

An Ocean of Possibility

Marine and mooring solutions for the offshore industries

Orwell
OFFSHORE 
Naval Architects and Offshore Engineers

OUR BUSINESS

ORWELL OFFSHORE IS A LEADING FIRM OF NAVAL ARCHITECTS & OFFSHORE ENGINEERS PROVIDING MARINE & MOORING SOLUTIONS FOR THE OFFSHORE INDUSTRIES

Our comprehensive range of fully integrated services means we have the skills and knowledge to drive and support every stage of a project's lifecycle from concept selection to decommissioning.

Worldwide, our services include concept studies, modelling and assessments, detailed design and technical support, vessel conversion, mooring systems, construction, FPSO packages, offshore installation and decommissioning.

We have built our reputation on safely managing and delivering complex and innovative solutions for clients across the marine industry and remain fully focused on its continuation and development.

We believe in the power of knowledge and ingenuity to create solutions.

“Our vision is to be the world’s leading mooring systems provider”

OUR SERVICES

Orwell Offshore provides the marine and offshore industries with an impressive range of integrated specialist services. Operating from offices in the UK, Singapore and Malaysia, we have successfully completed a portfolio of projects around the globe that showcases our skills across all aspects of the market.

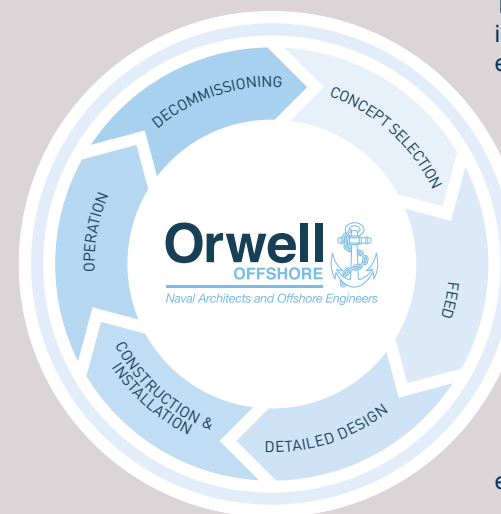


There is no such thing as a typical project and it's this constant challenge that makes our role so rewarding. Our range of commissions is vast, each one requiring its own set of skills. That's why we see ourselves as solutions providers, drawing on abilities and experience and applying them as required.

Working in parallel, the Design and EPCI sides of our business enable us to fully integrate ourselves into projects at any stage giving us a rare flexibility and versatility. The resulting teamwork and depth of knowledge informs and contributes to our company-wide expertise in an ever-shifting environment.

The Design team consists of innovative professionals bringing an exceptional clarity of thought to all projects whilst dovetailing perfectly with the robust advice offered by our experienced EPC team. Together they provide effective solutions to projects covering the most complex cross-disciplinary subjects.

Our teams are supported by our ownership of all of the major specialist analytical tools. This gives us the freedom to maintain our core skills, whilst continually developing bespoke add-ons and extensions to the software.



TURRET MOORING SOLUTIONS

Orwell Offshore's expertise in designing, building and integrating turret mooring systems is part of the company's core capabilities. Our personnel have gained considerable experience in the design and fabrication of internal and external turret mooring systems prior to and since the inception of Orwell Offshore in 2006.

COLUMN TURRET

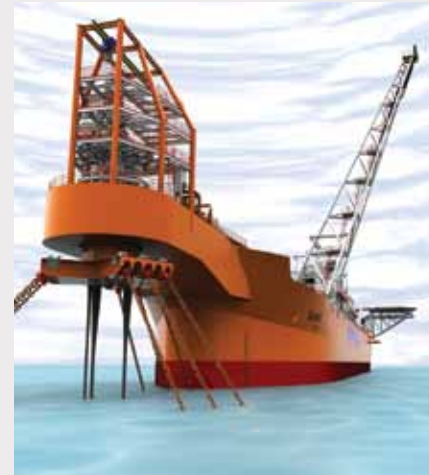
The column turret is suitable for harsh weather locations and/or shallow water applications with a converted or new build FSO/FPSO.

The turret is designed for environmental conditions of up to Hs 12.0m with suitable green water protection. The turret can be supplied with toroidal fluid swivel system or fitted with an owner-supplied swivel system and has capacity for up to 8 risers or umbilicals. The chain table can accommodate between 6 and 12 mooring lines.



CANTILEVER TURRET

Utilising key components of the column turret, the generic bow mounted external cantilever turret is suitable for integration with a converted or new build vessel. The turret has full 360° weathervaning capability and capacity for 12 risers or umbilicals. A generic turret is currently in construction for the FPSO Layang.



