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Segmental Precast Floating Draw Span

Purdue ECT Team
Purdue University, ectinfo@ecn.purdue.edu

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SEGMENTAL PRECAST FLOATING DRAW SPAN

THE NEED

In order to make the Ford Island as the site of new housing and administrative facilities for U.S. Navy's Pearl Harbor Naval Base Hawaii, the Navy preferred a low profile bridge to the island that would not obscure the setting of memorial and the experience of its many visitors, while at the same time providing a convenient vehicle crossing. Although the traffic of large ships is infrequent, only a few times a year, the bridge should provide a wide navigation channel that allows the large ships to travel around Ford Island.

**FIGURE 1 THE FLOATING SECTION OF ADMIRAL CLAREY BRIDGE IS
BEING RETRACTED UNDER FIXED BRIDGE SPAN**

THE TECHNOLOGY

To meet the requirements, the Navy built a bridge which was named after a decorated World War II submarine commander, Admiral Bernard "Chick" Clarey. The prime designer of the bridge was Parsons Brinckerhoff Quade & Douglas, Inc. and the contractor was a joint venture Dillingham-Manson.

The Admiral Clarey Bridge, includes a 100 ft long causeway, a 400 ft long fixed trestle and a 1035 ft long moveable section that includes the transition and floating drawspan. The fixed spans include a low level section as well as a high level section to allow a small boat channel. As the small boat channel is the high point of the bridge, it is also the location of the control house for moveable span.

The moveable span is designed to be opened or closed within a 25-minute period. This is accomplished by stopping traffic with traffic lights and lowering traffic gates, backed up by traffic barrier gates. The two transition spans are then raised hydraulically and the drawspan is withdrawn or extended using hydraulically powered winches.

FIGURE 2 PRINCIPLE OF SEGMENTAL PRECAST FLOATING DRAW SPAN

The pontoon moves through the water at a speed of 14 inches per second. When withdrawn, the pontoon slides under six of the fixed approach spans, and for those spans, straddle type pier bents with transversely post-tensioned caps are used.

The drawspan is made up of three 310 ft long floating concrete modules, bolted together to provide a 930 long unit. The pontoon modules were constructed using a mixture of precast and cast-in-place concrete. Each module is divided into 21 watertight cells by longitudinal and transverse bulkheads. The pontoon walls and diaphragms are precast and the remainder of the pontoon is made of cast-in-place concrete. Pontoons were produced in Concrete Technology Corporation, Tacoma, Washington, and integrated at the site into one continuous floating bridge pontoon.

THE BENEFITS

- The Admiral Clarey Bridge, a low profile bridge, reserves views of the historic harbor while, with its floating drawspan, permitting the passage of large ships.
- Floating structures, with a modular and repetitive configuration, provide the classic precasting opportunity for multiple reuses of the concrete formwork. This will reduce forming costs, produce nearly identical finished pieces, smooth surfaces, and easy fit-up and assembly.

- The method of combining precast and cast-in-place techniques allows an opportunity to compress the construction schedule.

STATUS

The Admiral Clarey Bridge is one of the five floating bridges in the world. Concrete Technology Corporation, as the precast concrete manufacturer for pontoons in this bridge project, has been built several floating structures since 1976 and the structures have been used as barge loading docks, ferry terminals, breakwaters, floating dolphins, boathouses, fuel floats, bridge and sinkable caisson. The construction of floats has been variously hollow or foam filled, cast in place or precast segmental, and post-tensioned or conventionally reinforced.

BARRIERS

For a busy navigation channel, the operation of floating drawspan could be uneconomic since the opening or closing time of this moveable span is considerably too long (25 minutes for 650 feet).

POINTS OF CONTACT

Michael J. Abrahams, Parson Brinckerhoff

Tel: (212) 465-5185, Fax: (212) 465-5575, Email: abrahams@pbworld.com

Gary Wilson, Marine & Heavy Construction

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REVIEWERS

Peer reviewed as an emerging construction technology

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