

USS DENVER (LPD 9) Propulsion Shaft Covering Repair

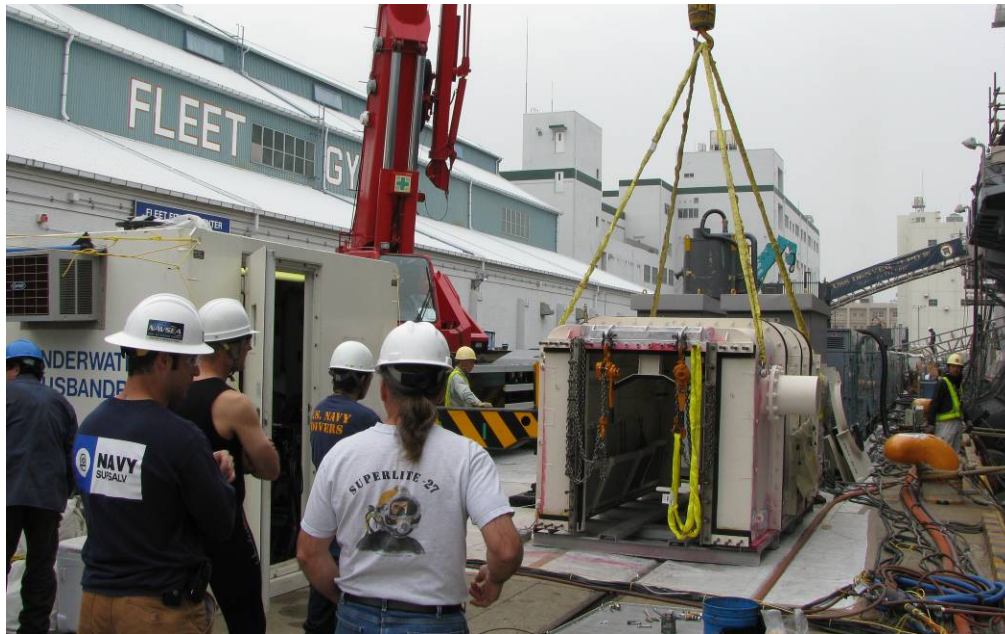
16 May 2011

In January 2011, divers conducting a routine hull cleaning and inspection on USS DENVER noted severe damage to the Glass Reinforced Plastic (GRP) covering around the port shaft. Further inspection revealed corrosion to the bare metal exposed in the damaged areas. US Naval Ship Repair Facility (SRF) /Japan Regional Maintenance Center (JRMC) requested SUPSALV assist SRF divers in conducting repairs, which required complete replacement of the GRP to the entire port propeller shaft, totaling 27 feet long. This was far longer than any in-water shaft repair ever attempted. SUPSALV tasked their diving services contractor, Phoenix International, to support the operation. SUPSALV and the Phoenix team arrived in Sasebo, Japan and began work on 24 April.



Dive station set up on port quarter of USS DENVER.

Working closely with crew from USS DENVER, the Navy Team, consisting of SRF Sasebo, SRF Yokosuka and SWRMC divers, Phoenix divers and the SUPSALV UWSH engineer stripped the shaft of GRP and identified damaged areas on the shafts. The Phoenix divers then mechanically groomed and MT inspected the shaft defects. Fleet and SRF divers then began to reinstall the shaft GRP covering. All 27 feet of the port shaft was completely stripped, groomed, defects faired in, and recovered with 4 layers of fiberglass cloth saturated with epoxy resin. Following GRP application, the shaft was surrounded with cages of ceramic mat heaters and left to cure overnight. After all the GRP had cured, divers painted the shaft with Hycote 151 epoxy paint.



SRF Yokosuka dog house habitat ready to hoist from the pier and into the water. With two habitats in use, the dive teams made effective use of their time conducting repairs to and preserving USS DENVER's port shaft.



Navy divers assigned to SRF JRMC SASEBO practice the technique of coating the shaft with GRP laminate on the pier before performing the repair in the habitat underwater.

These in-water repairs were made possible through use of diving habitats which allow divers to create a dry environment to conduct repairs. In this case, SRF Yokosuka provided a dog house type habitat

with a two-foot and three-foot extension installed. This extended habitat provided over 11 feet of interior space for conducting maintenance on long sections of the shaft. A second habitat was provided by SUPSALV's Emergency Ship Salvage Material (ESSM) facility in Port Hueneme, CA. This habitat was augmented by a two-foot extension giving an additional 9 feet of workable area. The combination of the two extended-length habitats allowed two teams to work simultaneously to complete the full GRP replacement in only 3 weeks, 2 weeks faster than using just one habitat.



Phoenix divers returning to the surface in Sasebo, Japan after putting in a shift repairing USS DENVER's port shaft.

SUPSALV's on site Underwater Ship Husbandry (UWSH) engineer, Mr. Justin Pollack was thrilled with the effort. He said, "The teamwork exhibited by the three Navy diving commands plus ESSM and Phoenix divers was exceptional. It was a very productive three weeks and a good learning experience as well. SUPSALV will take away valuable information for improving our UWSH Manual Chapter 13".



Completed repairs - shaft with new GRP covering before application of Hycote paint. This photo was taken from within the habitat.

The Underwater Ship Husbandry division of SUPSALV consists of engineers and divers who develop techniques, procedures, and equipment necessary to perform ship repairs waterborne. Waterborne maintenance minimizes the need to use dry docks for repairs, extends the interval between dry-dockings, and minimizes the amount of ship time spent in dry dock. In addition to the dollar cost savings, the repairs also return ships back to operational status more quickly than if they were dry-docked for the duration of the repair. NAVSEA's Underwater Ship Husbandry team conducts ship repairs worldwide. Ship repairs such as this in Japan are examples of the NAVSEA and a local dive locker's ability to support Fleet readiness anywhere or anytime!