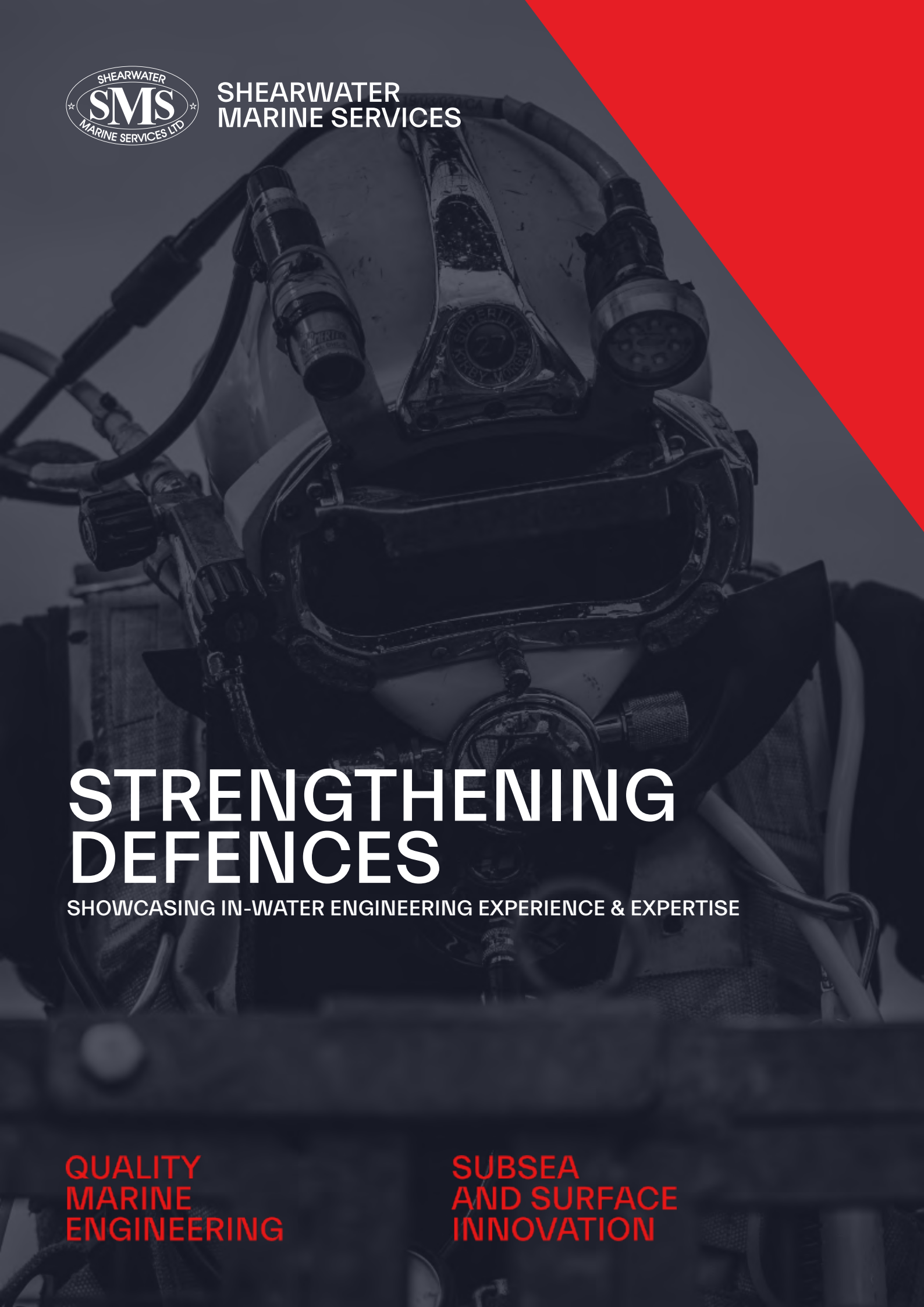
SHEARWATER
MARINE SERVICES



STRENGTHENING DEFENCES

SHOWCASING IN-WATER ENGINEERING EXPERIENCE & EXPERTISE

QUALITY
MARINE
ENGINEERING

SUBSEA
AND SURFACE
INNOVATION

SHEARWATER MARINE SERVICES

UK MOD DIVING & MARINE ENGINEERING SPECIALISTS

Shearwater Marine Services Ltd have a long history of providing diving and engineering services to the Ministry of Defence and their principal contractors at HMNB Clyde, RNAD Coulport, Rosyth Dockyard and many of their other operational facilities.

Shearwater Directors, Alastair Baird and Tom Brannan were involved in the construction of the HMNB Clyde Shiplift in the early 1990's which inspired them to form a company with an aspiration that it could provide inspection, repair and maintenance (nuclear/non-nuclear safety) services on that and its surrounding infrastructure and assets. Hence, from 1994 until present, Shearwater have provided that support and maintain a presence as the principal diving contractor of choice used for marine/diving operations in HMNB Clyde, RNAD Coulport and Rosyth Dockyard.

Since 1997, Shearwater have and continue to provide, diving and engineering services for the Royal Navy fleet. Offering a range of services that has required overseas mobilisation of technicians and diving specialists,

We have developed first of a kind techniques and processes, which without, would have unequivocally resulted in costly, programme impacting dockings and delays resulting in letters of commendation from key figures from the Ministry of Defence. This experience has developed, matured and sharpened Shearwater's perspective to risk management and maximising on efficiency with every opportunity.

The maintenance and support of Continuous at Sea Deterrence (CASD), along with the provision of personnel, engineering and logistics support to ships and submarines of the Royal Navy, remains at the forefront of our priorities in delivering some of Defence's highest priority outputs.

