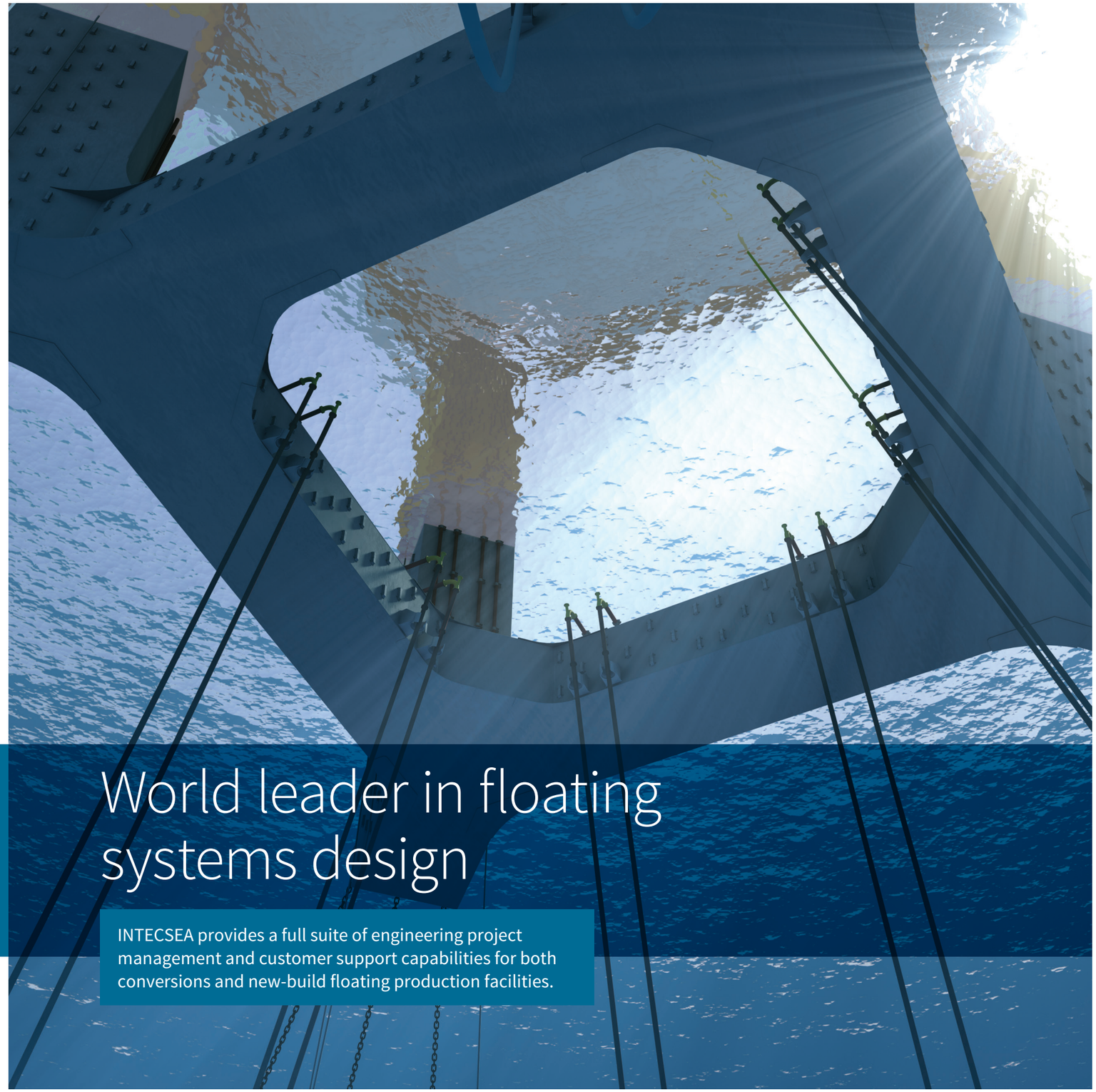
INTECSEA
WorleyParsons Group

Floating Systems

Capability & Experience



World leader in floating systems design

INTECSEA provides a full suite of engineering project management and customer support capabilities for both conversions and new-build floating production facilities.

Capability Overview

INTECSEA has more than 30 years of extensive experience with all types of floating systems: TLPs, spars, monohulls and semi-submersibles. Key INTECSEA technical staff have more than several hundred years of cumulative experience on various types of floating systems and are considered to be pioneers and industry leaders in their respective fields of expertise.

INTECSEA is the world's leader in floating system design for the offshore oil and gas industry in terms of the number and types of floating units designed.

INTECSEA provides concept and contractor-independent engineering and project management services specializing in deepwater solutions. We provide services across the whole of a project's lifecycle, including concept selection, FEED, detailed design, installation support, operational and maintenance planning and support, and removal and relocation planning of floating systems of all types.

