

# An Ocean of Possibility

Terminal Mooring Solutions



**Orwell**  
OFFSHORE   
*Naval Architects and Offshore Engineers*

## TERMINAL MOORING SOLUTIONS

The need for loading and offloading terminals suitable for remote locations or to ease congestions in existing harbours continues to grow as the global demand for oil products continues to rise. In these days of lower oil prices and tighter margins, Orwell Offshore offers cost effective, quality solutions for loading and offloading arrangements.

Our team of Naval Architects, using the very latest in optimisation software, can determine the most efficient, cost effective and environmentally friendly terminal mooring solution for your location. Our team can then design, build, install, operate and maintain the facilities.

### 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.



### SINGLE ANCHOR LEG MOORING SYSTEMS (SALM)



The growing use of 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

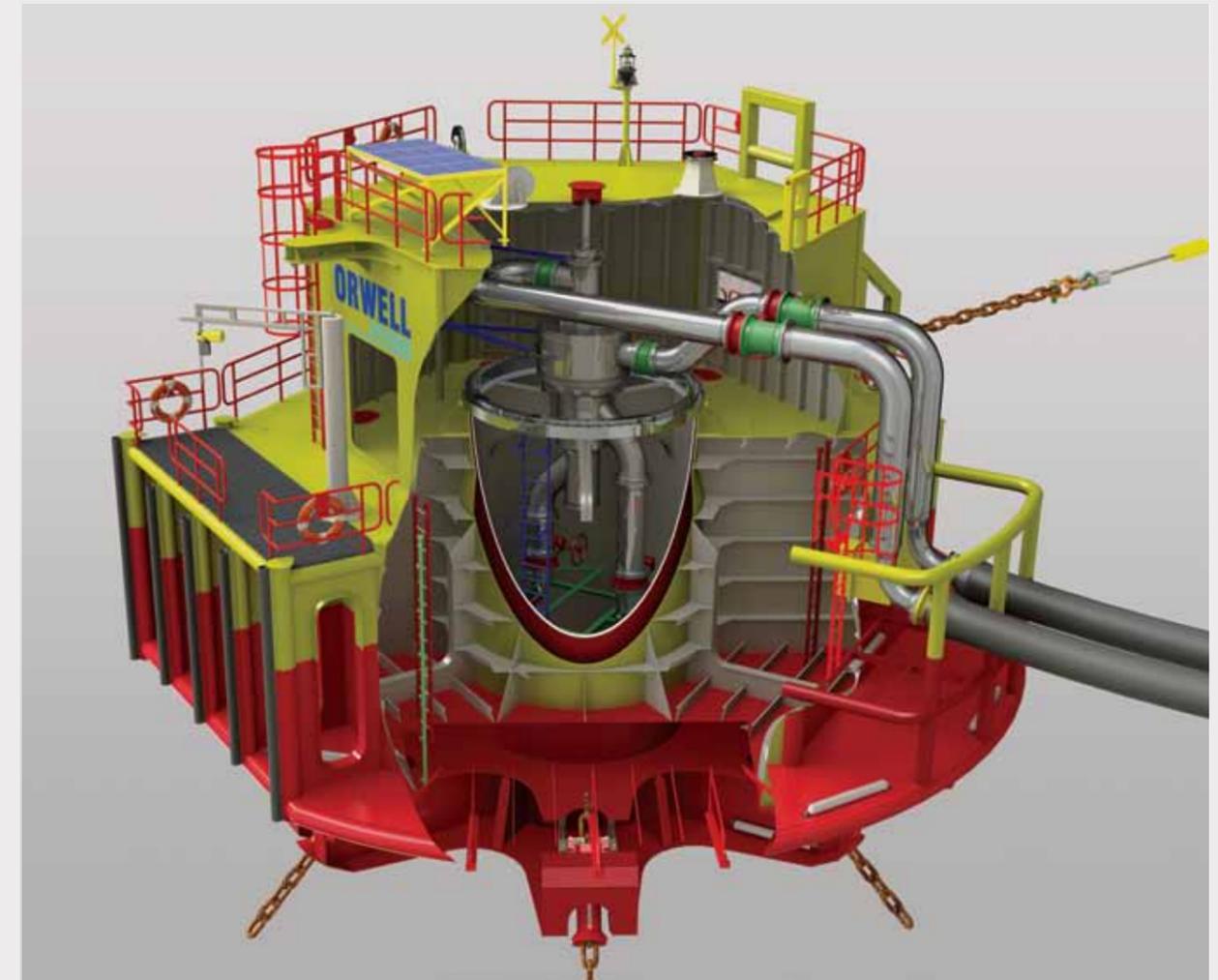
line to connect to. The wire and chain segments of the mooring line provide the stationkeeping element whilst product is transferred through a loading hose.

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.

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### SPM OFFLOADING BUOY (CALM)



Orwell Offshore's Catenary Anchor Leg Mooring (CALM) Turret 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.

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