



Beneficial Use Case Study

ACAA DFW Connector

Coal Combustion Product Type

Class F Fly Ash

Project Location

Dallas, Texas

Project Participants

NorthGate Constructors (a joint venture of Kiewit Texas Construction L.P. and Zachry Construction Corporation), PB Americas Inc., Texas Department of Transportation, Parsons Brinckerhoff, Cemex, Bexar Concrete Works

Project Completion Date

2014

Project Summary

Phase one of the Dallas-Fort Worth (DFW) Connector Project was conceived by the Texas Department of Transportation (TxDOT) as a way to reduce congestion at the junction of two of the region's most heavily trafficked highways—SH 114 and SH 121—and improve access to the world's fourth-busiest airport. The 8.4-mile \$1 billion project rebuilt portions of four highways, two major interchanges, and five intersection bridges—doubling the capacity of the original highway corridor around the north entrance of DFW International Airport. The largest project funded in a single contract in TxDOT's 94-year history to that point, it was also one of the most challenging, as much of the concrete paving had to be performed on weeknights and weekends to minimize disruption to the traveling public.

Project Description

In March 2009, TxDOT selected NorthGate Constructors—a joint venture of Kiewit Texas Construction L.P. and Zachry Construction Corporation—to develop, design, build, and maintain the project. Safety, efficiency, and quality of work were the top priorities, and so the team used a design-build process that allowed for construction to begin in areas where

designs were complete while plans were simultaneously under development for other segments of the project.

Traditionally, TxDOT designs project plans before granting them to contractors, but due to the DFW Connector's size and four-year time constraint, the agency required bidders to present designs for approval. Cement and fly ash supplier Cemex helped NorthGate with its proposal by showing them how locally available materials could be used to carry out concrete paving in the most efficient manner. Ultimately, Cemex—the project's sole supplier of both fly ash and cement—would furnish the project's contractors with 26,000 tons of Class F fly ash.

TxDOT consumes approximately 150,000 to 200,000 tons of fly ash annually. The agency has traditionally relied heavily on fly ash to improve the workability, temperature control, economics, and durability (mitigating against ASR and sulfate attack) during concrete placement. For the DFW Connector Project, concrete with 25% Class F fly ash replacement was used to help produce, among other things, the longest bridge girders in TxDOT history. Bexar Concrete Works delivered precast/prestressed concrete beams measuring up to 166 feet long for the SH 114/SH 121 interchange, attaining 8200 psi strength and up to 6500 psi release strength within 16 hours.

Concrete paving operations ultimately produced 155 lane miles of new concrete pavement on main lanes, toll-managed lanes, frontage roads, and intersections. Despite the accelerated time schedule—the project was substantially completed within 45 months—more than 267,000 man-hours of paving operations were carried out during the project without recordable injury. Moreover, the project was completed without rework and the pavement achieved an average International Roughness Index score of 62—well below TxDOT's criterion of 75. In 2015, the DFW Connector Project earned a Gold Award from the American Concrete Pavement Association's Excellence in Concrete Pavements awards.



Credit: Texas Department of Transportation.



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