INTECSEA is the world leader in Tension Leg Platform (TLP) designs with the most installed or sanctioned TLPs. The team has been instrumental in the design of 16 of the 20 currently installed and sanctioned TLPs. The company has also participated in major spar designs at record setting water depths and is the only engineering firm with execution experience in all floating production system types (TLP, spar, semi-submersible, MinDOC and monohull).

Services

- Concept selection
- Pre-FEED and FEED engineering
- Naval architecture
- Hull structural detailed design
- Hull systems design
- Riser system design
- Deck structure design
- Tendon mooring system design
- Catenary mooring system design
- Project and construction management
- Tanker availability and survey
- Tanker conversion engineering
- New-build FPSO/FSO engineering
- Tanker life extension engineering

Engineering Services

Structural Engineering

INTECSEA has a highly competent and experienced structural engineering group able to provide hull scantling design, appurtenance and outfitting design, deck design and analysis, and hull design and analysis. INTECSEA is highly skilled in global and local structures analysis, structure optimization, fatigue and fracture analysis, material and welding specifications, AFC drawings, shop drawings, and fabrication support. INTECSEA is well known in the industry for its efficient and robust structure design.

Mooring Systems

INTECSEA is experienced in assisting customers in the selection, design, and optimization of conventional and tendon mooring systems for applications such as TLPs, Spars, semi-submersibles and monohulls (FPU, FPSO, FSO). Typically, the work scopes comprise writing mooring system specifications, designing and analyzing mooring systems, soliciting tenders from specialist mooring contractors, evaluating tender responses, negotiating contract specifications, testing and fabrication supervision and providing assistance to offshore installation.

Hull Systems

INTECSEA offers an array of different services for the hull system design that include the following systems: bilge and ballast, vent and sounding, hull electrical, hull preservation (coating and cathodic protection), cargo loading and offloading, propulsion, steering and auxiliary machinery, cargo heating and control, and monitoring.

Naval Architecture

INTECSEA's Naval Architects have wide-ranging experience in the design of floating structures. The depth of experience ranges from conceptual, FEED, and detailed design, to transportation and installation. INTECSEA's Naval Architects are highly skilled in platform sizing and optimization, weight management and control, hydrodynamics and motions calculation, mooring analysis, wind tunnel and wave basin model tests, hydrostatic calculation, intact and damage stability analysis, transportation and installation design and analyses, among many others. INTECSEA has designed some of the most efficient floating structures to date in terms of displacement to payload ratio for the oil and gas industry.

System Types

Tension Leg Platform

A Tension Leg Platform (TLP) is a vertically moored floating structure. The platform is permanently moored by means of tethers or tendons grouped at each of the structure's corners. A feature of the design of the tethers is that they have relatively high axial stiffness (low elasticity), such that virtually all vertical motion of the platform is eliminated. This allows the platform to have the production wellheads on deck, instead of on the seafloor, and a simpler well completion gives better control over the production from the oil or gas reservoir, and provides easier access for downhole intervention operations.

Spars

Spars are moored to the seabed, but whereas a TLP has vertical tension tethers, a spar has more conventional mooring lines. Spars have had three configurations so far: the "conventional" one-piece cylindrical hull, the "truss spar" where the midsection is composed of truss elements connecting the upper buoyant hull with the bottom soft tank, and the "cell spar" which is built from multiple vertical cylinders. A spar has the ability, by adjusting the mooring line tensions using chain-jacks attached to the mooring lines, to move horizontally and position itself over wells at a distance from the main platform location.

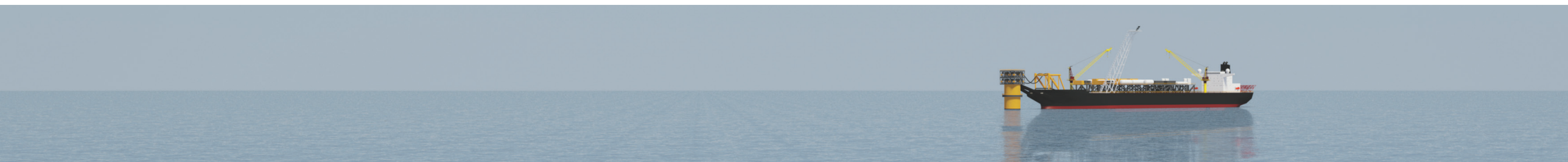
Semi-submersible

A semi-submersible is a specialized marine vessel with good seakeeping characteristics. The semi-submersible vessel design is commonly used in a number of specific offshore roles, such as for offshore drilling rigs, safety vessels, oil production platforms, and supporting heavy lift cranes.