TURRET MOORING SOLUTIONS

DISCONNECTABLE TURRET BUOY



Working alongside our partner, Flexible Engineered Solutions, we offer a Disconnectable Turret Mooring System based upon a conventional internal turret FPSO design. The system allows simultaneous fluid transfer from the subsea wellheads to the vessel for processing, storage, and offloading on station, and can be used with either moored or DP vessels.

The Disconnectable Transfer System can be tailored for new, existing or converted vessels / FPSOs and has a number of unique features, which means the system can offer significant advantages over conventional disconnectable systems.

The Disconnectable Transfer System offers an automated connection and disconnection without the need for manual intervention or access to a floodable turret space. This means that the vessel / FPSO can remain on station for longer periods of time allowing prolonged wellhead fluid transfer. The system can also be deployed in areas of the world where the time to disconnect and reconnect is of utmost importance.

Systems completed to date include:

- FPU Crystal Ocean (DP)
- FPSO Four Vanguard (Moored)
- FPSO Helix Producer (DP)



TERMINAL MOORING SOLUTIONS

CONVENTIONAL BUOY MOORING (CBM)

Conventional Buoy Mooring (CBM) systems remain a safe and effective means of vessel station-keeping during product transfer operations between tankers and shore facilities. They are a cost effective and reliable mooring solution for use in shallow water areas, usually up to a depth of 30m. CBM systems restrict the tanker's weathervaning capability, and as such lend themselves to locations with a prevailing directional environment and relatively benign sea-states.

CBMs typically comprise of four similar-sized mooring buoys located at the fore

and aft ends of the tanker, each anchored to the seabed by their own independent mooring line(s). Arrangements vary depending on field conditions and tanker sizes, but are usually suitable for tankers up to 60,000 DWT.

Each of Orwell Offshore's CBM mooring buoys contains its own independent solar-driven power supply, ensuring all electrical components on the buoy are operational continuously without need for an external power source. Electrical components include marine lanterns, fog detector/signaller, quick release hook unit and telemetry

systems; all of which can be tailored to suit the client's requirements.

Various combinations of quick release hook arrangements can be provided, each having the capability of being operated manually or remotely through a UHF telemetry system with bespoke telemetry software.

Orwell Offshore can adapt their existing CBM system designs to meet the Client's specifications, or alternatively provide full naval architectural and structural engineering services to design and supply completely new CBM systems, from anchor to hook.



SINGLE ANCHOR LEG MOORING SYSTEMS (SALM)

The growing use of FPSOs and FSOs to operate on smaller, more challenging fields has led to engineering expertise in designing and operating suitable mooring arrangements, with a corresponding requirement for a low cost mooring system. The use of Single Anchor Leg Mooring Systems offers a low cost loading solution for marginal fields.

The main components of the SALM comprises a gravity or suction anchor with a fluid swivel for the transfer of product and a yoke for the mooring line to connect to. The wire and chain

segments of the mooring line provide the stationkeeping element whilst product is transferred through a loading hose.

The system can be configured for water depths from 20m to 100m and for seastates up to 5.0m Hs.

The bow loading module provides the connection on the vessel for the mooring line and loading hose and comes complete with emergency disconnect capability.

Supply, installation and offshore operations support can be provided by Orwell's experienced personnel.



TERMINAL MOORING SOLUTIONS

SPM OFFLOADING BUOY (CALM)



Orwell Offshore's Catenary Anchor Leg Mooring (CALM) Buoy design offers a state of the art solution for loading and offloading crude oil, refined petroleum products and other fluids while providing for a safe on-board working environment, protection of all mechanical parts, and easy access for operation and maintenance.

The CALM Buoy offers a typical 25 year design life reducing overall cost of ownership, a turret-based design allowing vessels to weathervane freely, a flat unobstructed deck surrounded with hand railings for personnel safety and a circular skirt which protects the buoy and deflects vessels in the event of tanker 'kissing'.



For more details, please see our SPM Offloading Buoy brochure.

OFFSHORE VESSEL SOLUTIONS

VESSEL CONVERSION



The wealth of Naval Architectural experience we have gained over the years enables us to offer clients fast track conversion or modification of vessels. Whether it be a tanker to a generic FPSO or a supply vessel into a DSV, our engineering team can plan and manage the entire project from preliminary planning through detailed engineering to delivery from the shipyard.

Our portfolio of projects includes a range of vessel conversions for ship owners, oil companies and installation contractors, with the work often being carried out simultaneously with the planning and engineering of offshore construction projects.

Typical conversions might include: tankers to FPSO/FSO, supply vessels to subsea installation vessels, AHT to Dive/ROV support, barges to cable layers, drill rigs to production units, LNG carriers to FSRUs, integration of equipment including cranes, winches and A-Frames, and decommissioning barges including accommodation.

