

INSTALLATION



PORT GENTIL – GABON
 Float-off of the 80,500t Moho Nord FPU 'Likouf' from the Vanguard, supported by AHTs Union Lynx, Union Bear and Union Boxer, and Smit Lamnalco's Rima and Weaver.



Boskalis is a leading global dredging and marine expert. Since our founding in 1910, we have established a long track record of demanding projects, which have been achieved successfully through close cooperation with our clients.

In the international offshore energy sector, we offer a unique range of offshore services, from development, construction, transport, installation (fixed & floating), inspection, repair & maintenance (IRM) to the decommissioning of offshore and onshore facilities and the installation of fixed and floating production structures.

With our integrated capabilities and innovative power, we offer a truly unparalleled combination of people, vessels and activities which enables us to break new grounds and create new horizons for our clients.

Our work goes beyond the provision of services. With safety as our core value Boskalis has uncompromisingly embraced safety within its culture. This is the essence of 'NINA', our No Injuries, No Accidents safety program, which is held in high regard in the industry and by our clients. NINA rests on five values and five rules. Together they ensure that safety can be openly discussed, leading to a clear and very positive development in how safety is perceived.

Boskalis is known for its expertise and commitment to the environment. Our clients benefit from our vast experience in preparing environmental impact assessments and management plans. Our state-of-the-art monitoring programs and eco-friendly techniques, working methods and equipment will enable you to fully comply with environmental regulations.



SAFETY STATEMENT

Our people are our most valuable assets, making safety a core value. Our goal is: No Injuries No Accidents. This is embedded in our company's culture and supported through Values and Rules. All employees, including our sub-contractors, are expected to take these values and rules to heart.

VALUES

- I AM RESPONSIBLE FOR MY OWN SAFETY
- I APPROACH OTHERS ABOUT WORKING SAFELY
- I TAKE ACTION IN CASE OF UNSAFE OPERATIONS IF NECESSARY, I WILL STOP THE WORK
- I ACCEPT FEEDBACK ABOUT MY SAFETY BEHAVIOUR REGARDLESS OF RANK AND POSITION
- I REPORT ALL INCIDENTS, INCLUDING NEAR-MISSES, TO INFORM OTHERS AND BUILD ON LESSONS LEARNED

RULES

- PREPARE A RISK ASSESSMENT FOR EACH PROJECT, VESSEL OR LOCATION
- OBTAIN A PERMIT TO WORK FOR DEFINED HIGH-RISK ACTIVITIES
- MAKE A JOB HAZARD ANALYSIS FOR HAZARDOUS NON-ROUTINE ACTIVITIES
- BE INFORMED ABOUT RISK & CONTROL MEASURES
- BE FIT FOR DUTY AND WEAR THE PPE REQUIRED

YOUR RELIABLE PARTNER



With our commitment to safety, professionalism, entrepreneurship and drive, our 11,700 world-wide experts are focused on achieving the best results for our clients.

With the acquisitions of specialised companies in the past, Boskalis gained the experience, expertise and equipment of world-renowned transportation and installation companies. We have continued to grow upon those foundations and developed into a company capable of offering complete solutions for T&I of fixed and floating production facilities, including Engineering, Procurement and Project Management capabilities.

In addition to a dedicated crew, you can count on our highly skilled professionals from a wide range of disciplines. These include civil, marine, structural and transportation engineering; ecology, geology, geophysics and marine biology experts; but also surveyors, planners, designers, and construction and installation specialists. We can build dedicated global teams around clients and projects drawing in expertise from the breadth of the group.

As your partner you can rely on our expertise, experience and commitment to execute operations safely, on time and within budget.



'INVOLVE US EARLY ON AND WE CAN SIGNIFICANTLY IMPROVE YOUR PROCESSES, MITIGATE RISKS AND MINIMIZE UNCERTAINTIES'



PROVEN INSTALLATION SOLUTIONS



Aasta Hansteen: Topside float-over installation with the top of the SPAR hull above the waterline in between the S-class vessels, Norway.