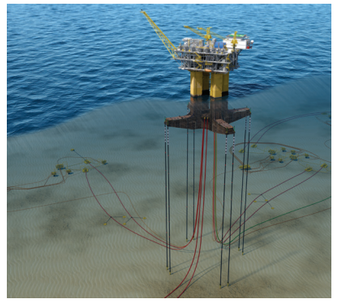
Semi-submersible rigs make stable platforms when drilling for offshore oil and gas. They can be towed into position and anchored, or moved and kept in position by their own azimuth propellers with dynamic positioning.

FPSO

An FPSO (Floating Production Storage and Offloading) unit is a floating vessel used by the offshore industry for the processing of hydrocarbons and storage of oil. An FPSO vessel is designed to receive hydrocarbons produced from nearby platforms or subsea template, process them, and store oil until it can be offloaded onto a tanker. FPSOs are preferred in frontier offshore regions as they are easy to install and do not require a local pipeline infrastructure to export oil. A vessel without oil processing is referred to as an FSO (Floating Storage and Offtake) vessel. A monohull vessel without storage capability is referred to as an FPU (Floating Production Unit).



Project Experience



Shenzi TLP

CUSTOMER MODEC International

LOCATION Gulf of Mexico, USA

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

Detailed engineering and design of the hull and deck structure, mooring, riser and hull systems. Produced MTO and AFC drawings, 3D PDMS reviewed shipyard drawings, fabrication support, transportation and installation analysis and support.

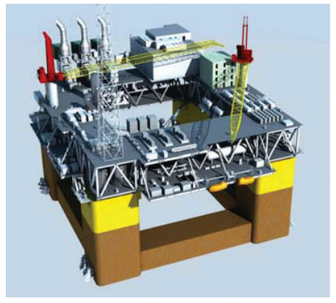
Chevron Frade Field Development

CUSTOMER Chevron

LOCATION Frade Field, Brazil

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

The facilities consist of subsea production wells with gas lift and water injection wells tied back to an FPSO processing facility. Flexible flowlines and flexible catenary risers link the FPSO to the wells. The entire scope of the Frade Field Development project was implemented in two project phases. On completion of the first project phase, the FPSO was connected to four production wells and four water injection wells. The second phase of the project involved the drilling, completion and tieback of an additional three-nine production wells and two-three injection wells.



Gumusut Semi-submersible FPU

CUSTOMER Shell

LOCATION Malaysia

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

INTECSEA was responsible for the detail design and analysis of hull structure and hull outfitting and produced shop drawings of the hull for MMHE.

The Gumusut-Kakap Field lies in 1,200m of water, 120 km offshore Sabah, Malaysia, on Blocks J and K. Sabah Shell Petroleum Company, Ltd., operator of the field with partners ConocoPhillips Sabah, Petronas, and Murphy Sabah Oil Co., Ltd., will develop the field with 19 subsea wells tied back to the region's first semi-submersible FPU, with a processing capacity of 150,000 BOPD exported via pipeline to a new oil and gas terminal located in Kimanis, Sabah.

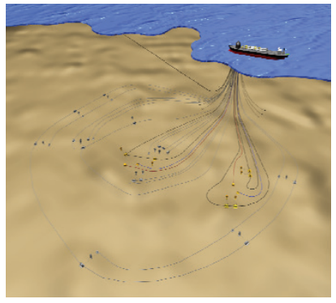
Devil's Tower SPAR

CUSTOMER J. Ray McDermott Engineering

LOCATION Gulf of Mexico, USA

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

Detailed engineering and design of the hull structure and hull system. Produced MTO and AFC drawings and participated in fabrication, and installation engineering support.



West Seno FPU

CUSTOMER Hyundai Heavy Industries

LOCATION Makassar Straights, Indonesia

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

Detailed design and analysis of the West Seno Phase 1 FPU facilities in the Makassar Straights of Indonesia for Hyundai Heavy Industries.

Responsible for the detailed engineering and design of the hull structure, hull systems, catenary mooring, global performance verification, SCRs and flexible jumpers going between the TLP and the FPU. Produced AFC drawings and MTOs, and participated in procurement, fabrication and installation support.

Marco Polo TLP

CUSTOMER MODEC International

LOCATION Gulf of Mexico, Green Canyon, USA

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

Detailed design of the Marco Polo TLP in Green Canyon Block 608 in a record 4,300 ft water depth.

Responsible for the detailed engineering and design of the hull and tendon mooring system, the preliminary design and analysis of the riser system, and engineering management and supervision of the riser system detail design. Produced MTO and AFC drawings, reviewed shipyard drawings, provided fabrication support, and installation analysis and support.

Success Through Insight

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