

Going Bigger And Stronger, Composite Camels' Next Berth: Aircraft Carriers

Composite Advantage recently delivered the first set of Fiber Reinforced Polymer (FRP) composite camels to Naval Station Mayport in Jacksonville, Florida. The third largest naval surface fleet concentration area in the U.S., Mayport will use the camels to berth aircraft carriers which can weigh up to 97,000 tons. CA based its design on the platform technology it developed for Naval Facilities Command's submarine camels.



Fiber Reinforced Polymers: Long Lasting and Corrosion Resistant

FRP's ability to resist corrosion in a harsh saltwater environment made the material an attractive option for replacing the Navy's traditional steel and wood structures while eliminating high maintenance and replacement costs.

In 2009, CA developed a universal composite submarine camel under contract to NAVFAC. Since then, CA has installed 14 sets of composite submarine camels at Submarine Base New London, Naval Station Norfolk, Naval Base Kitsap, Naval Station Norfolk, and Submarine Base Kings Bay. The success of this product has demonstrated the technology's capability to berth the Navy's CVN aircraft carriers.

History Checkup: Where Did Camels Come From?

The first ship's camel is credited to Dutchman, Meeuwis Meindertsz Bakker who designed the structure in 1690 to allow ships to navigate shallow water. Large wooden boxes were filled with water and secured to the hull on each side of the ship. Water was pumped out which caused the camels to float, elevate the ship and carry it across the shoals.

Camels evolved into large/ submerged metal or wood structures that attached to a mooring and were fitted with rubber bumpers to provide a buffer between a vessel and its waterfront berth.



CA installs first universal FRP composite submarine camel for SUBASE New London in Groton, CT.

Universal Composite CVN Camels for Aircraft Carriers

Product Advantage: CA's camel technology is built on a strong platform of performance that allows it to deliver longer life and substantially lower maintenance costs when compared to its steel cousins.

Product Details (per camel)

Size: 63 feet by 56 feet by 6 feet
Weight: 235,000 lb
Materials: FRP structural panels; embedded stainless steel; rubber element fenders; UHMW-PE sheets

Design

When the aircraft carrier is moored in port, the CVN camels transfer loads from the ship to the pier or wharf. The ship side of the camel has a fender system made up of UHMW-PE facings on FRP panels with high crushing strength.

These facings have superior abrasion resistance and impact resistance. Fender panels are backed by rubber fenders to absorb impact. Each of the five modules have an open bottom box design to withstand wave motion.

Multiple internal shear panels transfer load to the back side of the camel for reaction to the wharf. Modules are pre-fabricated on the shop floor where internal panels are bonded to the top cover panel. Long edge panels complete the module and provide a bonding surface for additional modules. The top cover panels can handle equipment loads and are coated with a non-slip polymer aggregate.

All attachment and lift points exposed to concentrated loads have embedded stainless steel for optimal strength. The edges have lifting locations, mooring cleats and air equalization openings when there is strong wave action. The structural sandwich panels have a natural buoyance supported by extra flotation foam to ensure correct balance and trim.

Transportation

Modules in a transportable size of 56 ft. by 11 ft. were shipped by flatbed trailers to a commercial shipyard near the destination base.

Assembly

Five modules are bonded and bolted together before being placed in the water and moved to a drydock to attach the deeper fender panels and rubber element fenders to the ship side of the camel.



Delivery. Finished camels are delivered to the base piers by tugboat.

