



December 2009

## SubSea Solutions Newsletter

*"The Chronicles"*

*Rapid Cost-Effective Worldwide Underwater Repair Solutions*

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It is hard to believe that another exciting year within the **Subsea Solutions Alliance** has "floated by". We look forward to an exciting 2010 with new and unique projects to tackle! December proved to be another THRUSTER month for the diver / technicians of the **Subsea Solutions Alliance**. Repairs to high value vessels operating in remote locations kept the Diver / Technicians busy this month. The team performed services to 9 different thruster units situated on 7 different vessels on 3 different continents. All of this work was performed CONCURRENTLY with teams of professional diver / technicians from the **Subsea Solutions Alliance** in full attendance on all repair projects. In addition to this work, two propeller repairs were performed on an additional 2 continents! Yes, we enjoy keeping freight forwarders and shipping companies busy with our equipment.

The **Subsea Solutions Alliance** was very busy meeting the needs of the industry by performing multiple high value repairs in various ports around the world. The summary below illustrates just some of the major projects performed.

- 1 Thruster was extracted in Europe
- 3 Thrusters were extracted / repaired in North America
- 2 Thrusters were repaired in Mexico
- 3 Azimuthing retractable thrusters were repaired in Africa
- 1 propeller repair with underwater cold static load Straightening was completed in New Zealand
- 1 propeller repair with cropping and hydrodynamic

balancing was performed in the Caribbean

Nonetheless, the Diver / Technicians are looking forward to a small holiday break before the excitement of the New Year arrives. We want to thank YOU our valued clients for your continued support and patronage and we look forward to continuing to serve you in the new year to come.

We remain available to meet your emergency and maintenance needs. Strategically placing resources and continuing to qualify new personnel the **Subsea Solutions Alliance** is growing to answer the call when required. Please feel free to contact us at any time and we look forward to hearing from you in the near future!

- Rick Shilling

**Subsea Solutions Alliance**

## What happens when they don't "Azimuth"?

**Retractable Azimuthing Thrusters repaired in the retraction column**



The exploration of oil and gas pushes vessels farther and farther away from customary repair ports. The high valued vessels employed in this niche market require total availability and performance from their propulsion equipment at all times to maintain their dynamic positioning status. With day rates at their current level, every day lost costs vessel operators HUNDREDS of THOUSANDS of dollars. So

what happens when bearing failures occur on retractable units on high value vessels operating in West Africa? The **Subsea Solutions Alliance** is called for support.

A dynamically positioned heavy lift vessel operating in West Africa had a seizure of a bearing on one of its retractable azimuthing thrusters which prevented the unit from turning or to be retracted back into the retraction column. When it was determined what caused the seizure of this thruster, an analysis of the other units mounted on board took place. It was determined through careful measurements that a second unit was exhibiting similar symptoms to the seized unit. This required immediate action by the vessel operator as having two azimuthing thrusters out of service jeopardized the vessel's charter.

Being the underwater service provider for the Original Equipment Manufacturer of the thruster allows the Diver / Technicians of the **Subsea Solutions Alliance** unrestricted access to the necessary technical information and OEM engineering personnel so that a well engineered repair solution with a defined schedule can be developed. Considering the remote location where the repair took place, mobilization of proper equipment and parts immediately commenced upon the acceptance of the schedule by the vessel's owner.

The completely seized Port side azimuthing thruster was retracted as far as possible up into the retraction column. Once retracted two-thirds of the way into the vessel, the retraction column was "blown-down" to create a dry environment around the affected bearing based on the engineered plan developed by the **Subsea Solutions Alliance**. The Diver / Technicians then

used specialized equipment and techniques to quickly remove the bearing carrier, race and liner. Additionally, the chockfast used to set the bearing into its proper position was blasted away with a specialized hydro-blaster specifically adapted for this application. Once the affected area of the thruster was completely disassembled and cleaned, a new bearing and liner was installed on the unit. The bearing was then properly aligned and chockfast was poured to permanently secure the bearing in place. Under the watchful eyes of the Owner's representative and the OEM service engineer the repair was completed.

Simultaneously, another crew of **Subsea Solution Alliance** personnel initiated the same repair on the starboard azimuthing thruster. In this case, as the unit was not yet seized, the unit could be retracted completely into the retraction column for repair. Just like the port side thruster, the entire repair was performed under the watchful eyes of the Owner's representative and the OEM service engineer. In total, the **Subsea Solutions Alliance** had 25 diver / technicians on site working around the clock in 2 shifts to complete the repair of these two thrusters!

Remaining the Benchmark for the industry, the **Subsea Solutions Alliance** completed the repair 4 DAYS earlier than scheduled! The owner's representative was extremely excited and pleased with the expertise, capabilities and work ethics of the entire team from the **Subsea Solutions Alliance**. By pioneering new technology and techniques for underwater ship repair, the **Subsea Solutions Alliance** completed this repair with the vessel afloat without the assistance of a shipyard and extensive local resources. **According to the Original Equipment Manufacturer, this was the first time in it's recorded history that a repair of this magnitude was performed on a retractable thruster unit with a vessel afloat.**

The diversity and experience of the engineers and Diver technicians of the **Subsea Solutions Alliance** makes the team immediately available to tackle even the most difficult situations. With a rapid response capability and equipment available on a global basis, we remain the industry leader in the development of solutions for complex in-water repairs. We remain available to meet your needs anywhere and at any time.

