



**OFFSPRING  
INTERNATIONAL  
LIMITED**

**Conventional Buoy Mooring Systems**

# High integrity, cost effective tanker loading / offloading

Since supplying its first Conventional Buoy Mooring over 15 years ago, OIL has systematically developed its product range to include submarine hoses, and state-of-the-art telemetry and monitoring systems. Conventional Buoy / Multi Buoy Mooring is the ideal mooring system where there are limited quay facilities, infrequent loading / offloading operations, and as an alternative to single point mooring. It comprises multiple buoys to moor the tanker securely and prevent weathervaning. A submarine hose attached to the terminal's PLEM is recovered from the seabed and connected to the midship manifold to begin loading / offloading operations.



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## MOORING SYSTEM

The CBM system comprises typically four steel mooring buoys. The exact configuration will depend on water depth, field requirements and environmental conditions. Each buoy is moored to the seabed with a single pendant chain to the bottom of the buoy. A secondary anchor is also included to prevent the primary anchor from being dislodged by adverse weather conditions.

Each buoy is connected to the tanker via a mooring line and quick release hook. Each quick release hook is fitted with a sensor to indicate whether it is locked or open, this is monitored by the telemetry system which can also control the release of each mooring line.

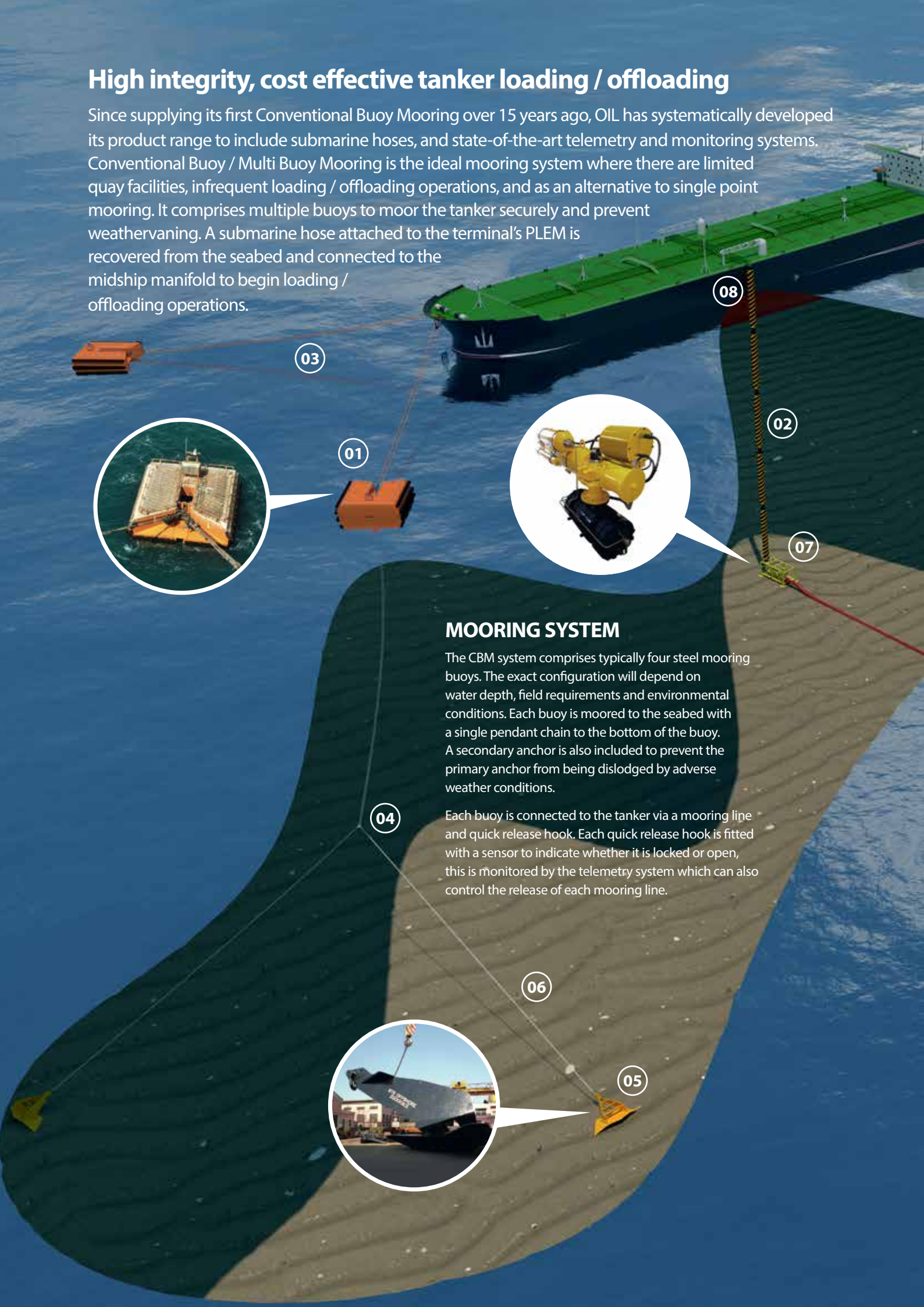
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## OFFSHORE OPS' VESSEL MONITORING SYSTEM



### BUOY CONTROL SYSTEMS

Each CBM buoy is fitted with a power system, navigation aid, hook release system, instrumentation / telemetry, tanker equipment and shore equipment. Power for the equipment on the buoys is provided from solar-powered batteries to provide autonomous 24 hour operation, and with sufficient capacity for multiple hook operations and prolonged periods of poor weather.

