Power Curbers Inc., Volume 25, Issue 1

Recipient, E-Award for Excellence in Exports, US Department of Commerce

POWER CURBER PROFILES

Our Commitment Shows

TIGHT SCHEDULE POSSIBLE WITH 5700-C

ACCELERATED BRIDGE CONSTRUCTION MAKES "FAST FIX" PROJECT EVEN FASTER

The Tennessee Department of Transportation (TDOT) recently completed the *Fast Fix 8* project in Nashville, and Power Curber owner Irwin Concrete Construction was right in the middle of this high-profile job.

TDOT's goal was to replace eight aging interstate bridges along Interstate 40 through Nashville using a process called Accelerated Bridge Construction (ABC), which uses fast-paced, around-the-clock work to limit road closures and speed up bridge completion,

impacting surrounding communities as little as possible.

The Federal Highway Administration, a division of the US DOT, estimates that approximately 25% of bridges in the US are in need of rehabilitation, repair, or replacement and are "structurally deficient." The bridges over Charlotte Avenue, Jo Johnston Avenue, Clinton Street, and Herman Street in downtown Nashville were built in 1968 and in 2013, chunks of concrete began falling from the Charlotte Avenue overpass, causing road closures and concerns about the safety of the downtown bridges.

The *Fast Fix* project was scheduled for 13 nonconsecutive weekends, where both directions of I-40 were closed from the I-40/I-65 split west of downtown to the split south of downtown every weekend to allow crews complete access to replace each bridge.

The interstate would close on Friday night after rush hour, when crews would begin demolishing the existing bridge. Working around the clock, new beams and precast bridge deck sections were installed and temporary precast barrier and parapet walls were put in place. The bridge would reopen to traffic in time for Monday morning commuter traffic.

"Coordinating with all parties and having the interstate opened to traffic on Monday at 6 am was the biggest challenge," said Lia Obaid, TDOT Construction Assistant Director.

The following weekend, or sometimes overnight during the week, the final finishing would be done to the bridge, including slipforming the permanent barrier and parapet walls. That's where Irwin's team came in, joining their first ABC project.

"If you can go in there and demolish a bridge and put it back and have traffic back on it in 48 hours, you're doing a pretty big thing," said Irwin's superintendent Stonie Garton.

Irwin's crew poured approximately 3,000 feet of 35" side parapet and 32" median barrier for the newly-constructed bridges with their 5700-C.

"It was a really fast-paced and accelerated job," said Garton. "You have no choice but to stay on schedule. There is no option to not finish on time at any phase of the project. We had some weather challenges but there was no room for failure at all."

With good planning and a lot of hard work from groups like Irwin's, the $62-million Fast Fix project was completed in only 6 months with only 10 weekend closures instead of 13, which put the project 7 months ahead of schedule.

"We received very positive feedback from the road users, communities, and businesses," TDOT's Obaid said. "Without the use of ABC, this project would have taken at least 2 years or more."

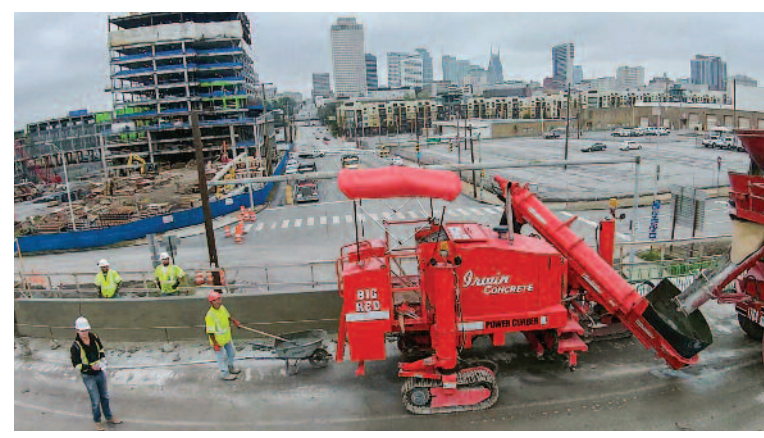
Advances in roadbuilding technology, including slipformed barrier, have changed the way DOTs approach large-scale projects. "It improves site constructability, total project delivery time, and work-zone safety," says Obaid.

As for the Irwin team, being part of such a tightly scheduled project meant there was no room for machine breakdowns on the job.

"The machine performed perfectly," said Garton. "There was never any issue with the machine and production and what we knew we could get done at any point in that job. The machine was the least of our worries!"

> **Without the Power Curber we would never have been able to meet such tight deadlines.**

"Without the Power Curber we would never have been able to meet such tight deadlines. The job would have been impossible if we'd had to handform all those walls," he said.



Working in the shadow of downtown Nashville, the Irwin team works on the Interstate 40 bridge over Charlotte Avenue.

Irwin's crew poured approximately 3,000 feet of barrier and parapet on I-40, southwest of Nashville.

