

# Precast Aids in Smooth Cruising

Constructing precast concrete parking structures at one of the nation's busiest cruise-terminal ports offers benefits that aid economics, schedule, and other goals

— Craig A. Shutt



Port Canaveral, Fla., already the third busiest port in the world for cruise-passenger traffic, continues to expand its services to serve more cruise ships. Precast concrete parking structures are helping to relieve congestion and facilitate the logistics of handling thousands of arriving and departing passengers on the same days. Photo: AeroPhoto.

Already the third busiest port in the world for cruise-passenger traffic, Port Canaveral, Fla., continues to expand its operation to serve more customers on bigger ships. As the number of terminals grows, there also is a growing need for support facilities, especially parking structures to facilitate smooth movement of passengers to and from the ships. Completing these projects on fast-track schedules without disrupting passenger traffic creates major challenges that precast concrete structural systems can meet.

The port features six operational cruise terminals, plus several others being phased out or under renovation and not in service. It also contains

four parking structures to support the terminals, including one just completed and another underway.

The port, along Florida's eastern "Space Coast," has completed other projects recently, including a \$7.8-million enlargement of its basin for larger ships and a \$25-million expansion of its south side with a 22,000-square-foot, seven-story Exploration Tower. The port served 4 million cruise passengers in 2015, and that number is expected to double by 2020.

"We develop our plans based on the needs of the cruise lines, and with the anticipated growth, we are going to be building more terminals and parking structures in the coming years," says Dave Perley, senior direc-

tor of port construction and infrastructure. The projects continue to expand in scope, he notes. The most recent precast concrete parking structure, still being constructed, was planned for 750 cars, but it was expanded after they found that the just-completed 1,000-car structure already was over capacity.

## Newest Parking Structure

The recently completed four-level structure serves the new Cruise Terminal One and was designed and built by the design-build team of Ivey's Construction and Finfrock. It features passenger drop-off and baggage-handling services on the first level, with

parking spaces on the second floor up. “That was a concept suggested by the design-build team during the planning stage,” says Perley.

The structure consists of a precast concrete structural system (total precast), including double tees, columns, beams, shear walls, litewalls, stairs, and other components. The 433,764-square-foot project was constructed, along with the new terminal, in less than 12 months to serve the Royal Caribbean line.

The parking structure has five 60-foot-wide bays on a 360-foot-long footprint. Two crews were used to erect the structure to shorten the schedule and keep it off the critical path of construction for the terminal being built next to it. Working on the site required the authority to review how best to maintain traffic and control security with the port’s own security, local police, Department of Homeland Security, and the Coast Guard, Perley notes. “We need the off-site construction and just-in-time delivery system that precast concrete provides because we have no storage space on the site. We’re too tight.”

### Earlier Parking Structure

Prior to building Cruise Terminal One, the port had selected the design-build team for the Cruise Terminal Six parking structure, designed for 750 cars with retail space on the first floor for passengers and crew to purchase last-minute items before heading on their cruise.

In this case, the design-build proposal offered parking consulting, design, and precast concrete manufacturing with a reconfigured footprint from the criteria documents. Finrock served as architect of record, structural engineer of record, design-build contractor, and parking consultant for Ivey’s Construction.

“We provided the only proposal with a path to meet the owner’s budget while still maintaining the required amenities package, which included a drop-off area, employee lounge, and retail shops for employees and cruise patrons,” says Dan Helmick, executive vice president of project development at Finrock. They also allowed the option of expanding the structure on one side if needed.

Retail space on the first floor currently consists of a crew-oriented market. “Crews typically don’t have much



*Cruise Terminal, which was recently completed, features passenger drop-off and baggage-handling services on the first level, with parking spaces on the second floor up. The 433,764-square-foot project was constructed, along with the new terminal, in less than 12 months to serve the Royal Caribbean line. Photo: Finrock.*

## PROJECT SPOTLIGHT

### Terminal One Parking Structure

**Location:** Port Canaveral, Fla.

**Project Type:** Parking structure

**Size:** 433,764 square feet

**Design-Build Team:** Ivey’s Construction, Merritt Island, Fla., and Finrock, Apopka, Fla.

**Owner:** Canaveral Port Authority, Port Canaveral, Fla.

**PCI-Certified Precaster:** Finrock, Apopka, Fla.

**Precast Components:** Double tees, columns, beams, shear walls, spandrels, stairs

time to pick up supplies and sundries between cruises, so the store works out well for them,” Perley says. Additional stores also are planned. The retail spaces are located on the first floor near the disembarking stations. All levels have higher ceilings than are typical for parking structures, he notes, to accommodate so many cars with luggage racks on top.