The buoys feature 10 nautical mile LED navigation light, and a radar reflector to enhance the 'visibility' of the buoy to nearby shipping. In addition, each buoy is fitted with a GPS receiver to provide accurate telemetry timing; as well as buoy positioning.

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### INTEGRATED TERMINAL MANAGEMENT

In keeping with tanker loading Best Practice, Offspring International, working with partnership with Offshore Ops, offers industry leading software and technologies for mooring and offloading operations. The compact modular system offers a range of terminal management environmental and equipment monitoring devices, seamlessly integrated into a single, secure software package.

Each buoy features a controller to receive inputs and create data messages for transmission over the telemetry link and receive commands from the telemetry system.

The tanker is the primary point for monitoring and control of the buoys, however, data can be monitored from multiple locations using a secure Internet connection. The system monitors the heading of the tanker in addition to its GPS position and that of the buoys, mooring line tension, manifold pressure and can also control mooring line release.

Offshore Ops' Vessel Mooring System (VMS) is monitored on portable equipment taken on board the tanker for final approach. Once moored tanker excursion and tanker manifold pressure, are monitored in real time, together with all CBM and environmental data.

### QUAY REEL

Conventional quay-based tanker loading systems utilise loading arms making the system prone to high loading times as the arms cannot cross each other which limits the number of products that can be loaded at any one time. Quay Reel's flexible loading system allows simultaneous loading and offloading, reducing operation times by up to 60%.

Quay Reel is based on technology proven in over 100 separate projects in the oil and gas industry. Utilising Quay Reel reduces the service life costs of offloading infrastructure and enhances capacity, allowing for sustainable increases in terminal demand.

01 CBM – Conventional Buoy Mooring

02 Offloading hose  
GMPHOM 2009 compliant Manuli hoses.

03 Mooring line

04 Clump weight

05 Anchor

06 Anchor chain

07 PLEM Autonomous Shutdown Valve  
Paladon Systems' Autonomous Shutdown Valves (ASV) provide fully automatic, fail-safe operation of subsea PLEM valves used in CALM buoy and other tanker loading/unloading subsea pipeline systems.

08 Manifold Pressure Monitoring with Surge Protection  
Connected to the Vessel Monitoring System (VMS), the Zone 0 certified battery powered wireless pressure transducer transmits pressure readings every 2 seconds. In the event of pressure build up an alarm is issued.

## Offspring International – Strength and Depth

Offspring International (OIL) specialises in equipment for mooring, offloading and control systems to optimise terminal operations both offshore and quayside. We offer a fully integrated supply of equipment for SPM and CBM buoy mooring, hoses, breakaway couplings, PLEM control, together with a comprehensive terminal monitoring and management system. Using experience and expertise gained over 25 years, OIL is able to support other mooring applications including renewables, chain ferries, port operations, aquaculture etc.

Offspring is a dedicated team of mooring professionals; bringing together over 150 years' experience in the design, supply and deployment of offshore mooring systems. We are an active member of the Oil Companies International Marine Forum (OCIMF), contributing our knowledge and experience to SPM and CBM Best Practice.

Offspring International combines in-depth technical and practical experience with industry leading mooring systems and products. As the exclusive worldwide agent for SPM hawser products and accessories from Lankhorst Euronete Portugal, OIL offers a full range of SPM products manufactured and supplied in strict accordance with the OCIMF 2000 "Guidelines for the Purchasing and Testing of SPM Hawsers".

Through international agent agreements with leading hose manufacturer Manuli Hydraulics – Oil & Marine Division and emergency disconnect systems specialist MIB Italiana, Offspring supplies a range of Manuli floating marine and submarine offloading hoses and MIBreak and Flip Flap marine breakaway couplings.

In addition, OIL is exclusive worldwide agent for Paladon Systems, a valve actuator and control system specialist providing PLEM control

systems for CALM Buoys, CBM's and FPSO's including the innovative Autonomous Shutdown Valve (ASV). The ASV utilises pipeline pressure to provide the energy to operate the subsea valves.

OIL is also primary agent for Techflow Marine's Quay Reel® flexible loading and unloading system. The Quay Reel® system offers significant improvements over conventional port and terminal fluid transfer systems resulting in reduced loading times, reduced demurrage, smaller footprint, and increased safety and reliability.

In keeping with tanker loading Best Practice Offspring offers Offshore Ops' compact, modular monitoring system which includes a range of terminal management, environmental and equipment monitoring devices, seamlessly integrated into a single, secure software package.

In addition, the software enables greater efficiency in terminal management by allowing comprehensive monitoring and control over consignment scheduling, asset management and policy and procedural adherence.

**For more information on Offspring International Mooring and Offloading Systems call +44 (0)1384 453880 email [mail@offspringinternational.com](mailto:mail@offspringinternational.com) or visit [www.offspringinternational.com](http://www.offspringinternational.com)**



**UK**  
Unit 8  
Castle Court 2  
Castlegate Way  
Dudley  
West Midlands DY1 4RH  
**Tel. +44 (0)1384 453880**  
**Fax. +44 (0)1384 453888**



**USA**  
28577 Jaeger Drive  
Laguna Niguel  
CA 92677  
**Tel. +1 949 215 3268**



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