

ENERGY  
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ECONOMY

## WÄRTSILÄ JETGUARD SEALS FOR HIGH SPEED NAVY CATAMARAN



In October 2011 Wärtsilä installed the latest technology in waterjet sealing onto all four waterjet shafts on the high speed catamaran, HSV 2 Swift. During a two week period all four waterjets were overhauled and commissioned with the latest design input shaft seals.

–The seals have responded well in all levels of water clarity, at times exceeding the vessel's recommended wave height limits. To date all four seals remain leak-free, says **Jim Kelley**, Chief Engineer, HSV 2 Swift, Sealift Inc.

The HSV 2 Swift was constructed by the Australian shipbuilder Incat in Hobart, Tasmania, in 2003 and was leased to the U.S. Navy. The ship is a 98 metre-long, ex-military, high-speed wave piercing catamaran now

running from a commercial arm of Military Sealift Command, hauling military goods. The vessel is equipped with four Wärtsilä LIPS LJ120E waterjets and was the second catamaran the Navy leased to test new technologies and concepts.

Swift is an aluminium-hulled, commercial catamaran with military enhancements, such as a helicopter flight deck, strengthened vehicle deck, small boat and unmanned

Challenges	Solution	Benefits
<ul style="list-style-type: none"> <li>– All previous sealing solutions suffered extreme corrosion issues resulting in premature failure and significant downtime from service</li> <li>– Confirmation and approval on design parameters in a short time</li> <li>– Very limited time for the seal supply and installation</li> </ul>	<ul style="list-style-type: none"> <li>– Installation of Wärtsilä Jetguard composite seal system for all four waterjets (size 220 mm)</li> <li>– Well planned and scheduled installation</li> </ul>	<ul style="list-style-type: none"> <li>– Reliable, high performing products providing maximum vessel utilisation between normal overhauls</li> <li>– Robust products withstanding extreme conditions</li> <li>– Smooth operation of the waterjet propulsion system, outperforming all expectations</li> <li>– No risk of continued corrosion issues thanks to composite materials within the seal components</li> </ul>

■ ■ ■ vehicle launch and recovery capability with an enhanced communications suite. It features a new, modular design, which allows the ship to be refitted to support any mission without requiring long shipyard periods. Although the vessel appears to look like a trimaran from the front, the centre hull does not rest in the water and is not used for buoyancy.

### **CORROSION ISSUES LEADING TO COMPLETE OVERHAUL**

In the past Wärtsilä had supported Sealift Inc. on corrosion issues within the waterjet propulsion system of the vessel and had previously tested other seal types in an attempt to overcome the problem. When the seals were inspected, it was apparent that the existing seals had suffered extreme corrosion due to a failing cathodic protection system onboard the vessel, resulting in premature seal failures and consequently extended downtime for constant seal repairs.

The port engineer at Sealift Inc. requested Wärtsilä to recommend a seal design that would solve the seal corrosion issues and would also offer exceptional sealing performance. The composite version of the seal seemed to be the perfect solution.

– We had learned about the new waterjet seals, Wärtsilä Jetguard, based on the previous PSE designs, and believed that the use of composite materials in combination with a well proven sealing design would be the right choice for this application, says **Gary Fairlamb**, Project Manager, Wärtsilä Defense Inc., USA.

What started as a minor service work grew into a major overhaul of all four

waterjets. Through the entire process, good communication was maintained between Wärtsilä and the customer, who had complete trust in the service and products being supplied. The biggest challenge in the fulfilment of the job was time.

– We only had a two week window to supply the seals, complete all four waterjet overhauls and ensure the customer made their charters for the year, explains Gary.

### **THE COMPOSITE JETGUARD SEALS EXCEED PERFORMANCE LIMITS**

– Wärtsilä installed the composite Jetguard seals on all four of our waterjet shafts in October 2011. Since then we have travelled over 42,000 nautical miles with almost 2,000 underway hours calling on ports from Peru and Central America, through the Mediterranean to one complete trip around Africa. The seals have responded well in all levels of water clarity and have at times exceeded the vessel's recommended wave height limits. To date all four seals remain leak-free, says Jim Kelley, Sealift Inc.

### **“THE WÄRTSILÄ JETGUARD SEALS ARE ACHIEVING A GREATER SUCCESS THAN EXPECTED AND SURVIVED AN EXTREME ACCIDENTAL TEST”**

After the installation the port engineer is in regular contact with Wärtsilä for technical and product support. He always points out that the seals are achieving a greater success than expected. While running a charter off the West African coast, a buoy entered into one of the jet intakes and was chopped up by the impeller. The chief engineer was in the port

propulsion room at the time and noted that despite this occurrence creating high levels of load and stress on the waterjet, the seal survived unharmed and did not leak a drop into the vessel.

The new Jetguard seal has out-performed all expectations in normal running conditions and even under extreme circumstances. The multi-task vessel HSV 2 Swift is capable of handling speeds in excess of 40 knots and has a manoeuvrability that doesn't require tugboat assistance when arriving at or departing from the pier. As part of the normal working routine HSV 2 Swift continues to service the roughest routes in the world, including conditions as harsh as the Persian Gulf. To date no other HSV in service has matched that ability.