'BOSKALIS HAS THE RESOURCES TO BUILD A GLOBAL TEAM AROUND THE CHALLENGES YOU FACE'



Boskalis delivers fully integrated solutions for the offshore installation of fixed and floating oil and gas production facilities. This includes services, such as seabed intervention, offshore transport and installation (T&I), subsea pipeline end manifold installation, and subsea light construction works for jackets and topsides. For floating structures such as SPARs and floating production, storage and offloading units (FPSOs) we deliver both dry transport and ocean towage, mooring installation, station keeping and hook-up services, and subsea installation of umbilicals, risers and flow lines (SURF). Our heavy lifting crane vessels can support the installation of modules, jackets and topsides.

Our installation activities bring together a range of fields of expertise to create comprehensive, cost-effective solutions that are specifically tailored to meet your needs. With our versatile fleet of vessels, we offer fully integrated solutions supported by in-house engineering, procurement and dedicated project management capabilities.

Top right
The Lucius Spar onboard the Mighty Servant 1 from Pori, Finland to Corpus Christi, USA

Middle right
Construction diver at work, North Sea

Bottom right
Turret with twelve chains in place Brazil OSX3



OFFSHORE FIXED STRUCTURES



ULSAN – SOUTH KOREA
Skidded load-out of the 42,000t Hebron Utilities Process Module on board the Blue Marlin.



Boskalis provides fully integrated transport and installation (T&I) solutions for fixed offshore oil and gas production structures in shallow waters. These include seabed preparation, transport to the field including load-out from construction sites, lifting and launching jackets, and installation of topsides.

Thanks to our integrated solutions, we can streamline processes and reduce interfaces, thereby saving costs and time, and reducing risks. We provide in-house engineering, procurement, project management and Quality, Health, Safety,

Environment and Security (QHSES) services. We can deliver end-to-end services thanks to the versatile fleet of semi-submersible, heavy marine transport, AHT's, sheerlegs, barges, fallpipe, cable laying, construction, crane and diving support vessels.

In addition, through our diversified fleet we offer services for subsea infield installation of umbilicals, floating hoses, power cables, and subsea infrastructure pipeline end manifolds (PLEM). We also offer inspection, repair and maintenance, and light construction work with divers and remotely operated vehicles. Further, we can provide platform and subsea structure for platform and subsea structures.

OUR SERVICES INCLUDE

- Float-over Installation of topsides
- Lift-Installation of Topsides
- Jacket installations for topsides
- Subsea template installations
- Civil Infrastructure
- Decommissioning

OFFSHORE FIXED STRUCTURES

PROJECT HIGHLIGHTS



As a transportation & installation contractor with a versatile fleet of vessels and excellent fleet management capabilities we select the most effective installation spreads that will bring transport and installation activities well within project timelines and budgets.

CKX BOOSTER COMPRESSION PLATFORM

Weight: 15,200mt

Location: Gulf of Thailand

Client: Hyundai Heavy industries

Scope: The engineering scope included the design of the float-over aids, i.e. surge stoppers, stern entry guide, deck furnishings and sway fenders installed on the jacket. Furthermore, in-house engineering designed the grillage and skid beams and delivered the load-out support frames. Boskalis E&I installed tide gauge, environmental buoy and the survey positioning system. Boskalis deployed the semi-submersible transport vessel HYSY 278. The topside was taken on board at the HHI yard in Ulsan, South Korea. Before commencing the float-over, extensive DP trials were performed according to the vessel's FMEA. Using its DP 2 system, the vessel was moved close to the jacket and ballasted to position the topside precisely on the jacket. The heart of this kind of projects is the actual installation, which takes only a couple of hours, after preparations lasting more than two years.

HEERA PROJECT TOPSIDES FLOAT OVER

Weight: 8,300mt

Location: Offshore Mumbai, India

Client: Afcons / ONGC

Scope: The float-over solution included (feasibility) engineering and design for the load-out, transport and float-over operation for the Heera re-development field, located 70 kilometers south-west of from Mumbai, India. Boskalis supplied specialist float-over equipment (e.g. winches) and used Boskalis anchor handling tugs including anchors.

