



US Navy, Seal Beach Naval Warfare Center, Seal Beach, CA

Completion: Spring 2010

Contractor: R.E. Staite Engineering, San Diego, CA

Challenge: The US Navy sought to install standoffs for lightweight naval vessels at the Naval Weapons Station at Seal Beach, CA. Improvements included installation of Harbor Technologies’ HarborCamel, which serve to spread the weight of a vessel to ensure no individual pile or point on a dock is stressed while the vessel is docked.

Constraints: NAVWPNSTA shares its area with a National Wildlife refuge. At least five endangered species are among the animals that inhabit approximately 1000 acres in the protected Anaheim Bay salt marsh, at the Seal Beach site .



HarborCamel is used between a ship and a pier or wharf structure to provide a vessel standoff. It spreads berthing loads across a number of fender piles, or the footprint of the pier or wharf structure. HarborCamels are usually allowed to float with the tide and are secured in the desired position via nylon ropes or chains running through hawse pipes or with connection to eyebolts. They are fabricated with a high density polyethylene (HDPE) for tough abrasion, impact and UV resistance. They are outer reinforced for stiffness and strength (bending moment) with an infused fiberglass laminate and a closed cell foam core, thus ensuring positive buoyancy with 50% freeboard. Composite Camels are non-metallic throughout; available in a wide variety of lengths and dimensions; and are currently installed in a wide variety of Port facilities, Coast Guard, and Naval installations, up and down both the East and West Coast.

Benefits include:

- Fendering: Tremendous ability to absorb the energy of vessel (lateral) impact through repeated recoverable deflection
- Load bearing: Axial pile capacity of 70 kips (18” 0.75” wall)
- Durable: Proven UV resistance; will not rot, decay, nor be eaten by borers
- Enormous design flexibility through “tailoring” of laminate, diameter and wall thickness
- HarborCamels are welded plastic, forming structural, watertight joints
- Lightweight, thereby reducing freight cost & carbon footprint
- Corrosion resistant



Harbor Technologies HarborPile and HarborCamel installed in Point Loma, CA

- Smooth consistent surface does not suffer from blotches or dimples
- Environmentally safe: no leaching chemicals
- No mechanical fasteners used throughout Camel construction
- Cut & drilled with carbide bit tools
- HDPE sleeve and poly-urethane closed cell foam is bonded to the FRP strength member. No gap is permitted between the three
- Camels are constructed to ensure they float with the hawse pipe perpendicular to the water line
- Standard colors are black and grey, although can be produced in virtually any color
- Excellent structural properties

For information on Harbor Technologies, LLC or this project visit www.schraderco.com

*Schrader Co. presents **environmentally-conscious products** for the industrial marine market and other applications for a variety of uses including piers, wharves, marinas, bridges, boardwalks, and seawalls.*