The Irwin crew poured 35" side parapet and 32" median barrier on the newly constructed bridges.

Work continued around the clock on TDOT's "Fast Fix 8" project.

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HIGH SPEED RAIL THROUGH THE DESERT

SPANISH CONTRACTOR BRINGS RAILWAY EXPERIENCE TO MIDDLE EAST

With mass transit in higher demand worldwide to ease traffic congestion for commuters and tourists alike, the Saudi Railways Organization's plan for a high-speed rail system will address the needs of Saudi Arabian residents as well as the millions of pilgrims who visit the country each year.

The Haramain High Speed Rail project, also known as the Western Railway, will stretch 281.5 miles (453 km) from Mecca to Medina, and is expected to carry 3 million passengers per year.

The first phase of the project, the construction of the train stations, began in 2009. Stops along the high speed rail's path will include Medina at the north end, King Abdullah Economic City in Rabigh, King Abdulaziz International Airport, Jeddah, and Mecca at the southern terminus.

Spanish contractor OHL is part of the Al Shoula Consortium, a group of 2 Saudi Arabian and 12 Spanish companies, responsible for Phase 2 of the job, which covers constructing the railbed and tracks, installing electrical and other utilities, signaling, and the trains themselves. The cost of the project was estimated at $9.4 billion US (6.736 EUR).

OHL purchased two Power Paver SF-1700 pavers and a Power Curber 5700-C-MAX to meet the strict requirements and tolerances for the railbed part of the project.

Most rail construction involves the use of ballast, typically a thick layer of jagged gravel, to help drain water away from the rails and also to bear the load exerted upon the railroad ties, also called sleepers.

With train speeds up to 200 miles per hour (320 km/hr) combined with the harsh weather conditions in the Saudi desert and concerns that sand and high winds could collapse a conventional aggregate base, the decision was made to slipform a concrete base to install the sleepers on.

OHL used their SF-1700 to pave the first layer of the concrete base.

"The slab was 3.6 m (12 ft) wide and the average depth was 30 cm (11.8 in)," said OHL Project Engineer Andres Arriazu.

The slab had a variable cross-slope to accommodate the curves in the tracks.

"In the curves, the depth was increased to 60 cm (23.6 in) on one side," Arriazu said.

They averaged 700 linear meters (2,297 ft) per day when pouring the base, with a 2 mm (0.08 in) window of accuracy.

Precast concrete sleepers, 2.8 m (9.2 ft) long and weighing 300 kg (661.5 lbs), were then mounted on reinforcing steel on top of the slipformed base. The rails were then attached to the sleepers using laser-guided instruments and alignment to place the rails with +/- 1 millimeter per meter precision.

Concrete was then poured around the sleepers to form the second layer of the base.

OHL was also responsible for installing utility channels that can be used to house electrical lines and signal track cables needed to operate the rail system. They used their 5700-C-MAX to pour the channels adjacent to the concrete base.

In some sections of the job, the 5700-C-MAX ran on top of the base slab to slipform the cable ducts, using stringline guidance set off the side of the slab.

In other areas, the utility channels were poured after the rails were in place. For those sections, the 5700-C-MAX was locked onto the rails with specially-engineered clamps and wheels that allowed the polyurethane tracks to ride on top of the rail. The rails were so accurately placed that the machine simply followed the rails and didn't require stringline to control steering or grade.

The utility channel was poured at an average rate of 1,000 linear meters (3,281 ft) per day, with the highest production day resulting in 1,400 m (4,593 ft) poured.

Once the utility lines are installed in the channel, precast covers will be placed into the grooved tops to close the channels and prevent sand from entering.

With temperatures in the Saudi desert ranging from 0° C (32° F) to 50° C (120° F), special care had to be taken to ensure that the concrete would withstand rapid climate changes.

"The temperature affects the concrete during pouring and curing," said Arriazu. "For this reason, plasticizers and concrete retarders were added to the mix. Once the concrete was dry, we applied a curing compound to avoid water evaporation."

This electrified double-track line is expected to transport 11,000-13,000 passengers during rush hours using 35 Talgo Class 102 and 112 Series trains. Each train will have the capacity for over 450 passengers.

Traveling the 78 km (48 mi) from Jeddah to Mecca will take less than half an hour. The 410 km (250 mi) between Jeddah and Medina will only take about 2 hours.

The concrete track slab and cable ducts have been completed. The railway is scheduled to open by the end of 2016.

