



# Firmly Planted

Precast concrete provides the perfect solution for a project involving a tight schedule and a tight squeeze at Navy Pier.

By Shari Held



Boasting nearly 9 million visitors annually, Chicago's Navy Pier is one of the Midwest's top attractions. It's home to Pier Park, the Children's Museum, the Pepsi Skyline Stage and a wide variety of shops and restaurants. Soon, thanks to the installation of 59 massive precast concrete tree pits along the South Dock, Navy Pier's only going to get better. The precast concrete work is part of a \$115 million-plus renovation designed to give the space a more "green," contemporary look.

"We're going to elevate the pier to become a world-class destination," said Navy Pier Communications Director Nick Shields. "Once our renovation is complete, visitors could potentially increase by 2.5 million."

Phase 1 of the overall project is slated for completion in time for Navy Pier's centennial anniversary celebration in 2016. Areas targeted for renovation during this phase include the public spaces at South Dock, Pier Park and East End.

"This is something that's very important to us," Shields said. "We're already in Phase 1 of our reimagining of the pier, which involves renovating the South Dock, our main walkway."

As visitors stroll along South Dock, their experience will be enhanced by the addition of rows of mature shade trees. Approximately 200 mature trees and other greenery will be planted to make the area more attractive and eco-friendly. The work it took to make this happen will likely be an afterthought for them.

But Leo Schlosberg, principal of Woodstock, Illinois' Cary Concrete Products and Mark Wieser, vice president of Wieser Concrete Products in Maiden Rock, Wisconsin, know what it took.

## Hammering out the design details

Schlosberg initially heard about the job from general contractor Madison Evans Construction Group and contacted Wieser based on prior successful collaborations and Wieser Concrete's significant experience with both large and custom projects.

"We've done a lot of work with Cary Concrete over the years," Wieser said. "Leo goes out and finds projects – a lot of times unique ones – and then he'll come to us to produce them."

The original design called for tree pits created in multiple pieces, requiring many difficult field measurements. It also specified a combination of precast and structural steel. The companies also had to contend with a tight window of time between when the trees could be planted and when South Dock needed to open for peak tourist season.

By the time Schlosberg bid on the job, Madison Evans had dropped structural steel in favor of a 100% precast solution.

"Going with all precast was quicker and more cost-effective," Wieser said. "It also involved less on-site labor."

In addition, design specifications were reduced to the basics – the number and overall size of each of the pits, the dimensions and thickness of the precast concrete, and the constraints – making the project more like design-build work. Still, the job was complex. Nothing was standard, leaving Wieser and Schlosberg with the task of how to manufacture the tree pits.

Issues of size and weight were integral to their decision process. There were eight different sizes of tree pits. Producing the largest pit, which was 28 ft long, as one piece would require non-standard shipping. This would also add to the cost of the project. Additionally, Wieser and Schlosberg weren't sure the pier could support the combined weight of an oversized delivery truck, tree pits weighing up to 34 tons and a large crane to position the pits in their permanent home.



“What we did was design the tree pits so they could be produced in two pieces and bolted together on site so we could get them there,” Wieser said.

Schlosberg presented their plan to the general contractor and it was accepted. Now, their race against the clock began.

## Repositioning the drain

After the contract was awarded, Schlosberg, who has years of experience working in landscape construction, modified the original drainage system details to provide a healthy environment for each of the largest tree pits. The root balls of the mature trees measured more than 7 ft in diameter. In addition to proper drainage, they need plenty of soil and air to thrive. The contract showed a drain in the corner. That location would require up to 3.5 in. of slope, making the floor of the opposite corner about 9.5 in. thick.

“That’s wasting concrete and taking up room from the tree,” Schlosberg said.

“We wanted to make it so the water would drain with minimal impact on floor thickness and have it be efficient and simple for forming, production and in the field.”

Schlosberg’s solution was to have the pit drain across the shortest dimension. Both halves drain to a small flat spot in the center of the long, or joint, side. One of the halves gets an 8-in. blockout that allows a drain body to be easily installed in the field. The other half remains flat with no blockout.

## Creating the prototype

Wieser’s piece of the puzzle was designing the mold and determining how to assemble the joint and the connections.

Wieser Concrete’s form fabrication division used a modified box

culvert mold and cast it upside down to create each half of the tree pit. The molds have a tongue-and-groove detail. If off just a fraction, they wouldn’t fit together properly. As a result, they were manufactured to very tight tolerances.

The main concern was how to seal the two pieces together since one specification was that the tree pits needed to be watertight. Wieser considered several options while working on the drawings but decided on a joint with a keyway. A compressible sealant, standard for manholes and culverts, was used to seal the joint.

“It was the best solution to lock the pieces together and make the pit watertight,” Wieser said.

As soon as the first few pieces were completed, Wieser Concrete assembled them in the shop to demonstrate how the two halves would fit together, easing everyone’s concerns.

To meet the tight schedule, Wieser employees worked two overtime shifts, producing up to four pieces per day. Between March 18 and April 11, the company delivered 31 tree pits.

## Challenging logistics

Getting the pieces delivered was one of the biggest challenges of the project. But that was just part of the issue.

A residential tower located across the street from South Dock required compliance with noise ordinances. No work – including deliveries – could begin until 8 a.m., which meant the delivery trucks had to battle downtown Chicago’s rush-hour traffic.

Once the trucks arrived, they had to stick to a limited pathway obstructed by the large holes cut into the pavement to accommodate the tree pits. This left very little space for staging.

“We had to work closely with the general contractor to get this done,” Schlosberg said. “From my perspective, they were a very

fine, cooperative group and easy to work with. And I think from their perspective both Cary Concrete and Wieser Concrete gave them good service."

### Enjoying success

The final challenge was assembling the tree pits on site. The rectangular openings in the pavement of the dock went all the way down to the steel beams that form the structure of the pier. Steel baskets were placed on these beams. Each half of the tree pit needed to be placed into the appropriate basket and then assembled.

There was very little clearance between the outside of the precast and the steel basket. Positioning the first half was the easy part. Positioning the second half to ensure workers could apply the sealant, slide the two pieces together and bolt them with the keyway fitting was where it got tricky. That's where taking the time to assemble the first few pieces in the plant paid off.

"If we'd first learned there was a problem when they tried to install it in the field, it would have been a disaster," Schlosberg said.

Assembly for each tree pit took only about 30 minutes. "They actually got installed more quickly than I expected," Schlosberg added. "It went in very nicely. Wieser Concrete located the lifting points and installed the lifters with precision, so the pieces hung plum. It made a lot of people happy that it went together so nicely."

All that remained was planting the trees, adding a steel plate over the tree pit and grating around the tree trunks. Visitors to Navy Pier can now enjoy the space's new "green spine."

"It's really rare in this business that something goes better than you expect," Schlosberg said. "It was a very aggressive schedule, but we were able to pull it off." **PS**

*Shari Held is an Indianapolis, Indiana-based freelance writer who has covered the construction industry for more than 10 years.*

All photos courtesy of Leo Schlosberg.



The installation of 59 massive precast concrete tree pits helps enhance the visitor experience at Chicago's Navy Pier.