The company has also supported several recent infrastructure installations at HMNB Clyde, including the Valiant Jetty and Nuclear Support Hub.

Directors and workforce are fully aware of the unique and sometimes diverse challenges that part of the daily routine when operating in a highly regulated nuclear base. They desire to set the highest of standards for safety and technical prowess, which is born out by their continued presence within HMNB Clyde and RNAD Coulport.

The varying challenges faced when working in such a highly complex and technical environment has advanced Shearwater into a highly accomplished, skilled and trusted supplier for MOD and their industry partners.

QUALITY MARINE ENGINEERING

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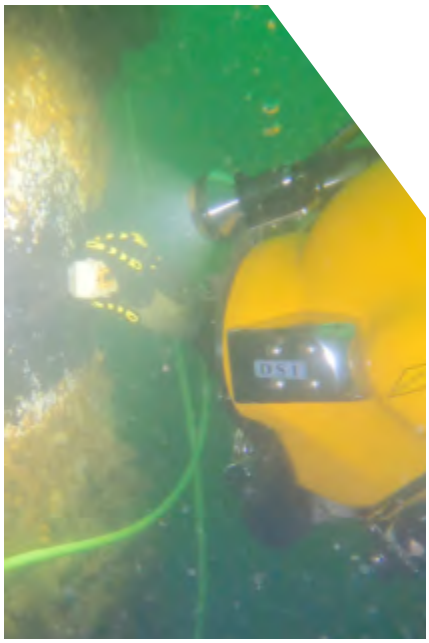
SHEARWATER
MARINE SERVICES

CAPABILITIES

Over the past three decades, we have gained significant experience across a range of sectors and developed a broad set of professional capabilities.

IN-WATER ENGINEERING & CASD MAINTENANCE SUPPORT



SPECIALIST SURVEY & INSPECTION SERVICES

TOPSIDE/MARINE/TECHNICAL ENGINEERING SERVICES

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SHEARWATER MARINE SERVICES

30+ YEARS OF IN-WATER ENGINEERING

1990–1992

INVOLVED IN CONSTRUCTION & MODERNISATION OF HMNB CLYDE

SINCE 1994

INSPECTION & MAINTENANCE OF DEFENCE INFRASTRUCTURE

Defence Infrastructure Organisation

SINCE 1997

IN-WATER ENGINEERING & SUPPORT OF ROYAL NAVY SUBMARINE SERVICE & NAVAL FLEET

ROYAL NAVY

SINCE 1998

TECHNICAL SURFACE SUPPORT FOR ROYAL NAVY FLEET

SINCE 2011

SUPPORTING NATO SUBMARINE RESCUE SERVICE IN COLLABORATION WITH DEFENCE PARTNERS

NSRS

Present

PROVIDING EXPERT DIVING & TECHNICAL SUPPORT 24/7/365 AT HM NAVAL BASES AND ASSOCIATED PORTS

SHEARWATER MARINE SERVICES

IN-WATER ENGINEERING & CASD MAINTENANCE SUPPORT

Shearwater Marine Services, with an established history of 28 years of service to the Royal Navy, is an innovator in the field of underwater repairs and services. Committed to preventing vessel dry docking, the company leverages its vast knowledge and experience to execute advanced repair methods. This approach offers significant time and cost savings while maintaining high-quality results. This case study examines the variety of tasks undertaken by Shearwater, highlighting its capabilities and the advantages of its unique approach.

Shearwater Marine Services is at the forefront of underwater engineering services, with its primary objective being to prevent vessel dry docking. Accumulating extensive experience and knowledge over the past 28 years, working closely with the Royal Navy and various clients, the company offers a wide array of services.

Shearwater meets these challenges with a blend of innovation, expertise, and an expansive array of services, all designed to save time and reduce costs. The tasks that Shearwater routinely undertakes include:

- Hull Scrubs - V&A Class Submarines
- Restricted Access Ballast Tank Diving
- In-Water Bellow Replacement
- Blank Installation – Hull and Ballast Tank
- Wet-Welding – CE Approved
- Prop Polishing
- Bangkok Strainers
- Grill Removal - Sea Chest and Ballast Tank Cleaning
- Blanking Fit and Removal
- NDT Surveys
- Lloyds Surveys
- ICCP – V Class Submarine Complete Replacement Utilising Underwater Habitat
- Flank Array Repairs
- Cofferdam Installation
- Underwater Painting
- Thickness, Pintle and Shaft Wear Down Readings
- Dry Dock - Capper Block Inspections
- Anode Replacement and Removal
- Docking - Shore Connections (waste, water, cooling water strainers etc)
- Thruster Removal
- Rope Guard Repairs
- Hull Blanking – Design and Fit
- Sensor Replacement
- Gland Packing
- Prop, Hull, Rudder

Shearwater's approach has resulted in significant time and cost savings. By performing repairs underwater, the company eliminates the need for dry docking, a process that is both time-consuming and expensive. Dry docking can often result in lost operational time and additional costs related to transportation, dock fees, and lost revenues. By contrast, Shearwater's underwater solutions enable vessels to remain operational for longer, reducing downtime and associated costs.

SHEARWATER MARINE SERVICES

SPECIALIST SURVEY & INSPECTION SERVICES

Shearwater Marine Services, with an established history of 28 years of service to the Royal Navy, is an innovator in the field of underwater repairs and services. Committed to preventing vessel dry docking, the company leverages its vast knowledge and experience to execute advanced repair methods. This approach offers significant time and cost savings while maintaining high-quality results. This case study examines the variety of tasks undertaken by Shearwater, highlighting its capabilities and the advantages of its unique approach.