THIEN UNG BK-TNG

Weight: 4,200mt

Location: Thien Ung Field, Offshore Vietnam

Client: Vietsovpetro

Scope: With the Asian Hercules III Boskalis successfully executed the lifting of the 4,200mt Thien Ung topside followed by a 830mt living quarters. The topside and living quarters was installed on a (pre-installed) jacket in the Thien Ung field, at a water depth of 120m. First offshore heavy lift installation with a crane barge.

SHWE - JACKET LAUNCH AND TOPSIDES FLOAT-OVER

Weight: Jacket 22,800mt / Topside 26,000mt

Location: Bay of Bengal

Client: Hyundai Heavy Industries

Scope: The SHWE Jacket launch and the SHWE Topside float-over were executed by using the modified HYSY 229 launch barge. The scope of work included load-out, tow, launch, float-over engineering and operations, mooring equipment and Marine Spread. The project demonstrates our ability to handle scope and sizes in the highest segment of the Transport & Installation market even where BOKA's fleet capabilities are exceeded. Management of major subcontracts, such as barge hire and ocean tow, formed an important part and challenge of the project.



OFFSHORE FLOATING STRUCTURES

SOUTH KOREA – NORWAY
Transport of the Goliat FPSO, with a diameter of 107 meters, onboard the Vanguard.



Boskalis operates one of the largest fleet of specialized offshore vessels in the world to execute transport and installation of floating production structures.

Thanks to our versatile fleet of semi-submersible heavy marine transport vessels, ocean going tugs and crane vessels, AHTs, sheerlegs, construction and diving support vessels, we can provide fully integrated transport and installation solutions for floating offshore platforms and units. These include semis, spars, tension leg platforms (TLPs), floating production,

storage and offloading (FPSO) units, and floating platforms for the production and processing of liquefied natural gas (FLNGs).

With our in-house Project Management, Engineering, and Procurement departments we provide tailor-made solutions for T&I projects. This includes load-out from fabrication site, transport to the field (dry and wet), heading control & positioning, mooring system installations, mooring and riser hook-ups, and assistance with SURF installations.

‘WITH OUR SUCCESSFUL OFFSHORE INSTALLATION TRACK RECORD YOU CAN RELY ON OUR COMMITMENT TO EXECUTE EFFICIENT, SAFE AND RELIABLE OPERATIONS’

