



November 2009

SubSea Solutions Newsletter

"The Chronicles"

Rapid Cost-Effective Worldwide Underwater Repair Solutions

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October proved to be another busy month for the diver / technicians of the **Subsea Solutions Alliance**. With a heavy variety of repairs performed at all corners of the globe, the global underwater ship repair experts performed extensive hull insert repairs, propeller repairs and tunnel thruster repairs. Focused on it's strategy of continuous improvement and growth, the **Subsea Solutions Alliance** also qualified an additional number of divers in underwater welding with all major classification societies in all positions. With all of this work going on, was anyone able to enjoy the nice autumn weather? PROBABLY NOT!

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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 exchanged in the Caribbean
- 1 propeller repair with underwater cold static load Straightening was completed in Far East
- 1 major propeller repair with cropping and hydrodynamic balancing was performed in the Caribbean
- 2 major steel insert repair were performed in North America

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

Groundings Happen

Bulbous Bow Insert Repair- Clearing the rocks from the Hull!



While entering the harbor in the Pacific Northwest a grounding occurred causing significant damage to the forward section of a container ship. After a full underwater inspection was performed by the **Subsea Solutions Alliance** member company from Vancouver, Canada a class approved temporary repair was employed to put the vessel back into service. This temporary repair

included the fabrication and installation of a temporary Bulbous bow on the vessel so it could continue to trade until a convenient period was available for off hire to initiate a permanent repair.

Upon completion of the damage survey, the engineering department developed a temporary repair solution with the attending class surveyor. The repair included the removal and fairing in of all areas of the shell plating with sharp edges, the control or removal of all cracks found in vessel plating and structures, the fabrication and installation of an internal framing system, the installation of a 5 meter by 300 mm by 13 mm plate along the bow's center line to add strength and the installation of a shaped 6 mm plate- 9 meters by 5 meters by 3.5 meters properly fastened to the vessel and internally developed framing system. Once the approved engineering solution was in place and evaluated by the attending class surveyor, the diver / technicians of the **Subsea Solutions Alliance** filled the affected area and vessel's hull 200 mm above the water line with almost 15 cubic meters of concrete as well as covered all welded areas with a 2-part epoxy.

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.

Groundings Happen

Major propeller repair in no time!



Ship owners never want to hear that their vessel has grounded; however this does occur from time to time. It is great to know that underwater repairs are available to all sections of the vessel without the significant expense of off-loading the cargo, finding a shipyard in close proximity and the hassle of significant delays to the vessel.

While transiting the Caribbean,

a fully loaded 6700 TEU container ship grounded causing significant damage to the propeller. A team from the **Subsea Solutions Alliance** member company in Miami was immediately dispatched for immediate investigation. The main propeller (six bladed 8200 mm in diameter) had a very large sectional loss on one blade with multiple fractures and mechanical deformation with multiple fractures on the other remaining blades. Blade root investigations proved that no linear defects (cracks) were present so an in-water propeller repair was employed under the supervision of the attending classification society surveyor.

The propeller repair included sectional reduction methods on areas of the blades with significant fractures combined with hydrodynamic and static propeller balancing through **Subsea Solutions Alliance's** engineering department. The maximum cut line on one blade extended almost 3000 mm in length and was cut through material over 165 mm thick. The overall weight of the largest removed section was approximately 2.2 metric tons. Additional repairs to the propeller included the removal of multiple fractures and linear defects on the other affected blades. The repair allowed the vessel to continue in service without any detrimental vibration or engine overload. The in-water approach allowed the client to maintain his cargo on board and minimize the vessel schedule delay.

The **Subsea Solutions Alliance** continues to invest in the training of it's personnel and the development of it's equipment and tooling. By having systems strategically placed throughout out the world, we are able to mobilize quickly and cost effectively to meet the ever changing demands of the Marine industry.



In the Tunnel

Thruster Exchange in 12 Hours

The **Subsea Solutions Alliance** together with **Rolls Royce Commercial Marine** continued it's successful program of tunnel thruster exchanges for vessels operating in the cruise industry. Utilizing **Rolls Royce**

Marine's patented sled and specialized tool system specifically developed for underwater exchange of tunnel thrusters with the blades installed, the team dramatically reduced exchange time of the lower unit of the tunnel thruster to 12 hours. This included the full weld out of the thruster strut using the **Subsea Solutions Alliance's** classed approved wet weld procedures. Combining this advanced procedure with close coordination with the vessel's itinerary, the **Rolls Royce and Subsea Solutions Alliance** team was able to perform the entire job in the vessel's home port in Florida with no mobilization of equipment or personnel.