At Shearwater, we specialise in providing comprehensive subsea inspection services to our clients. Our team of highly skilled and experienced professionals is trained and equipped to conduct various types of inspections, including General Visual Inspection (GVI), Close Visual Inspection (CVI), and Non-Destructive Testing (NDT).

Our GVI and CVI services cover a wide range of marine structures, including jetty and quay structures, bridge structures, canal locks and lock gates, mooring inspections, and other structures such as pontoons, slipways, sluice gates, pump houses, navigational aid structures, and berthing catamarans.

For vessel inspections, we are accredited for Lloyds, DNV, and ABS Class In-water hull surveys. We also conduct Restricted Access and Ballast tank inspections. Our diving NDT capabilities include UT plate thickness readings, MPI magnetic particle crack detection, ACFM alternating current field measurement for crack detection and sizing in welds, and Cathodic Protection Surveys.

Shearwater have worked with the Defence Infrastructure Organisation and Partners in the Inspection and Maintenance of the marine infrastructure at HMNB Clyde & other supporting ports since 1994. Our highly skilled team including Subsea Structural Engineers and Project Management team ensure that our client's requirements are always met by having an in depth knowledge of the critical maintenance and inspection schedules.

SURFACE INSPECTION & COLLABORATION

In addition to our diving services, we offer topside NDT services, such as visual inspections by a CSWIP senior weld inspector, MPI crack detection, and ACFM for crack detection and sizing in welds.

We also provide seabed surveys with GPS location of items, ROV surveys, and Spy-ball 360o Rotational HD Video Surveys. Moreover, we collaborate with our clients to offer 3D sonar point cloud surveys, aspect surveys, photogrammetry, and videogrammetry, using Viewport3 technology to produce accurate 3D models.

At Shearwater, we are committed to providing our clients with high-quality, cost-effective, and timely subsea inspection services. Our goal is to ensure the safety and integrity of our clients' assets while minimising downtime and maximising productivity.

SHEARWATER MARINE SERVICES

TOPSIDE/MARINE/TECHNICAL ENGINEERING SERVICES

As a leading provider of marine services, we specialise in offering manpower and technical engineering solutions to meet the diverse needs of our clients. With an unwavering commitment to excellence and a team of highly skilled professionals, we are poised to deliver innovative solutions that drive success.

At Shearwater Marine Services, we understand the critical role that manpower plays in the efficient operation of marine engineering projects. We recognise that having the right personnel can make all the difference when it comes to delivering a successful project. That's why we have built an extensive network of experienced and certified professionals who are ready to meet your specific project requirements.

Our team is made up of highly trained engineers, qualified technicians, and competent crew members, all of whom bring unique skills and perspectives to the table. We carefully select each member of our team to ensure that they have the knowledge, expertise, and experience necessary to contribute to the success of your project.

Our technical engineering surface projects offer a wide range of solutions designed to complement and enhance the performance and productivity of marine systems. From vessel refurbishment and maintenance to equipment installation, maintenance, and commissioning, we possess the technical skill set and industry knowledge to handle projects of varying complexities. Our meticulous attention to detail and adherence to local, international, and defence standards ensure that every project is executed with precision, resulting in increased efficiency, reduced downtime, and optimised performance.

What sets us apart is our unwavering commitment to safety, quality, and customer satisfaction. We prioritise the well-being of our personnel and the preservation of the marine environment, adhering to stringent safety regulations and employing sustainable practices throughout our operations. Our dedication to delivering high-quality solutions is reflected in our track record of successful projects and repeat satisfied clients.

QUALITY MARINE ENGINEERING

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Speedglas
3M

SHEARWATER
MARINE SERVICES

UNRIVALLED IN-WATER ENGINEERING EXPERIENCE & EXPERTISE

Shearwater Marine Services is proud of its extensive experience and expertise in providing high-quality engineering services to the Royal Navy. Our team has had the privilege of working on a number of Royal Navy vessels, providing in-water engineering services that meet the highest standards of quality and safety.

We are proud to showcase the insignia of the Royal Navy vessels we have worked on, highlighting our proud history of collaboration with the Royal Navy. Our commitment to excellence and dedication to ensuring that every project is completed to the highest standards of quality and safety is reflected in our work on these vessels.

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SHEARWATER MARINE SERVICES

PROVIDING 24/365 SUPPORT & INVESTMENT IN SERVICE

Shearwater are committed to continually supporting critical MoD asset requirements no matter how big or small. We have proven over the years that we are capable and willing to invest, develop and commit to providing a quality service and ensuring the delivery of a reliable service whether it is for an emergent or planned task. Each task is treated with the same professionalism, dedication and a commitment to customer satisfaction.

Emergency call out support and emergent tasks form a critical part of the service Shearwater provide at HMNB Clyde. Shearwater have supplied a 24hr, 7-day, 52-week support to the base . The dive teams have attended at short notice, numerous callouts and coped with hourly changes in contract requirements. We currently operate an on-call system within our dive teams where we have a 5-man dive team at a constant state of readiness should they need to react to any base requirements at short notice. The call out team are rotated weekly and managed by our Senior Dive Supervisors. As requirements increase, we have the ability to expand this capability and ensure the continued service to our clients is not interrupted.

To support the current scope of works and keep our footprint on HMNB Clyde to an absolute minimum, Shearwater diving teams are supported with four large, dedicated dive support vessels. The dive support vessels are all fitted with surface supplied dive equipment, diver recovery systems, certified lifting equipment and welfare facilities.