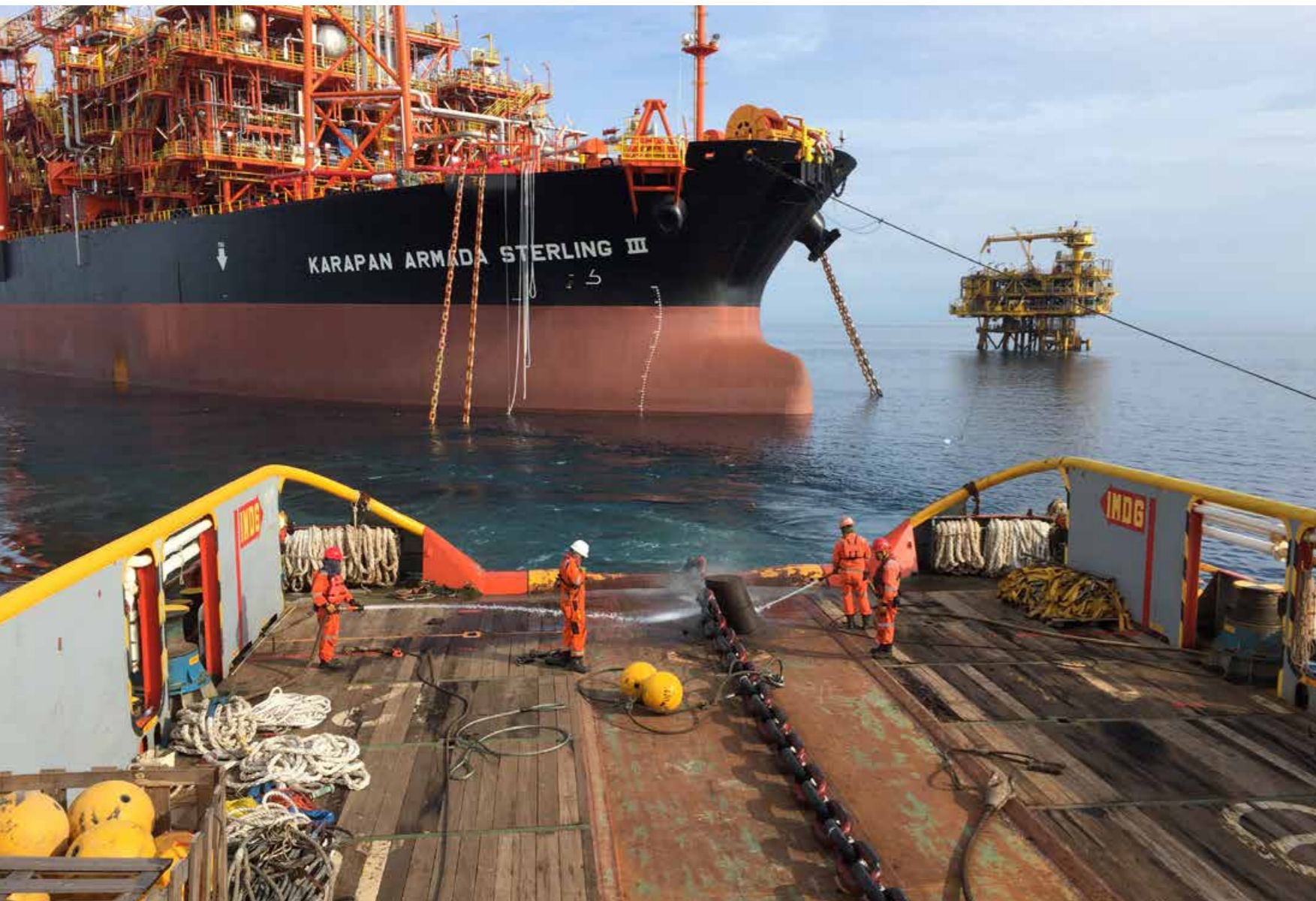
OUR SERVICES INCLUDE

- Inspection, Repair & Maintenance (IRM) of mooring systems, SURF and floating production structure
- (Offshore) Dry-docking Dive assistance during docking
- Terminal assistance (through Smit Lamnalco), including pilotage, tow back duties, and emergency response
- ROV inspections
- Mooring chain inspections & measurements of subsea assets
- Life Time Extension



OFFSHORE FLOATING STRUCTURES

PROJECT HIGHLIGHTS



With our long-standing and reliable track record we offer various services during the construction works for new-builds and the conversion of floating production structures, including module logistics and transport, intermediate facility transport, module integration and facility integration and installation assistance.

MADURA BD FPSO T&I PROJECT, MOORING AND RISERS SYSTEM INSTALLATION, AND HOOK-UP

Location: Madura Strait East Java, Indonesia

Client: Husky CNOOC Madura Limited (HCML)/ Armada Madura EPC Limited (AMEL)

Scope: Boskalis was responsible for the project management, engineering and execution of the works. The project consisted of 2 installation phases. Phase 1 pre lay of the moorings and Phase 2 FPSO tow, Mooring and Risers Hook-Up installation. The scope of work also included the outfitting of the installation spread, the procurement and fabrication of all the temporary aids. All the logistics which included receipt, storage, transport and return to the COMPANY of all the free-issued equipment and materials. The required survey scope was managed, supervised and executed by Boskalis' survey department.

KRAKEN FPSO STP HOOK-UP

Location: Block 9/2b, UK

Client: Enquest/ BumiArmada

Scope: The Scope of Work included project management, engineering, mobilization, installation, calibration, maintenance, and demobilization of all equipment required for the FPSO STP (Subsea Turret Production) hook-up activities. The STP, mooring system and risers were preinstalled, and needed to be hook-up to the FPSO once arrived in the field.

