

Commercial Boat Pier C-1

This precast prestressed concrete commercial boat pier, with 51 boat slips, was built for docking 40 to 55 ft (12.2 to 16.8 m) long fishing boats. It is located in a picturesque part of Pass Christian Harbor, Pass Christian, Mississippi.

The 416 ft (127 m) long main pier consists of 52 spans, each 16 ft (4.9 m) long.

A major design feature of the pier is its flexible connections. These connections are designed to prevent stress concentrations due to hurricane wave action and tidal surges, and from shock caused by impact from heavy commercial fishing vessels.

The structure utilizes 158 precast prestressed concrete components comprising deck channel sections, finger pier slabs, piles and pile caps with the following characteristics:

Deck channel sections (52)		48 in. wide x 16 in. deep x 16 ft long
Finger pier slabs (25)		24 in. wide x 6 in. deep x 12 ft long
Square piles (54)		12 x 12 in. cross section x 40 ft long
Pile caps (27)		16 x 16 in. cross section x 12 ft long

Note: 1 ft = 0.305 m; 1 in. = 25.4 mm.

The use of precast prestressed channel sections permitted spanning each berth without the intermediate bents required on economical treated timber piers. Elimination of the intermediate bents eliminated potential damage to boats and reduced construction costs.

Precast prestressed channel sections allowed for the installation of a fiberglass electrical cable tray between the channel legs. The cable tray was covered with a 2 ft (0.61 m) thick precast concrete cover. The cable tray cover rests on flexible cushions,



Precast prestressed deck channel sections, finger pier slabs, piles and pile caps provide strength, durability and economy for a 416 ft (127 m) long commercial boat pier situated in a hurricane prone harbor.

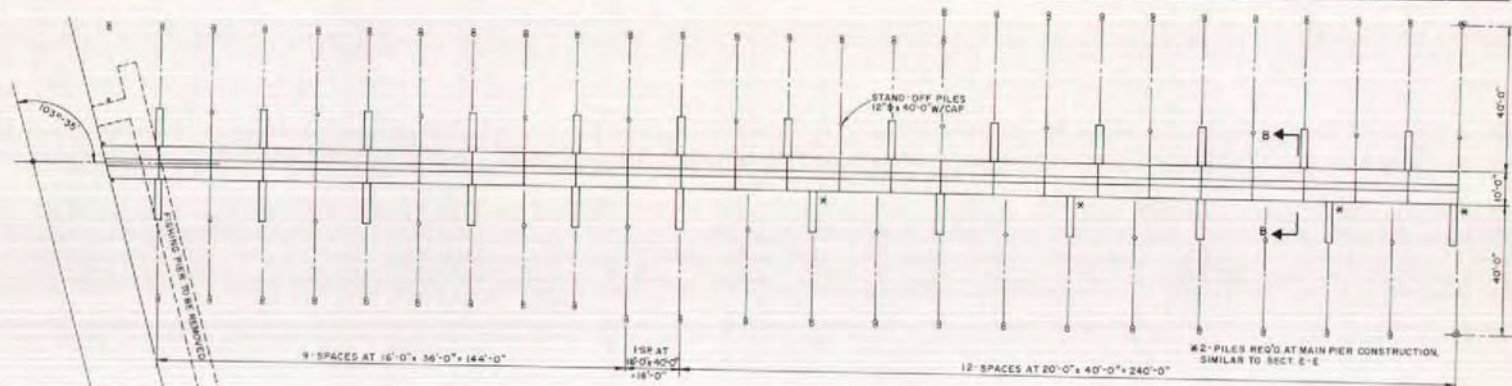
minimizing point load concentrations and permitting flexure of the entire deck structure without creating stress concentrations. No fasteners were required to hold the cable tray cover in place; access to the electrical cables can be achieved by quick removal of the cover.

The use of precast prestressed channel sections also permitted easy installation of the water mains along the inside of the channel legs and easy installation of the water services to each berth.

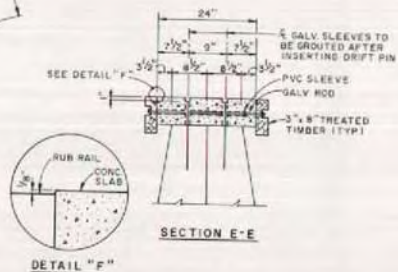
Precast prestressed finger piers provided for the installation of longer span piers, which are more stable due to the added mass of the concrete. The prestressed finger piers also permitted the installation of support piles which minimize use of the berth width. The finger pier was attached to the main pier deck with a flexible connection to prevent stress concentration if the finger pier were struck by a boat.