As the dive support vessels are primarily dedicated to the work we undertake in the base, the boats remain stationed there, saving time and costs on mobilisations to and from the naval base. It also affords Shearwater the ability to react almost instantaneously to any emergent requirements that may arise.

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THE SHEARWATER FLEET


Sea Vigil, Vigilance & Coast Guardian

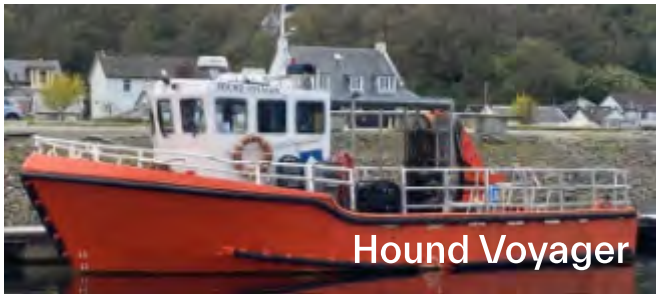
Shearwater currently owns and operates seven dive support vessels, which are active around the River Clyde and at nearby facilities. Each dive support vessel is fully equipped with IMCA D040-compliant dive systems and can support all diving tasks in

Gare Loch, Loch Goil, Loch Long, the River Clyde, and surrounding areas. The DSVs have a full complement of lifting equipment and winches to support projects such as the removal and retrofitting of seabed mounted equipment, as well as emergency diver recovery.


Jade M


Miner 3

DSR Gallia 1


Hound Voyager

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SHEARWATER MARINE SERVICES

INNOVATION & PROCESS DEVELOPMENT

Shearwater's business successes result from our commitment to continuous professional improvement. We recognise exactly where and when change is required, and implement the necessary changes within a carefully organised framework. Our customers always benefit from this approach.

Recent projects have seen Shearwater develop an in-water habitat capable of replacing ICCP anodes on vessels which has resulted in a complete solution often only achievable through expensive and timely dry docking. The development and testing of the underwater habitat was carried out at Shearwater HQ prior to successful deployment for the Submarine ICCP Replacement.

Shearwater divers also completed the first ever successful removal of the A class vessels SPM underwater. This was a complex task only previously ever carried out during a dry docking period however Shearwater devised a method of removing the SPM safely using divers operating within the hull of the submarine to rig and remove the SPM.

Another example of innovation on the part of Shearwater and in particular one of our dive supervisors, was the method used to free a jammed anchor chain on an Astute class vessel. Previous attempts from the platform staff had failed in freeing the chain, it was initially considered that the only alternative would be to dry dock the vessel. However, Shearwater divers managed to free the chain by devising an innovative sacrificial anchors method with lift bags that freed the chain in a matter of hours.

Habitat Testing in Training Tank

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SHEARWATER MARINE SERVICES

INNOVATION & PROCESS DEVELOPMENT

Our philosophy regarding how we work with our customers is also important to note. Shearwater's approach is always based on open partnering-style behaviours, working together in an open and honest way, sharing information and driving to deliver goals jointly. In addition to a large range of other benefits, this consistently delivers direct and indirect financial savings.

As well as developing methods to complete new task we are constantly aiming to improve on regular tasks we undertake in the base. Following the UKs exit from the European single market it was seen as a risk to the business that the supply of suitable hull scrubbing equipment could be affected. This drove us to developing our own brush cart discs and brushes that are suitable for use on the submarines that can be made in house to ensure supply is not affected. These brushes and wheels had undergone extensive testing and development to ensure that they were fit for the task before deployment. They are now being use regularly in hull scrubs in the base and the results speak for themselves.

Our director Alastair Baird is the Scottish representative on the board of the Association of Diving contractors. Alastair is passionate about the industry and is a key contributor to policy and standards within the ADC, this also involves changes within the UK diving industry, contributing massively to improving condition and safety for divers inshore.

Shearwater were also a key contributor to the development of The Clyde Dockyard Port Diving Safety and Environmental Management System and regularly attend safety briefings and reviews managed by QHM where their knowledge and expertise is often relied upon when it comes to safe diving and best practice within the naval base.

All Shearwater dive camera systems used during diving project are able to provide a live feed of the diving operations with HD quality and are supported by a control unit which have been designed at the request of Shearwater for use in HMNB Coulport and RNAD Coulport.

We have also made available remote control, 360 degree rotational, manual zoom, high definiton, cameras and control units which has been regularly used on vessels within the naval base on special projects.

All camera system have DART approval and are accredited by the Royal Navy SyoPS.

For the duration of our presence on HM Naval Bases and support of the operations within, Shearwater have been committed to strategic collaboration with all of our clients. We continue to be committed to sharing our expertise and knowledge of diving and marine engineering in a way that benefits our clients and the platforms they manage. We have dedicated time to working with Babcock Marine (Clyde) on some of their most difficult challenges to ensure a common end goal is reached, often going over and above the call of duty at no extra cost.

SHEARWATER MARINE SERVICES

ARMED FORCES COVENANT

PROUDLY SUPPORTING THOSE WHO SERVE

Shearwater Marine Services Ltd has pledged their committed to upholding the Armed Forces Covenant and supporting the Armed Forces Community, recognising the contributions of Service personnel, veterans, and military families. The company will promote the Armed Forces, support the employment of veterans, and participate in national events, among other commitments outlined in the Covenant.