## Time for a Thruster Overhaul

**Retractable thruster lower unit brought to surface for overhaul**



Seismic vessels working in the oil and gas market have maintained strong day rates due to their unique mission profile and scarcity in the field. Being critical pieces of equipment for the continued exploration of hydrocarbons, availability and reliability are of paramount importance to vessel operators today.

As oil and gas fields continue to be developed farther and farther away from typical repair facilities, remote emergency repair services are becoming the norm as opposed to the exception. As a seismic vessel was between charters and prepared for it's next customer's needs, a wet dock was performed in Africa. By performing the work close to it's point of operations, the client saved considerable time and money as no transit time or expense was required.

Working directly for the Original Equipment Manufacturer (OEM) under our global underwater service agreement, the OEM was able to offer a complete "turn-key" thruster overhaul including the mounting and demounting of the unit pier side in Africa. This provided the vessel operator a full OEM warranty INCLUDING the mounting and demounting of the unit. This value added

warranty on parts and workmanship gives an additional degree of security to operators of vessels with such critical mission profiles.

Even though the Retractable thruster lower unit is NOT designed for underwater demounting, the **Subsea Solutions Alliance** together with the engineering department within the OEM developed a safe and efficient procedure for the lower unit extraction. The extraction procedure included the securing of the Steering tube which is a twin tube mechanism that slides up and down within the retractable unit based on it's position. The Engineering team within the **Subsea Solutions Alliance** incorporated techniques to develop the specialty tooling required to perform this pioneering service within the dry environment created in the retraction column within the vessel. Combining this tooling together with **Subsea Solutions Alliance's** experience handling large and heavy equipment underwater, the 14 ton thruster lower unit was safely extracted and brought to the surface for overhaul.

Upon completion of the lower unit overhaul by the Original Equipment Manufacturer, the unit was safely reinstalled without any incident.

Continuing to lead the industry in revolutionary underwater repair procedures, the **Subsea Solutions Alliance** yet again demonstrated that the impossible is really possible! Thinking in the water as opposed to out of the water will continue to allow the **Subsea Solutions Alliance** to deliver "value added" emergency and maintenance services to the global fleet throughout the world. We look forward to continuing to "raise the bar" in the service industry; so give us a try. We look forward to demonstrating what we can do for you!



## Propeller Repairs

### Working down under!

The **Subsea Solutions Alliance** in The Netherlands was contacted by a European client reporting severe propeller damage in the vicinity of Australia. Based on the initial diver report and pictures reviewed, the propeller specialists within the **Subsea Solutions Alliance** confirmed that a repair was available utilizing the underwater propeller straightening press combined with a hydrodynamic engineering solution. The severe damage to the propeller caused considerable engine overload and the vessel speed was considerably affected.

The **Subsea Solutions Alliance** dispatched personnel and equipment from it's member companies in The Netherlands and Vancouver Canada for the repair. Under the watchful eye of the attending Class surveyor, the repair commenced combining a cold static load straightening process together with hydrodynamic balancing of the propeller. Utilizing proprietary laser measurement techniques together with experienced propeller diver / technicians, the engineering department of the Subsea Solutions Alliance developed a repair solution that was predicted to provide an operational improvement in propeller performance. Upon completion of the repair, the vessel departed without any sea trial.

Two days after the repair was completed, the Chief Engineer of the vessel

submitted engine performance and vessel performance data to his head office and our engineering department. The Chief Engineer reported better than expected performance. The vessel speed was fully restored to its original parameter, engine load was substantially lower and the Specific fuel consumption was reduced. When the engineering department at the **Subsea Solutions Alliance** received additional information from 6 months prior to the propeller damage a closer evaluation was performed to quantify the actual propeller performance improvement. Engine data was mapped and compared against the original test bed results. Pre-damage engine data recorded 6 months prior to the damage indicated that the vessel was operating with a Heavy running Propeller. In this case, normal engine load was high, fuel consumption was high and significant engine temperatures were above the engine manufacturer's test bed results. When the damage occurred, it exacerbated this Heavy running condition; thus the engine was significantly overloaded and vessel speed was substantially reduced. When the repair was performed and compared to the PRE-DAMAGE engine data, it was confirmed that the load on the engine was reduced by 1.5 percent, fuel consumption was reduced by approximately 5 percent, and critical temperatures were similar to the original test bed results recorded at the engine builders factory in the Far East.

With a high percentage of vessels operating today with Heavy Running Propellers, hydrodynamic propeller upgrades are immediately paid back through a SIGNIFICANT savings in fuel. What started out as an underwater propeller repair turned into a propeller upgrade. This is what the **Subsea Solutions Alliance** is all about.

The Subsea Solutions Alliance (SSA) consists of underwater ship repair specialists including: All-Sea Enterprises Ltd, Miami Diver Inc, Parker Diving Inc and Trident BV. With a dedicated staff of over 150 divers globally, SSA has revolutionized the methods of repair for ship equipment underwater. Through a common shared system of dive equipment, specialty tools, and dive personnel the SSA is able to mobilize quickly anywhere throughout the world with diver / factory trained service technicians for most OEM equipment. From the replacement of aft propeller shaft seals to the exchange of thrusters to straightening large bends in propellers, SSA has become the OEM's choice for all types of complex repairs. With class approved techniques and a highly trained staff in both underwater ship repair and propulsion equipment maintenance, SSA is the clear choice for vessels operating in sensitive environments and on critical trade routes.

For Further information please feel free to contact:

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