

Sitka Floating Dock

Sitka, Alaska

Owner: Samson Tug & Barge

Description: INCA Engineers, Inc., A Tetra Tech Company (INCA) provided preliminary and final design for the Sitka Dock. INCA developed alternatives for the shore connections and mooring system; analyzed loads, tidal fluctuations, and wind loads; evaluated and developed alternatives for pontoon reinforcement; and provided siting of the pontoon. Special features included the design of ramp connections using a specially fabricated set of elastomeric and steel bearings for kinetic energy absorption in the event of docking collisions.

INCA evaluated two alternatives for reinforcement of the pontoon to carry large design loads generated by forklifts and cranes:

- ▶ A gravel and pavement overlay.
- ▶ A reinforced cast-in-place concrete topping.

Three alternatives were considered for a mooring system:

- ▶ Three steel pile dolphins (two on the barge side and one centered on the opposite side).
- ▶ Two steel pile dolphins at the shore end of the pontoon (two anchor weights and anchor chains at the offshore end).
- ▶ Four anchor weights and anchor chains at the four corners of the pontoon. A flexible fendering system was developed to reduce the load transmitted to the dock structure.

Ramps were fabricated from six existing railroad flat cars at Samson's Seattle site. The main ramp was built in two 12-foot wide sections and was designed to slide on the pontoon with the rising and falling tide. Side ramps were placed by forklift from the pontoon and were evaluated as two eight-foot-wide sections, which were placed separately. They connect to the pontoon by overlapping one-inch square steel bars in accordance with current standards. The end on the pontoon slides on a steel bearing plate without rollers.

This design was named an "Outstanding Example of Excellence in Concrete Construction" by the Washington Aggregates and Concrete Association.

Special Features:

- ▶ Dock built from reinforced rebuilt floating pontoon from I-90 floating bridge
- ▶ 60-foot by 300-foot floating dock
- ▶ Seismic and impact dynamic analysis
- ▶ Off-site fabrication to reduce costs
- ▶ Large forklift design loads – 220 kip axles
- ▶ Elastomeric reinforced mooring system
- ▶ Ramp fabricated from surplus railroad flat cars