DEMONSTRATING OUR COMMITMENT

We recognise the contribution that Service personnel, reservists, veterans, the cadet movement and military families make to our organisation, our community and to the country. We will seek to uphold the principles of the Armed Forces Covenant by:

- **Promoting the Armed Forces:** promoting the fact that we are an Armed Forces-friendly organisation, to our staff, customers, suppliers, contractors and wider public.
- **Veterans:** supporting the employment of veterans, recognising military skills and qualifications in our recruitment and selection process; working with the Career Transition Partnership (CTP) to support the employment of Service leavers.
- **Education:** support the MOD's Enhanced Learning Credits (ELC) Scheme as a registered Learning Provider through sister company Professional Diving Academy and promote lifelong learning amongst members of the Armed Forces.
- **National Events:** supporting Armed Forces Day, Reserves Day, the Poppy Appeal Day, and Remembrance activities.

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TRAINING & EMPLOYMENT OPPORTUNITIES

With a strong history in HMNB Clyde, RNAD Coulport and Rosyth Dockyards, Shearwater Marine Services Ltd is in a strong position to offer career opportunities to the Armed Forces Community. Through our partners and connections we are able to offer discounted rates for service personnel with the Professional Diving Academy as well as employment opportunities in a strong and expanding organisation.

Shearwater Marine Services and their sister company, the Professional Diving Academy, are committed to providing opportunities for Armed Forces leavers to transition into civilian life with meaningful and rewarding careers in the maritime industry. With this in mind, they have partnered with the UK Ministry of Defence's Enhanced Learning Credits (ELC) Scheme to offer a range of training courses that are fully funded for eligible service leavers.

The Enhanced Learning Credits (ELC) Scheme, which is a program that helps members of the UK Armed Forces pursue higher education. The scheme offers financial support for up to three courses at Level 3 or above, which are nationally recognised qualifications or their international equivalents. The scheme is administered by the Enhanced Learning Credits Administration Service (ELCAS) and requires approval from the MOD or the Single Service Representative (SSR).

This means that not only can service leavers receive the training they need to start a new career, but they can also do so with the added support of Shearwater Marine Services.

Furthermore, Shearwater Marine Services offers opportunities in project management, engineering, technical services, and finance. These opportunities are designed to provide service leavers with the skills and knowledge needed to succeed in the maritime industry.

By offering these opportunities and support, Shearwater Marine Services are helping to ensure that service leavers can make a successful transition into civilian life and build fulfilling careers in the maritime industry.

SHEARWATER MARINE SERVICES

Shearwater Marine Services Ltd are in the unique position with our specialist training links through their sister company, the Professional Diving Academy (PDA). The PDA has a global reputation for delivering high quality HSE accredited commercial diver training and internationally recognised certification which allows Shearwater Employees to maintain their Continuous Professional Development to the highest standard.

The Professional Diving Academy (PDA), one of the two leading UK offshore and inshore diver training schools, is gearing up to celebrate its 20th anniversary in 2024. Widely recognised as a global leader in the diving industry, PDA is committed to producing highly skilled and professional divers with a realistic outlook on their careers and a burning desire to continuously enhance their skills beyond graduation.

With its wealth of commercial diving expertise and support from its sister company Shearwater Marine Services Ltd, PDA can provide full support services for underwater projects.

PDA's dedication to producing world-class commercial divers with cutting-edge training methods has made it a trailblazer in the diving industry. Join the academy today and take the first step on your diving journey towards a successful and fulfilling career.

DIVER TRAINING

PDA offers inshore and offshore HSE certified and IMCA recognised courses that extend to depths of 50msw, providing graduates with access to a world of opportunities in the diving industry. Further training is available for divers already in the industry, including in-water rigging and hydra-tight equipment training.

IN-WATER TRIALS

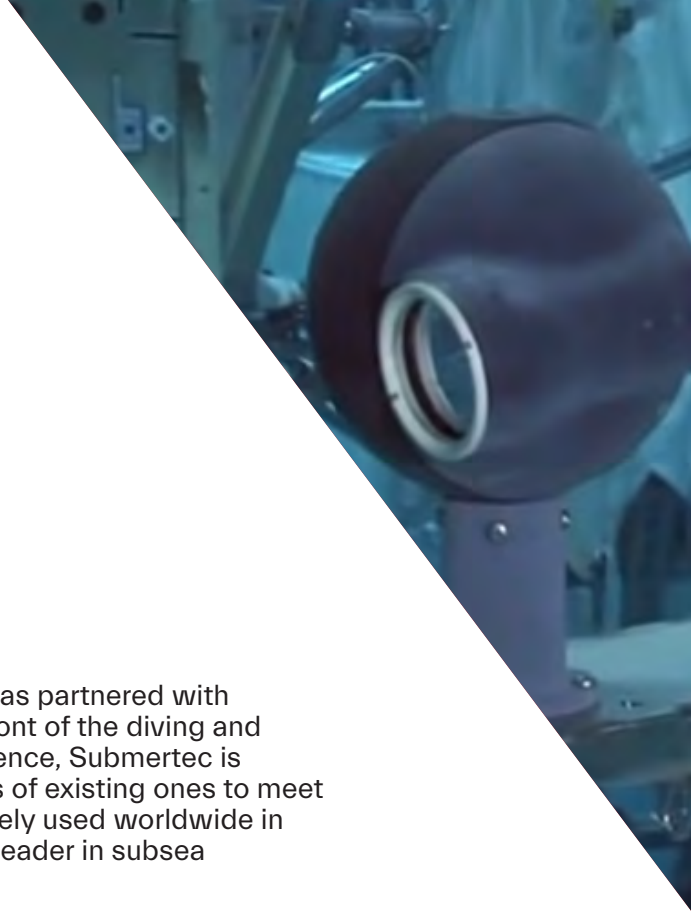
For companies looking to test equipment or trial techniques in a controlled environment, PDA's dive training vessel 'Sleat' is anchored at 35m of water and has a platform secured below at 8.0m for trials. The vessel is fully equipped with welfare facilities, a wet bell and diver's basket, full air supplies with backup, and hot water suits.