### Design-Build Preferred

The authority typically uses design-build packages for the parking structures, he notes. “We give the teams the initial concept and design criteria but try not to get too precise with our requirements to allow them to innovate. They are always coming up with new ways to skin the cat, and we want to leave it to them to decide how to create the most efficient design.”

A variety of factors are weighed to find the best option for the port’s needs in each case, he explains. “We

like to keep up with what the industry is doing while remaining flexible. As a government agency, it often comes down to price, but we look at the most efficient design for the price so we can get the best value, even if it’s not the lowest cost.”

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On occasion, construction teams propose steel parking structures, he notes. “But schedule and cost, along with maintenance, usually steer the projects to precast concrete. That really gives us the best bang for the buck.”





Precast concrete spandrels had the terminal's blue logo cast into them, after which they were painted to create a dimensional appearance. Photo: Finfrock.

### Congestion Proves Challenging

"The biggest challenge is working around an operational cruise terminal," says Helmick. "The port is very conscious of the passengers' experience and doesn't want construction to interfere in any way or have an effect on them." That goal creates challenges on "ship days," the days the cruise ships come into port to disembark passengers and take on a new group.

"It's always a challenge to work around active terminals," says Perley. On the most recent project, the work progressed next door to an existing terminal, where on ship days 4,000 passengers were disembarking while another 4,000 were arriving to go aboard in an eight-hour period. "It creates a lot of traffic and can become very difficult."

To facilitate deliveries and coordinate schedules especially on ship days, the precaster created a software program called Piece Tracker. The product-management program tracks each piece through the system. "It's a lot like FedEx, tracking each piece from design through production, storage, loading, and shipping," explains Helmick. "We can ship directly to the hook to minimize truck traffic and overshipping."

The system also lets the precaster schedule around ship days to minimize deliveries on those days and they are coordinated closely. "It gives us a very detailed, piece-by-piece system coordinated with dates for erection rather than general delivery times in hopes that we can avoid ship days."



Spandrels with the port's logo cast into them are shown. Two crews were used to shorten the schedule and keep it off the critical path of construction for the terminal being built. Photo: Canaveral Port Authority.



Design-build packages are typically used for the parking structures, allowing bidders to use their most innovative techniques and custom expertise to create the most efficient system. Photo: Finfrock.

It's a more surgical approach that creates more efficiency." Finrock's vertically integrated process, acting as architect, engineer, and contractor, gave them more control over the process, he notes.

### Corrosion-Prevention Plan

The port's site along the Atlantic Ocean in a hurricane zone also required special attention. The precaster used a customized corrosion-prevention plan, including stainless-steel and galvanized plates. Connections were reinforced to meet the area's stringent requirements for wind loads.

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"The area's code requirements are very high and pretty prescriptive," says Helmick. "But they're not much different from the rest of Florida, and we do a lot of projects here. So they weren't anything out of the ordinary for being on the coast." Adds Perley, "We factored that into the design approach and used the specific connections we needed, but they weren't unusual."

The structure has a complementary finish to the other parking garages and terminals, featuring a smooth gray concrete that was painted with a sandy, textured elastomeric paint. "We try to keep the finishes basic and maintenance free," Perley explains. The precaster was able to incorporate the port's distinctive, stylized-wave logo, into the parking structure which was cast into the spandrels on the upper level and painted blue.

### More in the Future

Additional parking structures are planned for the future as the terminals expand. One terminal expansion is underway, scheduled for completion in May, when another renovation will begin for completion in November. Those are being expanded to accommodate the arrival in November of the Norwegian Epic, the third-largest cruise ship in the world with 4,100 passengers, and Royal Caribbean's Oasis of the Seas, the largest cruise

## PROJECT SPOTLIGHT

### Terminal Six Parking Structure

**Location:** Port Canaveral, Fla.

**Project Type:** Parking structure

**Size:** 274,543 square feet

**Design-Build Team:** Ivey's Construction, Merritt Island, Fla., and Finrock, Apopka, Fla.

**Owner:** Canaveral Port Authority, Port Canaveral, Fla.

**PCI-Certified Precaster:** Finrock, Apopka, Fla.

**Precast Components:** Double tees, columns, beams, shear walls, spandrels, stairs




Five 60-foot-wide bays on a 360-foot-long footprint were used for Cruise Terminal One.

ship in the world, carrying 6,000 passengers (and 2,400 crew members).

"We have been very successful with our projects and meeting our schedules," says Perley. "Our only regret is that we don't think big enough. It seems that every time we finish a parking structure, we decide it isn't big enough."

Those parking structures, as de-

signed, no doubt will be constructed with precast concrete, he says. "The ability to bring the precast concrete components directly to the site and go truck to hook keeps everything moving and gets it all into place quickly. Those trucks move through here quickly and are gone again." 

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