EAST HUB SUCTION PILE AND MOORING LEG INSTALLATION, FPSO HOOK-UP

Location: Block 15/06, Angola

Client: ENI/ Bumi Armada

Scope: Engineering and outfitting of the construction support vessel, suction pile installation engineering, mooring leg catenary analyses and rigging design, FPSO station keeping analyses, FPSO hook-up analyses, Several mooring analyses. Provision of procedures for suction pile installation, mooring leg installation (chain and spiral strand wires), FPSO station keeping, FPSO hookup, seawater suction lift hose installation and offloading installation.

MOHO NORD FPU TRANSPORTATION, WET TOWING AND STATION KEEPING OF A FLOATING PRODUCTION UNIT (FPU)

Loading location: Ulsan, South Korea

Discharge location: Port Gentil, Gabon / Pointe Noire, Congo

Client: HHI (Hyundai Heavy Industries)/Total

Scope: Boskalis was contracted for the Float-on in Ulsan, South Korea and the subsequent dry-transport and float-off in Port Gentil, Gabon. Boskalis Offshore Transport Services was contracted for the FPU wet tow to offshore Congo and station keeping in the Moho Nord field. The FPU measured 252 x 62 x 140 [m] (L x W x H) and weighed 80,500 [mt] during transportation.





Boskalis operates one of the largest fleets of specialized offshore vessels in the world, including semisubmersible heavy lift vessels, diving support vessels, (anchor handling) tugs, multipurpose/cable laying vessels, rock dumping vessels, crane vessels, and pontoons and barges.

Our fleet of lifting equipment comprises a number of floating sheerlegs, including those owned and managed in the Joint Venture Asian Lift Pte. Ltd.

With the conversion of one of our semi-submersible heavy transport vessels our fleet has been expanded with a 3,000t capacity revolving crane vessel.

With a deck space of 7,000 m², the vessel will be able to load multiple structures, resulting in fewer transits from/to the fabrication and/or disposal yards. Her DP-2 capabilities prevent loss time for anchor spread deployment. The vessel will be able to work in harsh environments, can accommodate 150 persons and will have a helicopter deck for offshore transfers.

In addition, the company owns equipment such as trailing suction hopper dredgers, cutter suction dredgers, and backhoes and grabbers for excavation, landfall installation and seabed rectification services.



The Vanguard is the latest state-of-the-art semisubmersible heavy transport vessel. Due to her 'bowless' design she can accommodate overhang on both bow and stern and has a deadweight capacity of 117,000 ton.

The long distance ocean going Anchor Handling Tugs, with 205 tonnes bollard pull, are designed to safely handle heavy and difficult assignments. AHTs and other specialist transport vessels, like the Union Manta or the Smit Nicobar are primarily deployed to support offshore installation activities.

The Constructor, Komodo, Atlantis, Da Vinci and Protea and DP2 / DP3 dynamically positioned diving support vessels, which are fully equipped with AIR/SAT diving and ROVs to perform subsea construction activities, as well as to support IRM contracts for offshore and subsea structures.

A safe and reliable operation of your offshore production facility is essential. With our diving support vessels we offer UWILD, hook-up and IRM services by diving and ROVs. We have an in-house department dedicated to IRM campaigns.

Our versatile fleet is supported by the full spectrum of in-house design, SHE-Q, procurement, project management and engineering expertise, including a specialism – workability studies to assess vessel behavior under different environmental conditions (e.g. wind and wave effects, which impact the load and stability of the vessel) with different loads.

FPSO TEN turret integration with floating sheerleg Asian Hercules III



'TELL US ABOUT YOUR CHALLENGES'

For over 100 years, Boskalis has helped clients meet some of the toughest challenges.

How can we help you?

Give us a call and tell us about your challenges.

Or look at our portfolio on www.boskalis.com/offshore. You can download our corporate brochures, solutions brochures, project and equipment sheets.



Boskalis

Rosmolenweg 20

PO Box 43

3350 AA Papendrecht

The Netherlands

T +31 78 6969000

E offshore.energy@boskalis.com

www.boskalis.com/offshore