This marks the 4th thruster exchanged with the specialized underwater procedures developed between the **Subsea Solutions Alliance** and **Rolls Royce Marine**. By minimizing mobilization costs and developing a process that is quick, safe and in-line with the vessel's itinerary, there is no need for cruise vessels to perform this work in the dry dock. With typically 5 to 6 tunnel thrusters per vessel installed, this allows vessel operators to minimize their time in dock to hull treatment only. In the end it allows cruise operators to achieve additional cruises over it's lifetime by keeping vessel in-service.

Innovation is the product of imagination and ingenuity! We look forward to applying some our innovative ideas to your equipment maintenance and repair initiatives.



Propeller Repairs



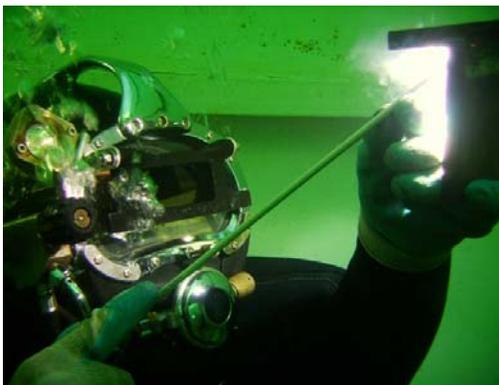
Voyage nightmares to vessel saviors!

The **Subsea Solutions Alliance** in The Netherlands was contacted by a European client reporting severe propeller damage in the Far East. 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 heavy vibrations along the entire propeller curve. The vessel was unable to move under it's

own propulsion without repair.

The **Subsea Solutions Alliance** dispatched personnel and equipment from it's member company in Vancouver, Canada for repair. Under the watchful eye of the attending Class surveyor, the repair commenced combining a cold static load straightening process together with hydrodynamic and static balancing of the propeller. Utilizing proprietary vector calculation software together with experienced propeller diver / technicians, the engineering department of the **Subsea Solutions Alliance** was able to predict an operational improvement in propeller performance and then execute a successful repair. Upon completion of the repair, to demonstrate the expected propeller performance improvement, the vessel went on sea trial to confirm the expected results. During the sea trial the vessel experienced an approximate 1/2 knot speed improvement over it's entire operating range with engine parameters and vibration levels within original / design limits. Not only was the propeller repaired and fully restored, the PROPELLER PERFORMANCE IMPROVED OVER IT'S ENTIRE OPERATING RANGE.

Within 3 days of notification, a propeller repair / propeller upgrade was performed on a disabled vessel in a remote port in the Far East. This is what the **Subsea Solutions Alliance** is all about.



Underwater Welding

The Growing pool of certified wet welders!!!

The **Subsea Solutions Alliance** continues to strengthen it's workforce by certifying 15 additional diver / welders to the **Subsea Solutions Alliance's** class approved wet weld procedure. Under the watchful eyes of surveyors from ALL

MAJOR classification societies, the Diver / Welders from **Subsea Solutions Alliance's** member company in Long Beach California certified an additional 9 divers in ALL positions for permanent wet welding in critical areas and non-critical areas of a vessels hull or structure. Additionally, an additional 6 diver / welders were certified under the watchful eyes of ALL MAJOR classification societies from **Subsea Solutions Alliance's** member company in Vancouver Canada. By having certified wet weld procedures

already in place and approved by all major classification societies combined with diver / welders certified to this procedure, the **Subsea Solutions Alliance** is available to immediately respond to emergency repairs anywhere in the world at any time. It is planned that an additional 9 diver / welders from **Subsea Solutions Alliance's** member company in Long Beach California will also be qualified to these procedures in the next couple of months.

The **Subsea Solutions Alliance** continues to develop it's own workforce. By maintaining a permanent workforce, certification and training programs are integral to the diver / technicians personal development plans. This dedicated training and certification system allows the **Subsea Solutions Alliance** to maintain the highest qualified personnel on staff ensuring that we have certified personnel available for our clients in times of need. Our people are the heart and soul of our business. This ever growing dedicated work force of highly qualified Diver Technicians is what differentiates the **Subsea Solutions Alliance** from all the rest. We look forward to introducing your team of experts to ours!



Growing to meet our customer needs!

Subsea Solutions Alliance- All-Sea Atlantic Ltd- Halifax, Canada

The **Subsea Solutions Alliance** is pleased to announce the opening of our newest location in Eastern Canada. The Halifax, Canada facility officially opened in October 2009, ready for business with Diver / Technicians and specialty equipment to meet our clientele's needs. Expanding our presence on the East Coast of Canada allows commercial as well as offshore clients better access to rapid emergency and expert routine maintenance services for their vessels. From Ship's husbandry to high end equipment and ship repairs, the team in Halifax Canada is available to meet your needs.

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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