port Authority specified Ceratech's Ekkomaxx cement concrete for its high early strength and rapid moisture loss, which facilitates fast-track construction processes. Ekkomaxx is a hydraulic cement producing concrete that meets or exceeds ASTM C-1157 and C-1600 requirements.

Ekkomaxx incorporates Class C fly ash to help improve the concrete's performance characteristics over many traditional cement concretes, yielding improved volume stability, corrosion resistance, scaling and sulfate resistance, and immunity to alkali silica reaction (ASR). As such, it is suited to a wide variety of concrete construction applications, including roads, bridges, aviation runways, boat ramps, building foundations, roller compacted concrete, and precast concrete products.

The Port Authority's first phase of pavement reconstruction incorporated over 48 cubic yards of Ekkomaxx concrete supplied by Argos USA's Savannah plant. Superior mechanical strengths enabled the Port Authority to eliminate steel reinforcing matting and decrease the depth of the runways to just 12 inches. The concrete produces substantially less heat than traditional cements—minimizing the potential for cracking due to thermal stresses—and eliminated the need to use supplementary heat-mitigation methods during curing.

Sustainability benefits achieved from using Ekkomaxx cement concrete in place of traditional portland cement concrete included:

- Lower CO₂ emissions (Ekkomaxx cement eliminates one ton of carbon dioxide for every ton of portland cement it displaces)
- 50% lower mix water requirements
- Crude oil savings
- Diversion of fly ash from landfills and surface impoundments

Completed in 2012, this application represented the first major cast-in-place concrete construction project of its kind in which portland cement was completely replaced by an alternative binder.



SOURCE: Ceratech USA.



SOURCE: Public Domain.