1. *The Haramain High Speed Rail project will stretch 281.5 miles (453 km) from Medina to Mecca in Saudi Arabia.*
2. *A concrete slipformed base was used instead of traditional rock ballast to withstand the high winds and blowing sands of the Saudi desert.*
3. *OHL used their Power Paver SF-1700 to pour the concrete base for the railbed.*
4. *The concrete base will help drain water from the rails and help bear the load of the 200 mile-per-hour (320 km/hr) high-speed trains.*
5. *Concrete sleepers, or railroad ties, were installed to hold the metal rails.*
6. *The rails were precisely placed on top of the concrete sleepers.*
7. *OHL poured cable channels adjacent to the base layer to contain electrical lines for powering the rail system.*
8. *Precast covers are placed into the tops of the channels to close them and prevent sand from entering.*
9. *The polyurethane pads allowed the C-MAX to travel directly on top of the rails.*
10. *Custom-engineered clamps and wheels locked the machine onto the rails.*
11. *The accurate placement of the rails allowed the 5700-C-MAX to follow the rails while pouring the utility channel without the need for stringline.*
12. *The 5700-C-MAX poured the channel at an average speed of 1,000 m (3,281 ft) per day.*

MILLIMETER GPS HELPING REBUILD IN JAPAN

SEAWALL PROJECT PART OF RECONSTRUCTION AFTER TSUNAMI

In March 2011, the 9.0 magnitude earthquake that struck 70 km (43 mi) off the eastern coast of Japan triggered massive tsunami waves of up to 40.5 m (133 ft) high that traveled up to 10 km (6 mi) inland in places.

The small town of Shinchi in Fukushima Prefecture was devastated by the tsunami. Half of the town, 577 homes, were destroyed or swept out to sea and 116 residents were killed.

To protect the town against future flooding disasters, a large seawall is being built along the coast in Shinchi.

Koyanagawa Company Limited, a longtime Power Curber customer, used their 5700-C-MAX to pour the unique profile using the Topcon Millimeter GPS stringless machine controls.

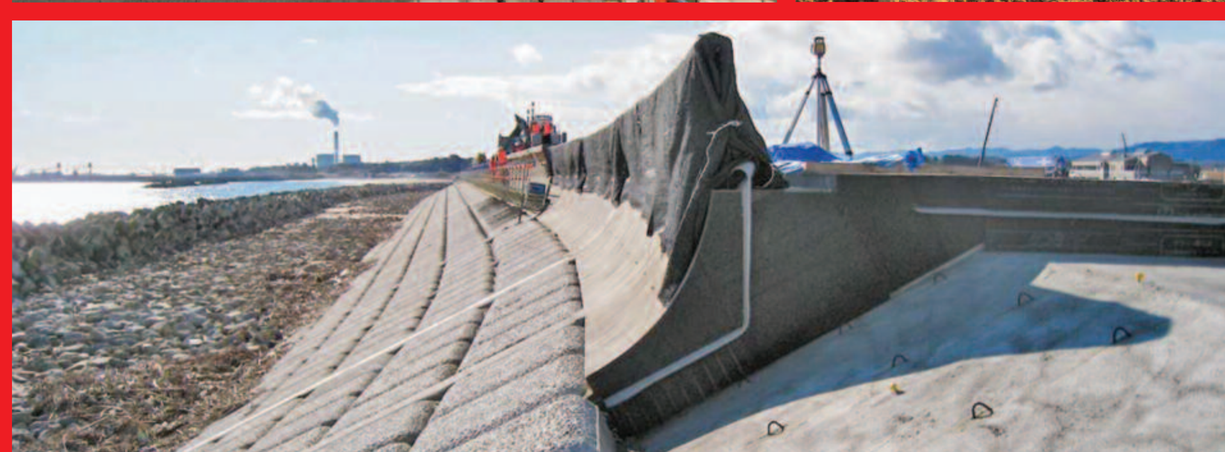
This stage of the Shinchi reconstruction project consists of a 480 meter (1,575 ft) length of wall, 1.1 meters (3 ft 7 in) high, located 40 feet (12 m) above sea level.

The main contractor on the project poured the concrete base and laid concrete slabs on the angled sides of the base. Koyanagawa's crew then poured the sloped seawall over a curved steel cage.

The inverted slope of the seaward face of the structure combined with its placement above sea level will help prevent large waves from cresting over the top of the wall.

The Koyanagawa crew used a proprietary method to ensure that the integrity of the extreme slope was maintained immediately after slipforming.

Later phases of the project will include additional protective seawalls as housing in the area is rebuilt.



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150 EXTRUDER

SPOTLIGHT

Location: State of Franklin Rd at Sunset Dr., Johnson City, TN

Customer: Summers-Taylor Inc., Elizabethton, TN

Project: Parking lot islands for new supermarket

Application: 4,600 linear feet (1,402 m) of perimeter curb and 3,200 linear feet (975 m) of islands, all poured on top of asphalt grade

Specifications: Curb base – 7.5" (19 cm) wide, curb top – 4" (10 cm) wide, curb height – 7.5" (19 cm) tall

Average pouring speed: 20 feet per minute

Advantages of the 150 extruder: "We love the Honda engine and the light weight of the machine. Hills, up and down, are easier to do. The mold is easy to change and you can run the face of the curb on the edge of the pavement without worrying about the machine losing balance." -Lee Thompson, Concrete Specialist at Summers-Taylor Inc.

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SIMPLE AS ABC

Full Story