CONSULTANCY

PDA's consultancy services are highly sought after by clients and the diving industry. The academy has been at the forefront of the drive to increase diver safety in the Aquaculture Industry, developing methodologies and documentation to benefit both clients and the diving industry.

The academy's Dive Site Awareness courses are proving popular and effective for port managers, project managers, masters, and chief engineers in shipping and ferry companies, project managers in offshore wind operations, construction sites, oil and gas facilities, and utility sites.

SHEARWATER MARINE SERVICES



SUBMERTEC

Submertec Limited, founded in 1989 by Peter Sharphouse, has partnered with Shearwater Marine Services to bring innovation to the forefront of the diving and underwater vehicle industry. With extensive practical experience, Submertec is committed to developing new products and special versions of existing ones to meet industry requirements. Their Spyball systems have been widely used worldwide in various applications, and their aim is to become an industry leader in subsea technology and innovation.

Submertec Limited was formed in January 1989 by Peter Sharphouse in order to develop and market products based on over 25 years of experience in the diving and underwater vehicle industry.

In 2022, Submertec and Shearwater Marine Services formed an official partnership dedicated to developing the industry's capabilities and bringing innovation to the forefront. Submertec is committed to exploring opportunities that will allow it to develop new products or create special versions of its existing ones to meet the specific requirements of the industry.

Submertec's extensive practical experience working with a wide variety of equipment has made it an expert in the field. As such, this experience is being put to good use during the design process to ensure that all Submertec products are durable, functional, and easy to use. By leveraging this expertise, Shearwater Marine Services can be confident that the equipment and technology provided by Submertec Limited will be of the highest quality.

Submertec has always aimed to put itself in the position of the end user while developing products so that they are truly functional. With the support of Shearwater Marine Services, Submertec aims to become an industry leader in subsea technology and innovation.

SUPER SPYBALL UNDERWATER CAMERA

ULTRA BRIGHT LED UNDERWATER LIGHT

UNDERWATER SEASPY CAMERA

SPECIALIST CAMERA CONTROLLERS

QUALITY MARINE ENGINEERING

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SHEARWATER MARINE SERVICES

SHEARWATER MARINE SERVICES PROJECT CASE STUDY

INNOVATIVE UNDERWATER REPAIR OF AN ICCP SYSTEM

Shearwater Marine Services, with its 30 years of experience and extensive surface and subsea engineering capabilities, successfully completed a unique project involving a full repair of an Impressed Current Cathodic Protection (ICCP) system. Typically, these repairs are conducted via dry docking, but due to limited availability, Shearwater completed the works alongside a dock with the underwater replacement section. The company's innovative solution saved the client time and money and ensured the longevity of the system for the vessel at sea.

INTRODUCTION

Impressed Current Cathodic Protection systems are crucial for maritime vessels to mitigate the risk of corrosion. However, the repair of these systems traditionally requires dry docking. This conventional approach can be expensive and time-consuming, and sometimes not feasible due to docking space availability. Shearwater Marine Services, with its deep-rooted experience in servicing the Royal Navy Fleet, was tasked with the challenge of repairing an ICCP system alongside a dock, carrying out the replacement section underwater.

CHALLENGE

The main challenge in this project was conducting the underwater repair without the use of a dry dock. The technical repair underwater required a dry space to allow the technician to terminate cables appropriately, and adhesion methods had to be applied in the dry and monitored. This unprecedented task also involved ensuring that all connections were watertight to withstand depth water ingress to the cables.

SOLUTION

Shearwater Marine Services designed and manufactured an underwater dry space, which was light, neutrally buoyant, and could be secured effectively to the vessel's hull. This innovative solution allowed for cathode change-outs and the correct underwater repair methods. The company's surface technician, armed with appropriate training and the best techniques, conducted all cabling repairs. The dry space creation and the innovative testing methods for checking the repair integrity established Shearwater as the preferred contractor for cable repairs and change-outs.

RESULTS

The results of this project were groundbreaking. For the first time, to Shearwater's knowledge, a full repair of an ICCP system was conducted underwater for the Navy. The underwater dry space, specially designed and produced by Shearwater, made it possible for a technician to perform the necessary repair to the cabling and control the environment to produce a sound connection. A fully functional check was conducted upon completion of the repair, and the vessel went to sea with the entire system operational. This innovative solution not only saved the client time and money but also ensured the system's longevity at sea.

CONCLUSION

This case study showcases Shearwater Marine Services' innovative approach to problem-solving, technical expertise, and commitment to delivering value to clients. The company's successful underwater repair of an Impressed Current Cathodic Protection system has set a new standard in the industry. By leveraging its extensive experience, innovative engineering capabilities, and rigorous testing methods, Shearwater was able to overcome significant challenges and deliver a first-of-its-kind solution that ensured the operational efficiency and longevity of the ICCP system for the vessel at sea. This accomplishment further underscores Shearwater's position as a leading provider of marine services to the Royal Navy Fleet and beyond.

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SHEARWATER MARINE SERVICES

SHEARWATER MARINE SERVICES PROJECT CASE STUDY

PORT RUDDER RAM IN-WATER REPLACEMENT

Shearwater Marine Services (Shearwater) successfully completed an in-water repair of the Port Rudder Ram on a naval vessel, a first-of-its-kind accomplishment. The initial plan to use a Rudder Cofferdam for dry access was not feasible, leading to the development of a collaborative and innovative solution involving multiple diving teams and stakeholders. The repair was completed in a challenging environment, with meticulous planning and execution, ultimately finishing only two days over the scheduled timeline.

