FROM OUR DESIGN PORTFOLIO

ICE MARINE DESIGN

OFFSHORE INDUSTRY EXPERIENCE

Floating Production Storage and offloading ("FPSO") Vessel Conversion 2024-25

Client: Bluewater Energy Services B.V., the Netherlands

Operator: Navitas Petroleum Development and Production Limited

ICE's Scope of Work:

Fast-track front-end engineering and design (FEED) contract for hull engineering.

Aoka Mizu FPSO

Project for afloat production of green H2 and Ammonia for an international consortium.

Year: 2024 -25

Picture courtesy SwitcH2 B.V.

1.6 M Bbl Generic FPSO Hull 2019

In-house development based on earlier design to meet Petrobras ITT for Brazilian clients.

ICE's Scope of Work:

Enhanced basic design.

LOA	283.00 m
Breadth	59.40 m
Depth	30.00 m
Storage capacity	1.6 M bbl

Tango Floating Liquefied Natural Gas (FLNG) facility and Excalibur Floating Storage Unit (FSU)

Fast-track conversion of an LNGC to an FSU and arrangement for interconnection to an FLNG barge to create an integrated offshore ship-to-ship LNG export terminal for Eni Congo.

Client: Exmar, Belgium

Operator: Eni SpA, Italy

Shipyard: Drydocks World, Dubai.

Year: 2022 -24

ICE's Scope of Work:

Onboard survey including laser scanning, basic design, MTO, detail design, yard supervision, inclining tests, Class submissions, field supervision, etc.

Engineering and project management services.

Certification formalities/ Class interface / Vendor Interface.


Tango FLNG and Excalibur FSU

The Ondina drill ship being assembled by Kawasaki Heavy Industries in Japan.

Drill Ship – New Building

2012 -14

Client/Shipyard: Enseada Indústria Naval & Kawasaki Heavy Industries, Ltd (Sakaide and Kobe shipyards)

Owner/Operator: Sete Brasil S.A

ICE's Scope of Work:

Update and completion of Class package, detail design, assist with procurement of equipment, and generate production information.

Floating Storage and Offloading ("FSO") Vessel Conversion for Total on the Norwegian Continental Shelf.

Client / Operator: KNOT FSO 1 AS / Knutsen NYK Offshore Tankers AS, Norway

Shipyard: Remontowa Shiprepair Yard, Gdańsk, Poland

Tender phase front end engineering design ("FEED") study 2012

FSO vessel conversion design 2013 -17

Field engineering support in the shipyard and various technical assistance during pre-commissioning 2016 -18

Provision of project management (procurement, interface, project control team) and engineering support to supplement Owner's team. 2013 -17

Martin Linge FSO

Detail design of a series of MODUs built in Singapore

Class: ABS.

Owner: Maersk Drilling

Shipyard: Keppel, Singapore

Floating Storage and Offloading (FSO) Vessel Conversion 2009

Client / Shipyard: Teekay, Norway / Drydocks World Dubai; Owner: Teekay Offshore Partners / Occidental Qatar Energy Company LLC

ICE's Scope of work:

Basic and detail design for conversion of a shuttle tanker to an FSO; naval architecture, structural, piping, electrical.

Falcon Spirit FSO deployed offshore Qatar at the Al Rayyan Field.

Gimboa FPSO Conversion – Saipem / Moss Maritime 2006 -07

ICE's Scope of Work:

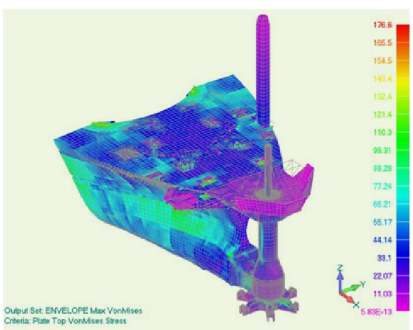
3-D Model, including:

Main deck coordination; Crane pedestal & foundation; Aft spread mooring integration; Helideck design; Marine pipe rack foundation; Flare Tower foundation; Tandem Mooring integration; Offloading Equipment and Foundations;

Shipyard assistance;

Plan approval (ABS).

Gimboa FPSO



Turret - Hull Integration Structural FE Analysis - OLT Toscana Floating Storage and Regas Unit (FSRU)

2008 -10

Moss Maritime (Saipem) / OLT (Offshore LNG Toscana), Norway

Class: DNV

Train Ferry to FPU Conversion 2006 -07

Viktor Lenac Shipyard / Helix Energy Solutions

Design of conversion of a rail ferry to a dynamically positioned Floating Production Unit (FPU), including:

- Addition of DP system with thrusters;
- New heliport;
- Expanded accommodation block;
- Added generator capacity and substantial structural modifications.