All precast prestressed components were connected with galvanized steel pins and semihard epoxy grout. The epoxy grout is flexible enough to permit flexure of the structure and connections without damage to the connections or components. This feature is very important in hurricane prone areas where tidal surges and wind driven waves are frequently encountered. The flexible connection system permits the pier to



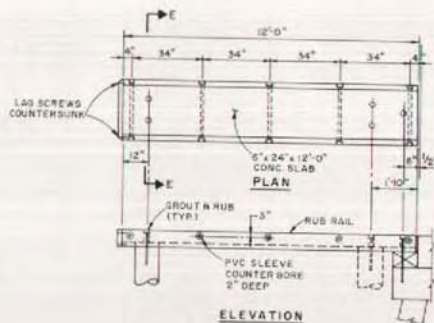


PLAN

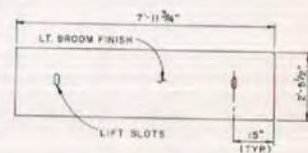


SECTION E-E

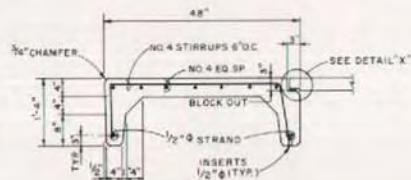
DETAIL "F"



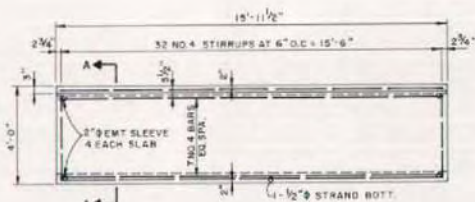
ELEVATION



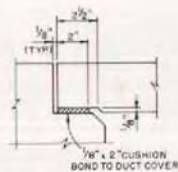
ELECTRICAL DUCT COVER



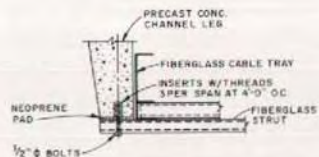
SECTION A-A



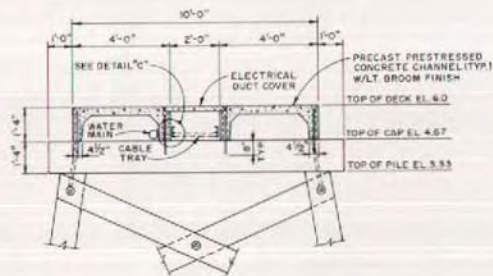
TYP PRECAST PRESTRESSED CHANNEL SLAB



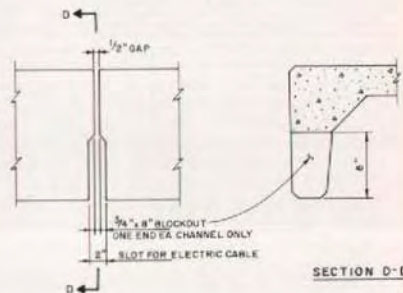
DETAIL "X"



DETAIL "C"



SECTION B-B



SECTION D-D

CHANNEL BLOCKOUT DETAIL





take shock loads from the heavy commercial boats without overstressing the connections or components.

The use of precast prestressed channel sections made longer spans practical, thereby reducing the number of bents required. The cost of materials for the precast prestressed concrete pier was estimated to be about \$15,000 more than the cost of materials for a treated timber pier. The labor savings on the concrete pier was estimated at \$8000, thereby resulting in an increased cost of about \$7000 (1.6 percent) for the \$442,000 precast prestressed concrete pier.

The owner considered the increased cost for the concrete pier an excellent investment when compared to its superior durability and longer life. Easy access to the electrical duct was considered another advantage by harbor maintenance personnel. Commercial boat operators have praised the anti-skid broom finished concrete surface as being much safer than the older treated timber piers and they also like the clear span berths, which eliminate damage to their boats caused by the intermediate bents on existing timber piers.

The project was completed in February 1987. During the past year the facility has become increasingly popular with the boating community.

Credits

Owner: City of Pass Christian (Honorable J. W. "Jake" Erwin, Mayor), Pass Christian, Mississippi.

Engineer: Advanced Developments Inc. (ADI), Consulting Engineers (Michael R. Smith, P.E., PhD, President), Bay Saint Louis, Mississippi.

Contractor: George P. Hopkins Inc. (George P. Hopkins III, Project Manager), Gulfport, Mississippi.

Precast Prestressed Concrete Manufacturer: Gulf Coast Pre-Stress Co. Inc., Pass Christian, Mississippi.