

Floating Systems

Capability and Experience



Capability Overview

INTECSEA provides concept and contractor-independent engineering and project management services specializing in deepwater solutions. We provide “Cradle-to-Grave” services 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 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 Tension Leg Platforms. The company has also participated in major SPAR designs at record setting water depths and it is the only engineering firm with execution experience in all floating production system types (TLP, SPAR, Semisubmersible, MinDOC and monohull).

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

Services

- Concept Selection
- Pre-FEED and FEED Engineering
- Naval Architecture
- Hull Structural Detailed Design
- Hull Systems Design
- Riser System Design
- Deck Structure Design
- Mooring System Design
- Tendon Mooring System Design
- Project and Construction Management
- Tanker Availability and Survey
- Tanker Conversion Engineering
- New Build FPSO/FSO Engineering
- Tanker Life Extension Engineering

#1

World's largest FPSO

8

Installed or Sanctioned TLP Projects



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 specification, AFC drawings, shop drawings and fabrication support. INTECSEA is well known in the industry for its efficient and robust structure design.



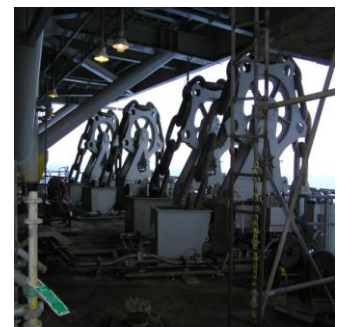
Naval Architecture

INTECSEA's Naval Architects have a wide experience on the design of floating structure. 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 optimizing 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, and model tests among many other analyses. 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.



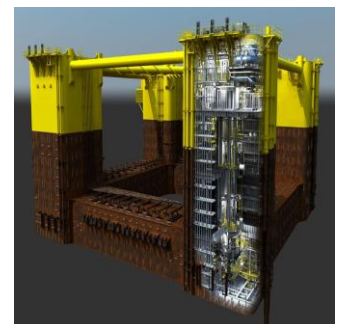
Mooring Systems

INTECSEA is experienced in assisting clients in the selection, design and optimization of conventional and tendon mooring systems for applications such as TLP, SPAR, Semisubmersible, monohulls (FPU, FPSO, FSO, etc.) Typically, the work scopes comprise writing mooring system specifications, designing and analyzing mooring systems, calling tenders from specialist mooring contractors, evaluating tender responses, negotiating contract specifications, witnessing testing, fabrication supervision and providing assistance with respect to offshore installation.



Hull Systems

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

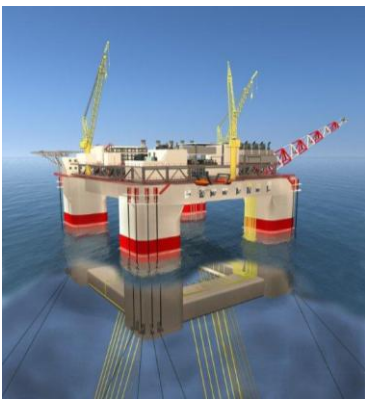


System Types



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 group of tethers is called a tension leg. 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 (connected directly to the subsea wells by rigid risers), instead of on the seafloor. This allows a simpler well completion and gives better control over the production from the oil or gas reservoir, and easier access for downhole intervention operations.

SPARS are moored to the seabed, but whereas a TLP has vertical tension tethers, a SPAR has more conventional mooring lines. SPARs have to-date had three configurations: 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 to position itself over wells at some distance from the main platform location.



A **Semisubmersible** is a specialized marine vessel with good seakeeping characteristics. The semisubmersible 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.

Semisubmersible rigs make stable platforms when drilling for offshore oil and gas. They can be towed into position by a tugboat and anchored, or moved by and kept in position by their own azipod propellers with dynamic positioning.

An **FPSO** 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 or a pipeline. 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 vessel. A monohull vessel without storage capability is referred to as an FPU.



Project Experience

Project: Shenzi TLP

Client: MODEC International

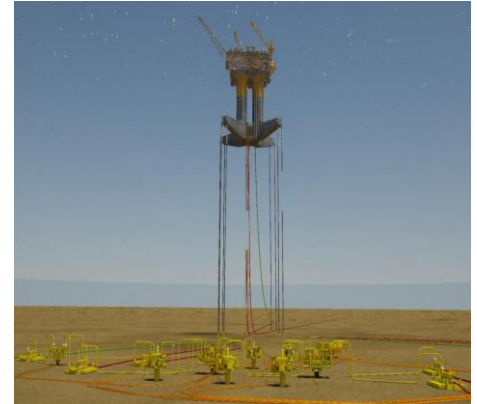
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Gulf of Mexico, USA

Detailed design of the Shenzi TLP in 4,300 ft water depth

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

Scope responsibilities included conceptual design, project engineering and management, interface management, naval architectural/global performance, model testing, structural engineering of hull and deck, tendon system design, riser system design, hull system design, MTO and AFC drawings, PDMS of hull, onsite fabrication support, and installation planning and support.



