Juneau, Alaska

Cruise Ship Terminal Concrete Pontoons

CLIENT
Concrete Technology Corporation
Tacoma, Washington

REFERENCE
Rob Easley
Senior Project Manager

PROJECT FEATURES
- Design and construction of two concrete pontoons on a design-build basis
- South berth concrete pontoon is 300 feet long, 50 feet wide, and 20 feet deep
- North berth concrete pontoon is 400 feet long, 50 feet wide, and 20 feet deep
- 8.5-foot freeboard
- Tidal variations up to 30 feet
- Pontoon access by a 140-foot-long transfer bridge
- Open-ocean tow from Tacoma to Juneau

SERVICES BY BergerABAM
- Structural Engineering
- Construction Support

CONSTRUCTION COST
$53.7 million (total project cost)
$12.6 million (concrete pontoons only)

PROJECT DATES
2014 to Present

KEY STAFF
Elmer Ozolin
Manfred Zinserling
Markus Wernli
Bob Harn
Yeliz Firat
Iman Ghorbani

Each pontoon will be held in place by mooring dolphins and accessed from an approach dock by a 140-foot-long transfer bridge. (Photo courtesy of Manson Construction Co.)

As part of the cruise ship terminal improvement project, two concrete pontoons were installed to facilitate simultaneous berthing of one 1,000- and one 1,100-foot-long cruise ship for the City of Juneau. BergerABAM supported the pontoon fabricator, Concrete Technology Corporation (CTC), with the design of the pontoons. The pontoons serve as passenger loading/unloading platforms between the cruise ships and land by enabling operations during tidal variations up to 30 feet without the need for special equipment or measures. Each pontoon is accessed via a transfer bridge designed by the owner. The transfer bridge is supported on a landing platform that is attached to the pontoon hull at a highly eccentric location with respect to the pontoon center of buoyancy.

Numerous fittings to be incorporated into the pontoon walls and deck, and stringent strength requirements at these connections, led to special design of relevant segments. Design of hull plating and the embedments at the bridge landing connections and mooring frame connections was a major challenge. High-strength anchor rods at bridge landing connections were incorporated into the deck by designing cast-in-place deck segments with special reinforcement. The pontoon walls were strengthened at mooring frame locations through wide flange beams. For the 100- and 50-ton mooring/towing bollards, cast-in-place deck segments were designed to transfer the load to the adjacent precast deck panels. In an effort to minimize anticipated constructability issues, a series of experiments were conducted for optimizing the deck connection details for guardrails designed to resist AASHTO-defined truck loads.

BergerABAM also provided recommendations on maximum wave heights that would not overstress the pontoons during the open-ocean delivery voyage of approximately 1,000 nautical miles.

BergerABAM's extensive design experience and long history working with CTC on the construction of floating concrete structures resulted in a cost-effective and efficient design for the concrete pontoons.