INTRODUCTION

In February 2020, an issue with the hydraulic system of a naval vessel's rudder was discovered, resulting in sea water contamination. The original plan was to investigate this defect using a Rudder Cofferdam, but it could not be fitted successfully. Shearwater developed an alternative solution that involved diver entry into the Aft Free Flood Space (AFFS) for the first time ever.

CHALLENGE

The challenge was to carry out the in-water repair of the Port Rudder Ram, given that the Rudder Cofferdam could not be fitted. The repair involved a series of complex tasks that had never been conducted in-water before, requiring innovative solutions, meticulous planning, and collaboration across various stakeholders.

SOLUTION

SMS and its partners developed a first-of-its-kind in-water repair solution, which included the following key steps:

1. Investigation and repair timeline: From December 2020 to July 2021, Shearwater carried out various activities, including ROV and diver entry, hydraulic leak detection and repair, in-water repair of the Port Rudder Ram, sourcing a replacement Rudder Ram, and successful pressure testing after the repair.

2. Repair methodology: The repair process involved removing the defective Ram, workshop activities to prepare the new Ram, and fitting the replacement Ram.

RESULTS

Shearwater successfully completed the in-water repair of the Port Rudder Ram, overcoming numerous challenges, such as:

- Ram internal slinging within the AFFS
- Slinging of Rudder Ram in/out of the AFFS
- Tiller Pin Nut removal
- Pilgrim Nuts removal
- Hydraulic Swagelok connections
- Fitting of Bearing Top Hats to the new Ram
- Strength Testing of eye bolts and cleats within the AFFS

CONCLUSION

Shearwater Marine Services demonstrated exceptional expertise, dedication, and innovation in completing this first-ever in-water repair of the Port Rudder Ram. By working closely with multiple stakeholders and diving teams, and overcoming numerous challenges, Shearwater delivered a successful repair that was only two days over the scheduled timeline. This case study showcases the capabilities of Shearwater in providing innovative and effective solutions in challenging environments.

QUALITY MARINE ENGINEERING

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SUBSEA AND SURFACE INNOVATION

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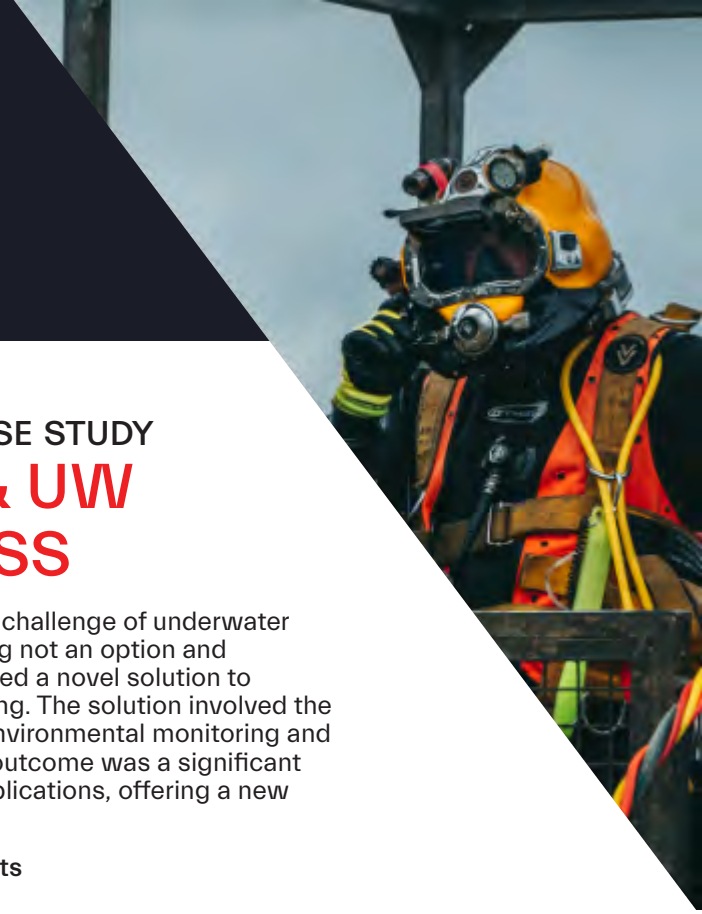
SHEARWATER MARINE SERVICES



SHEARWATER MARINE SERVICES PROJECT CASE STUDY

HABITAT DEVELOPMENT & UW ACOUSTIC TILING SUCCESS

Shearwater Marine Services successfully addressed the ongoing challenge of underwater acoustic tiling for the Ministry of Defence (MOD). With dry docking not an option and temporary fixes insufficient, Shearwater Marine Services developed a novel solution to control the underwater environment and ensure tile adhesive curing. The solution involved the creation of an underwater 'dry space' for divers to work in, with environmental monitoring and CCTV surveillance to ensure optimal application conditions. The outcome was a significant improvement in adhesion strength over conventional in-water applications, offering a new standard for underwater acoustic tiling.

Introduction

The MOD faced a persistent problem: the application of acoustic tiles underwater. The traditional practice of dry docking was impossible, and temporary repairs were not durable. The task was to devise a solution that would control the environment and maintain stability during the adhesive curing process. This was a novel task, with no previous baseline statistics or established methodologies to follow.