Project: Chevron Frade Field Development

Client: Chevron

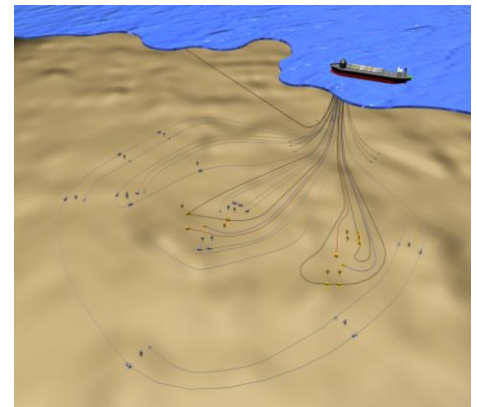
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Frade Field, Brazil

Flow assurance for all flowlines and the export gas pipeline as well as FEED, ITB and cost estimates for various parts of the project.

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.



Project: CP Semisubmersible Development

Client: MODEC International

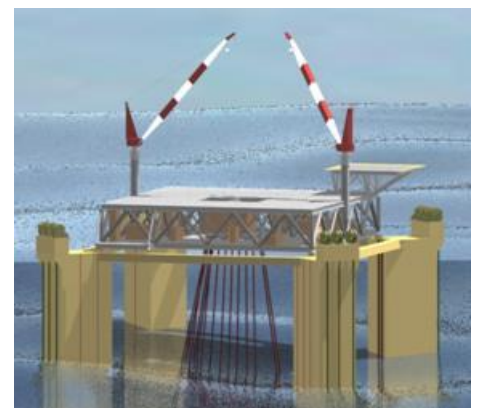
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Gulf of Mexico, USA

The CP Semi is a new class production semisubmersible design. INTECSEA was responsible for developing the design from early concept to project ready status.

Responsible for the preliminary engineering and design of the hull structure and hull systems and mooring system, and responsible for the design of the SCR riser system. Produced MTO level drawings and developed an installation plan.

Scope of work included conceptual design, project engineering and management, naval architecture/global performance, model testing, planning and management, structure engineering and analysis, mooring system design, steel catenary riser (SCR) analysis design, MTO drawings, and installation planning.



Project: Devil's Tower SPAR
Client: J. Ray McDermott Engineering

Phases: IDENTIFY >> EVALUATE >> DEFINE >> EXECUTE >> OPERATE

Detailed design and analysis of the Devil's Tower SPAR, MC 773 in the Gulf of Mexico for Murphy Oil

Responsible for the detailed engineering and design of the hull structure and hull system. Produced MTO and AFC drawings and participated in fabrication and installation engineering support.

INTECSEA was responsible for the scantling design, mooring analysis, hull detail structure design, hull structure analysis, hull appurtenances design, hull systems design, MTO and AFC drawings, and fabrication support.

Gulf of Mexico, USA



Project: West Seno FPU
Client: Hyundai Heavy Industries

Phases: 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 and 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.

Makassar Straights, Indonesia



Project: Marco Polo TLP
Client: MODEC International

Phases: 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, and responsible for 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, fabrication support, installation analysis and support.

Gulf of Mexico, Green Canyon



About INTECSEA [\(click here to learn more about INTECSEA\)](#)

For more than 25 years, INTECSEA has provided frontier technology leadership for the energy industry's most challenging offshore field development and pipeline projects.

INTECSEA was formed in 1984 and provides design for floating systems, risers, pipelines, and subsea engineering and construction management services within the global WorleyParsons Group. INTECSEA has established operating offices in Houston, Kuala Lumpur, Singapore, Delft, Rio de Janeiro, Jakarta, Angola, Cairo, St. John's, Perth, Melbourne, and London. [\(see all WorleyParsons' locations\)](#)

INTECSEA's major areas of expertise include deepwater subsea and floating production systems, marine pipeline and riser systems, Arctic pipelines, marine terminal systems, and Arctic structures. Additional areas of expertise include flow assurance and operability, marine surveys, marine operations and offshore equipment design.



A History of Innovation and Benchmark Achievements...

SUBSEA

- Deepest Subsea Production
- Longest Oil Tieback
- Longest Gas Tieback
- First Subsea Allocation Flow Meters
- First 15,000 psi Subsea Trees
- First Electrically Heated Pipe-in-Pipe Flowlines
- Deepest Multiphase Subsea Pumps
- First Super Duplex Umbilical
- First Diaphragm Chemical Injection System

RISERS

- First Pipe-in-Pipe Steel Catenary Riser
- First Reeled Steel Catenary Riser
- The Deepest Steel Catenary Risers
- Most Shallow Catenary Riser
- Largest Diameter Flexible SCR Joint
- First SCRs on an FPSO
- Most Direct Vertical Access Risers
- First GOM Free-Standing Riser

FLOATING SYSTEMS

- **Largest FPSO**
- **Deepest TLP at Time of Installation**
- **Deepest SPAR at Time of Installation**
- **Most Installed TLPs**
- **First Deepwater FPU Operated with a Drilling Tender**
- **Most Types of Floating Systems**

MARINE PIPELINES

- Deepest S-lay Pipeline
- Deepest J-lay Pipeline
- Longest Offshore Pipeline
- First Offshore Arctic Pipeline
- First Arctic Pipeline Leak Detection System
- First Piggable Wyes
- First Arctic Pipeline Bundle

(for more capabilities information [click here](#))

Global Reach, Local Knowledge, Global Solutions



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our global capability, email
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