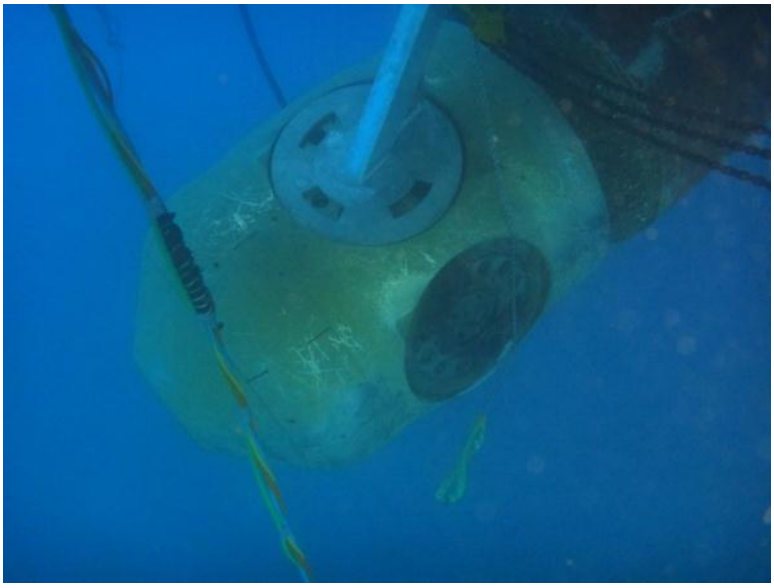
SUPSALV teams with NSSA to repair USS TAYLOR's (FFG 50) damaged propeller and hub.

11 April 2014

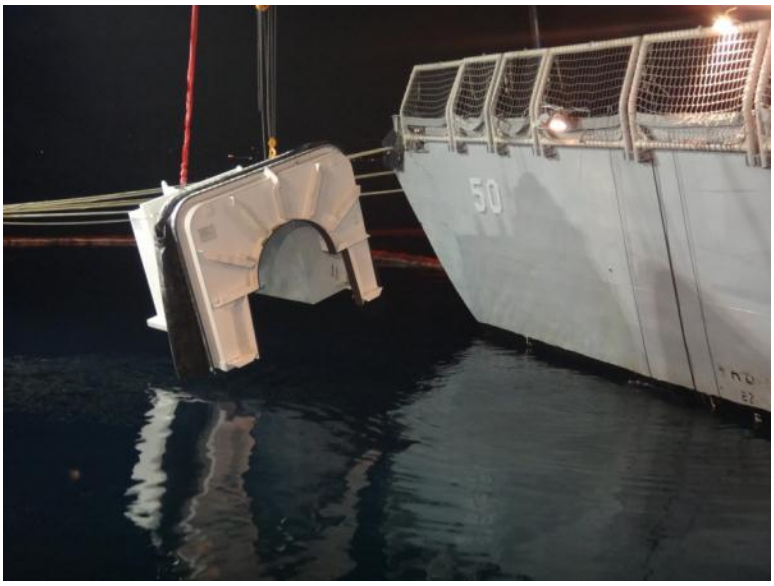
USS TAYLOR (FFG 50), moored in Souda Bay, Greece was the subject of intense underwater repairs to its propeller and hub. The repair task was a total waterborne hub replacement. This had never been attempted before requiring new procedures and processes to be developed to support the operation. The repairs were being carried out by NAVSEA 00C Underwater Ship Husbandry Division engineers, Norfolk Ship Support Activity (NSSA) divers, and Phoenix International (SUPSALV's diving support contractor) divers.

With two NSSA dive teams, one Phoenix dive team, and 3 SUPSALV underwater repair specialists on site, 24 hours a day underwater operations were possible. One of the initial tasks was to install lifting beams, both port and starboard, under the hull to allow rigging material in place and removing interferences. Once that was done, a hub davit was installed in 1A blade port to support removal of the rope guard and installation of the bearing sealing plates.

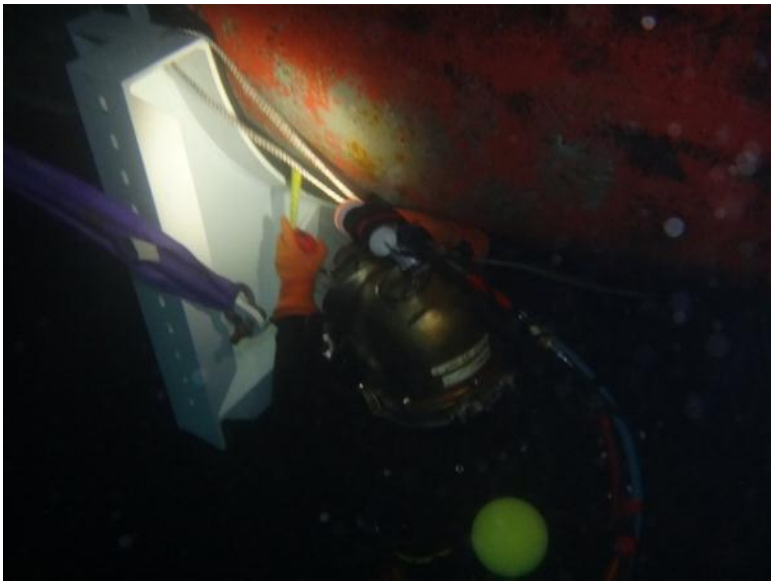


TAYLOR's old hub with blades removed and hub davit installed.

