Manufacturing Facility Finds Perfect Solution with GCP Applied Technologies

STRUX® 90/40 synthetic macro fibres used to meet construction specifications for manufacturing facility

Project	Cedar Grove Composting Facility
Owner	Emerald Services, Inc., Seattle, WA
General Contractor	Bayley Construction, Mercer Island, WA
Engineer	Earth Tech, Vancouver, BC
Concrete Producer	Concrete Nor'West, Burlington, WA
Concrete Contractor	Olympic Concrete Finishing, Inc., Auburn, WA
GCP Solutions	STRUX® 90/40 synthetic macro fibres, ECLIPSE® Plus shrinkage reducing admixture

The Overview

The Project

As a provider of compost for agricultural purposes, Cedar Grove Composting is in the business of helping things grow. And with an increasing demand for compost, the company needed to help itself grow by building a new composting facility in Everett, Washington. Construction of the manufacturing facility involved some challenges.

"Schedule advances and labour savings made it easier to stay on track with STRUX® 90/40 versus having to instal conventional steel reinforcement."

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Jeff Toles, Bayley Construction

The Challenge

A critical component of the Cedar Grove manufacturing facility was the ability of the eight-inch (20-cm) thick slab-on-grade floor to provide the high performance needed for a busy composting operation. During the composting process, the compost sits directly on the slab which generates heat that can cause cracking. In addition, the slabs needed to withstand the stress of constant scraping and scooping from front-end loaders, along with the stress of the heavy machinery's weight

Fortunately, Mateo Ocejo, the project's Structural Engineer from Earth Tech, already had a solution. During a previous expansion of one of Cedar Grove's existing plants, Ocejo had evaluated different fibre reinforcement options and found the hard data and performance results made STRUX®90/40 synthetic macro fibre reinforcement his choice. Not only did STRUX®90/40 deliver fatigue resistance but also structural fibres to provide the necessary toughness to the concrete. The success of Cedar Grove's first expansion project confirmed his decision.

The Solution

The slabs were confidently designed with STRUX®synthetic macro fibres to meet the loading and durability requirements – while still providing the equivalent residual flexural strength to steel. This was vital since the rising cost of steel, issues over its availability and the added time required to place secondary reinforcement bars, would put the job's schedule and budget in jeopardy.

STRUX®provided a high-performance solution that enabled the manufacturing facility to be completed on time and on budget.

In addition, ECLIPSE®Plus Shrinkage Reducing Admixture was added to reduce cracking from drying shrinkage and to minimise curling.

"The use of STRUX®90/40 and Eclipse Plus for our slab-on-grade applications allowed us to maintain adequate integrity, toughness and crack control while optimising our installation schedule", said Ocejo. "These products were cost competitive when compared to a traditional reinforcing bar installation".

"I am very impressed with how well STRUX dispersed itself into our concrete mix. We did not see any balling of fibres."

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Jerry Simmons, Concrete Nor'West

The Results

Because STRUX®is dispersed throughout the concrete mix, it provides uniform performance and strength, without the clumping and balling associated with steel fibres. A total of 4,000 cubic yards (3,058 cubic metres) of concrete were treated to produce a high-performance slab-on-grade floor — with STRUX®90/40 added at 6 lbs. per cubic yard (3.5 k/cubic metre). The completed high performance slabs revealed no drying shrinkage cracks and are expected to deliver years of service under hard use.

The owner, contractor and structural engineer are all very pleased with the completed slabs. In fact, they're already looking at future manufacturing projects to incorporate STRUX®90/40 technology.

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