Our multidisciplinary engineering team, combining Naval Architects, Structural, Mechanical, Piping, Electrical, Safety and Project Engineers, can undertake to manage your project from concept to delivery including the interface with the Classification Society and Flag State.



Past Vessel Conversion projects include:

- The conversion of OMS Discovery from Offshore Supply Ship to Hyperbaric Rescue Vessel, which included designing an ROV deck and A-Frame which could be used in conjunction with the onboard winches to recover the hyperbaric rescue chamber in the event of an emergency.
- The conversion of Rubicon Intrepid from shuttle tanker to Generic FPSO. Orwell provided engineering and operations support including structural analysis, finite element analysis, operations support and motions response analysis. After the conversion, we continued to provide ongoing support during the operational period including life extension work and marine updates.
- The conversion of Rubicon Vantage from Panamax tanker to Generic FPSO. Orwell provided structural engineering and design for main items including utility module, helideck, flare tower, off-take platform, process module footings and access walkways. We also continued to provide on-site technical support during the fabrication of all structures in the shipyard and worked closely with the DNV Classification Society.
- The conversion of Havila Harmony from Supply Vessel to Installation Support Vessel, including relocation of the ship's structures, fabrication and installation of flexible lay spread support structure, mezzanine deck and A&R winch, as well as supporting with the 3 week mobilisation period in Singapore.



OFFSHORE CONSTRUCTION SUPPORT

Marine and Offshore construction management and execution has been a core business line of Orwell Offshore since the company's inception in 2006.

Typical projects include installation feasibility and methodology, vessel operability and selection, mobilisation and construction planning, engineering transit and/or installation procedures and provision of specialist support personnel to execute construction campaigns. Orwell Offshore also offers a range of services, from the installation of anchors and pre-laid mooring lines to the towing of equipment, vessels or buoys to the field.

Orwell Offshore has links to a number of vessel owners who may be able to provide a suitable vessel for offshore construction operations. This option is often attractive for marginal field developments where costs need to be kept low.



Our engineering team provides services using its wide range of staff skills and comprehensive array of specialist software, including sequential downtime analysis allowing clients to select optimum vessels for their operations.

Projects covering complex cross disciplinary subjects take advantage of the extensive experience of key staff. All the major software tools are owned internally, allowing us to maintain core skills and develop a number of bespoke additions to this software.

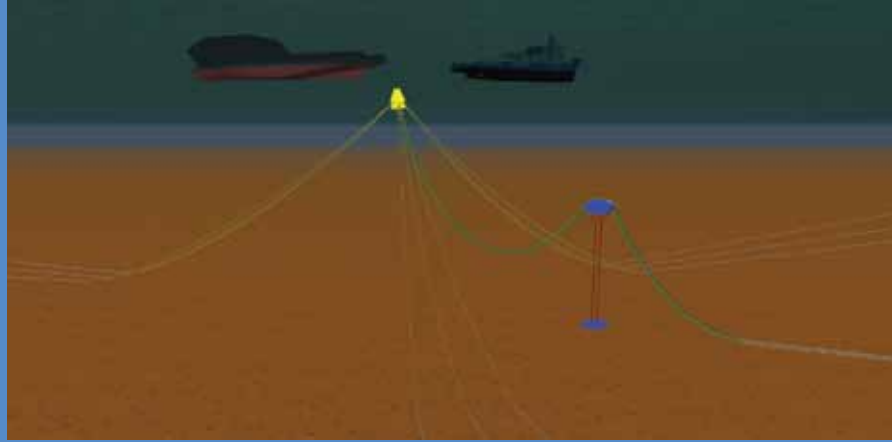


MARINE CONSULTANCY

Our Consultancy team brings you a full range of study, analysis, testing and verification services. These capabilities mean confidence and reassurance at every stage of a project. Whether it's a feasibility study, analysis to aid efficiencies or the development of new technology, we enable you to enter projects with genuine conviction.

Our confidence comes from two things: knowledge and trust. The insight our approach brings gives you the ability to make critical decisions across the breadth of the project, whilst our experience and expertise means you know the data you are basing those decisions on is of the highest quality.

It is our versatility that makes us so unique. We have all the core skills required in-house and ready to apply, whatever the challenge. This means you know the entire project is being handled seamlessly and coherently through one organisation with a



singular vision. By complementing, augmenting and integrating with our Design capabilities, we are able to offer a complete turnkey service.

Working in some of the most demanding conditions all over the world, where precision is vital, the services we provide can have a highly beneficial effect on your business,

helping you to recognise issues and dangers, spot inefficiencies and maintain the highest safety standards.

Our multidisciplinary engineering team consists of a combination of Naval Architects, Master Mariners, Structural, Mechanical, Piping and Project Engineers.



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