One of the challenges with this job was to prevent water intrusion into the hub and shaft when breaking the hub to shaft seal before removing the hub and again when installing the new hub. The solution to this challenge is to install a cofferdam which is rigged under the vessel and bolted to the shaft bearing flange.



Hub cofferdam being lowered into the water for a test fit.



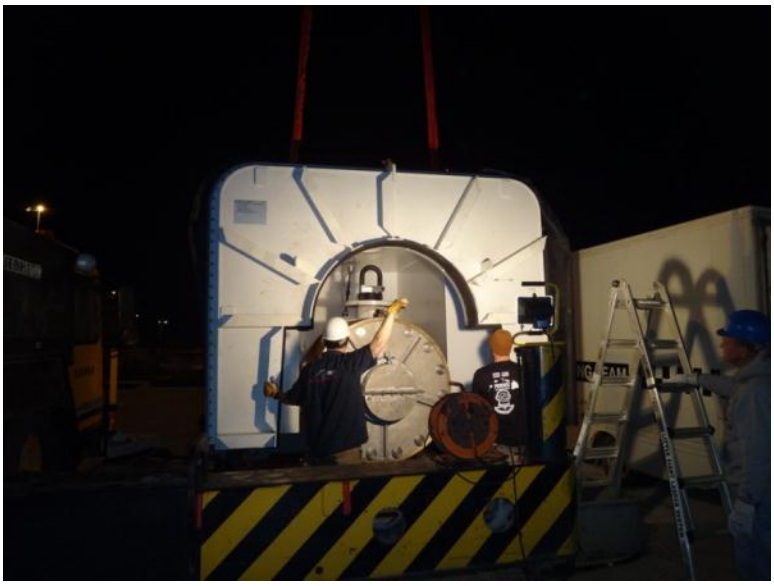
Here a diver is measuring the cofferdam lower door to see what additional gasket material is needed to provide a watertight seal for the hub removal.

Another challenge the divers faced is the sheer mass of the hub and cofferdam assembly which will be removed as a single unit. The combined weight is approximately 47,000 pounds. Movement of the assembly is complicated by the fact that it is positioned under the ship's stern and cannot be serviced by a shore based crane. Once the hub was hydraulically jacked off the shaft and secured it was rigged, using the yard-and-stay method, from the port and starboard hull lifting beams to the side of the ship transferring the load gradually to the shore crane as the hub–cofferdam system moves out from under the ship.

NSSA dive team observing operations using underwater video camera from the pier adjacent to USS TAYLOR.

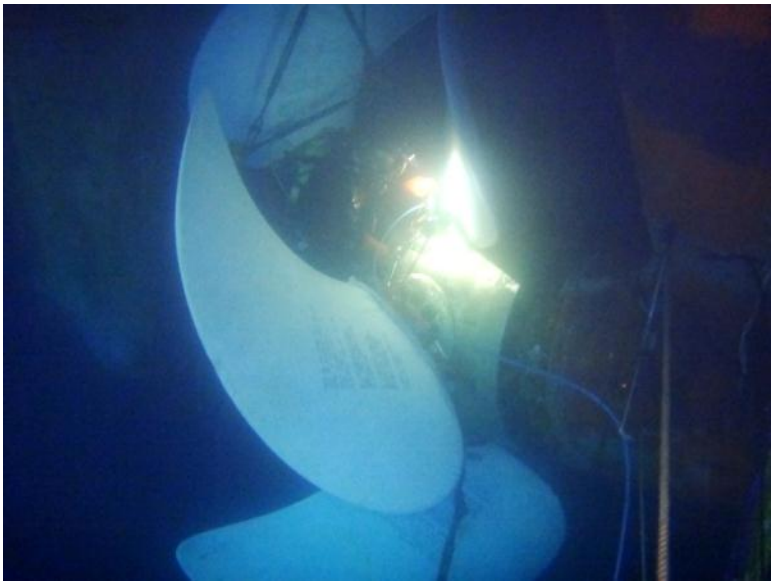
Underwater Repair Specialist completing the removal of the hub (on left) from the shaft.

On 27 March, the teams successfully removed the old hub from the shaft, yard-and-stayed it to the outboard side of the hull and recovered it to the pier. The cofferdam was removed from the hub and installed on the new ready for issue (RFI) hub which was then hoisted back into the water.



The cofferdam being lowered onto the ready-for-issue hub in preparation for reinstalling hub on the shaft.

Over the course of the following days, the hub was installed onto the shaft, filled with oil and verified to be functional. The cofferdam was removed and new blades were reinstalled. USS TAYLOR completed dockside testing on 10 April followed by sea trials on 11 April, returning her to service and allowing her to complete her deployment. The ability of SUPSALV's UWSH Division to develop the waterborne hub replacement procedures and NSSA and Phoenix divers to carry out the repairs in a remote port have saved the Navy time, money and restored a deployed resource to full operational capability.



8 April 2014 image of new hub with the blade installation in progress.