Challenge

The project faced several obstacles, including limited information on tiling application, restraining methods, environmental parameters, availability of testing facilities, and requisite training. The principal challenge was creating and maintaining an environment suitable for tile application that had never been attempted before. Testing parameters were challenging to define, but Shearwater's in-house testing facility, dive tanks, 30m dive sites, and training vessel enabled the exact testing conditions required on-site to be replicated.

Solution

After exploring various solutions, including industry-standard hydro boxes, Shearwater decided to construct a dry space for the diver to work in a controlled, dry environment. This dry space was equipped with an environmental monitor and CCTV, allowing certified trainers and supervisors to oversee the application process. The dry space was designed and built in-house using aluminium and CE-approved in the company's execution-class workshop. This innovative approach, combined with appropriate planning for the right equipment, helped address the cost implications of the project.

Results

The dry space was successfully constructed, and initial tests were conducted on the surface with a qualified applicator before progressing to sea trials. Subsequently, the testing was moved to the Professional Diving Academy facility, where a cage was built to simulate the vessel's hull, enabling attachment of the dry space and lowering it to the required testing depth. With QinetiQ onsite to ensure procedural compliance and data collection, the testing results were nearly identical to those of surface application. In contrast, in-water trials showed significant loss in adhesion strength compared to surface application, highlighting the effectiveness of the dry space solution.

Conclusion

The innovative solution provided by Shearwater Marine Services sets a new standard for underwater acoustic tiling. By creating a controlled dry space underwater, the company has not only overcome the limitations of traditional tiling methods but also demonstrated a potential model for other underwater engineering tasks. This case study provides a testament to Shearwater Marine Services' ability to think outside the box and devise creative solutions to seemingly insurmountable challenges.

SHEARWATER MARINE SERVICES

SHEARWATER MARINE SERVICES PROJECT CASE STUDY

UNDERWATER SECONDARY PROPULSION MOTOR (SPM) REMOVAL

Faced with a submarine suffering catastrophic damage to its secondary propulsion motor (SPM), Shearwater Marine Services devised an innovative underwater solution to remove the SPM while the vessel remained afloat. This approach overcame significant challenges, such as insufficient docking clearance and potential program implications for other platforms. The successful operation exemplifies Shearwater's expertise in submarine diving and their commitment to delivering ingenious solutions in challenging environments.

INTRODUCTION

A client approached Shearwater Marine with a problematic decrease in fluid levels from the internal system of their submarine's SPM. During Shearwater's inspection, the SPM drive motor was found to have sustained irreparable damage, necessitating its removal and posing a series of logistical challenges.

CHALLENGE

Initial consideration of potential solutions revealed several obstacles. The North platform's docking blocks did not provide enough clearance for the SPM's removal or re installation. Modifying the dock bottom would involve a lengthy process without guaranteed success. Lastly, docking at Barrow would have significant implications for other platforms in production.

SOLUTION

Confronted with these challenges, Shearwater, in collaboration with Babcock's Submarine Support Engineering (SSE) Group (formerly SSMG), proposed an innovative underwater approach to remove the SPM while the submarine remained afloat. Shearwater provided the concept and design of the SPM Slinging Blank Plate, and SSE Group performed the necessary calculations and drawings to support this idea.

This innovative design created the required clearance for lifting the SPM within the Main Ballast Tank (MBT), allowing the platform to maintain the integrity of the MBT and adjust the trim during daylight hours. This made it possible for the primary maintenance task to proceed as the SPM removal package was conducted during night shifts.

In addition to this, Shearwater tackled several other engineering challenges during this process. They implemented a low-pressure blow system within the port and starboard MBTs for dry hydraulic connection disconnects and blanks, as well as for dry electrical connection disconnects. The platform authorised Shearwater to undertake diving and trimming operations to establish a dry working environment for these work packages. Furthermore, they meticulously calculated the necessary depth for the slinging route and cross-haul, ensuring that the SPM opening did not impede the cross-haul to the SD Angeline. For the encoder cable protection, Shearwater utilised their temporary low-pressure blow system to create a dry working environment within the main ballast tank. This enabled them to apply resin potting to the encoder cable using a Fil-O-Form resin kit.

RESULTS

Through innovative problem-solving and meticulous execution, Shearwater successfully removed the damaged SPM, utilising a low-pressure blow system to create dry working environments within the MBT and meticulous planning to ensure the safety of the entire operation. The client's trust in Shearwater's abilities allowed for the successful completion of this intricate underwater engineering task.

CONCLUSION

The successful SPM removal operation underscores Shearwater Marine Services' ability to innovate under pressure, navigate complex challenges, and deliver effective solutions. This case study serves as a testament to Shearwater's commitment to tackling unique underwater engineering challenges while maintaining the highest safety and operational standards.

> "I would like to express my thanks to Shearwater for their support with this task, not only over the last week but during the planning process. Without their marine engineering expertise and submarine experience, this task would not have been possible." - Project Manager Marine (Clyde WSMI)

SHEARWATER MARINE SERVICES

COMPANY PROFILE

COMPANY REGISTRATION NUMBER:	SC137036
DATE OF INCORPORATION:	10 MARCH 1992
COUNTRY OF REGISTRATION:	UNITED KINGDOM
COMPANY VAT NUMBER:	GB801553658
DUNS NUMBER:	771229242
HSE DIVING CONTRACTOR REGISTRATION NUMBER:	0332

Management System Accreditation

Trade Memberships

Service Supplier Accreditations

Certifications & Registrations

BS EN 1090-1: Execution Class 3 CAB: 0040

Social Media Profiles

Facebook:	facebook.com/ShearwaterMarineServicesLtd
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