Class: Lloyd's Register

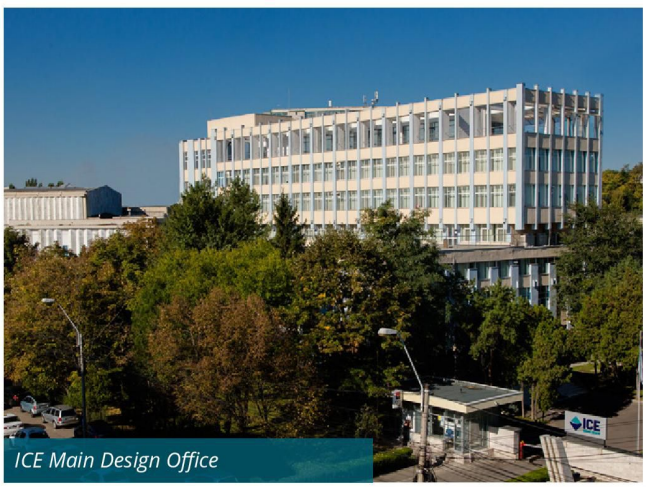
Helix Producer I (HPI) FPU.

Fred. Olsen Windcarrier's "Brave Tern" installing the first offshore wind turbines in the US. The GustoMSC-type vessel was built by Lamprell to Class and detail drawings developed by ICE.

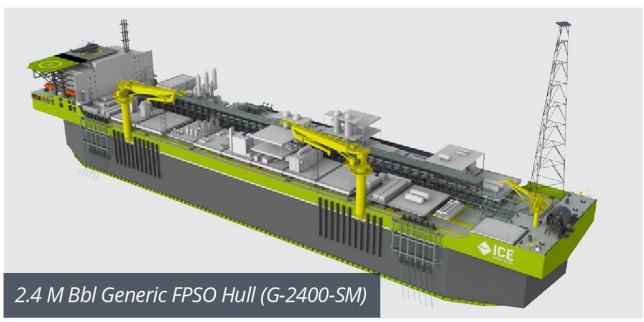
Images courtesy of ICE Group / Bluewater Energy Services /EXMAR / Helix Energy Solutions Group / Deepwater Wind / Fred. Olsen Windcarrier / www.shipspotting.com .

ICE GROUP CAPABILITIES AND RESOURCES

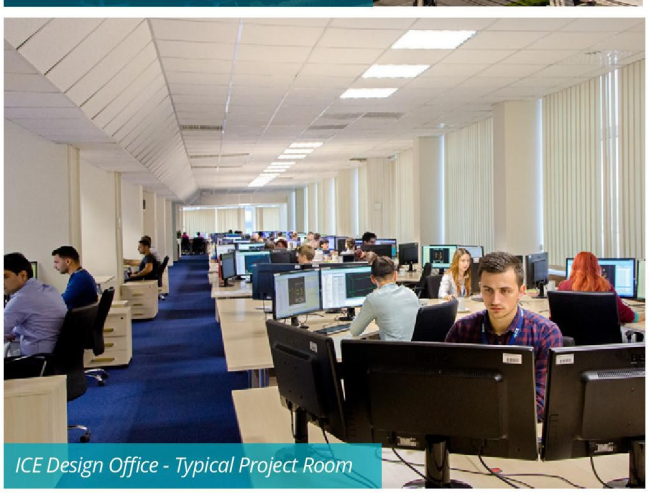
ICE is an independent full service marine design company with a substantial capacity, serving clients world-wide. Our experience includes 40+ FSO / FPSO projects (new construction, conversions and various studies), jack-up drilling platforms, drill ships, semi-submersible drilling rigs, self-elevating vessels for wind turbine installation, well intervention vessels, converter platforms, etc. We are familiar with the rules of the major IACS Classification Societies and with Brazilian, UK and Norwegian (NORSOK and PSA) regulations. Most of our work is done for repeat clients.



ICE Main Design Office



2.4 M Bbl Generic FPSO Hull (G-2400-SM)


ICE Design Office - Typical Project Room


"Seajacks Hydra" serving the "SylWin Alpha" windfarm transformer platform. ICE contributed substantially to the design of both platforms.


FPSO (Dubai)


Semi-Submersible Drilling Rig

ICE
MARINE DESIGN

ENGINEERING CERTAINTY

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With a 55-year track record and an annual output having exceeded 700,000 professional engineering man-hours, the International Contract Engineering (ICE) Group is one of Europe's largest independent ship design consultancies. We provide high-calibre multi-discipline design services to yards and owners in the commercial shipping, defence and offshore energy industries, ranging from conceptual studies and Class drawings to detail design and production information. We cover a full range of naval architecture and marine engineering disciplines such as hydrodynamics, structural, mechanical, piping, electrical, instrumentation, outfit and HVAC. Our experience includes gas carriers, passenger vessels, navy and coast guard ships, chemical tankers, drill ships, FSO/FPSOs and a range of other vessels. We also have available proprietary designs that can be adapted to clients' requirements.

With our head office in the Isle of Man and engineering facilities in Romania and Croatia, we provide high quality design and engineering at very competitive prices.