

Case Study

Parque das Conchas (BC-10)



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The first phase of the energy-producing, deep-water project Parque das Conchas (BC-10) is made up of three oil fields (Ostra, Abalone, Argonauta) located in the Campos Basin, off the coast of Brazil. The three fields have been developed with subsea wells and manifolds, with each field tied back to a centrally located Floating Production Storage and Offloading (FPSO) vessel moored in around 1,780 meters of water.

The heart of Parque das Conchas (BC-10) is the FPSO Espírito Santo, with 100,000 BOE/day of processing capacity. Built by SBM Offshore in Singapore, the FPSO was delivered to Brazil in late 2008. In 2013, Shell awarded SBM Offshore in Kuala Lumpur a project for the implementation of a vertical intervention approach utilizing a purpose-built intervention facility mounted on the BC-10's FPSO production facility. The function of the Rigless Intervention System (RIS) is to facilitate replacement of worn or failed caisson-based artificial lift systems deployed in the BC-10 field. To operate the RIS, additional modular accommodation for 20 persons was required to ensure sufficient living space on board the FPSO for the extra workforce needed.

SBM Offshore awarded deugro (Singapore) Pte Ltd the transportation of the

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Project Data

- Industry: Offshore Oil and Gas
- Client: SBM Offshore
- Project Owner: Shell
- Cargo: Accommodation modules, 2,000 FRT
- Cargo Highlight: 12 x 12 x 7 m / 85 MT
- Origin: Abu Dhabi, UAE
- Project Location: Off Guanabara Bay, Brazil



HSE Requirements
Beyond the strict standard



Technical Requirements
Transport engineering



Vast Distance
Teams in multiple time zones



Critical Move
Tug and barge alongside vessel offshore



Zero Incidents
No harm to persons and cargo

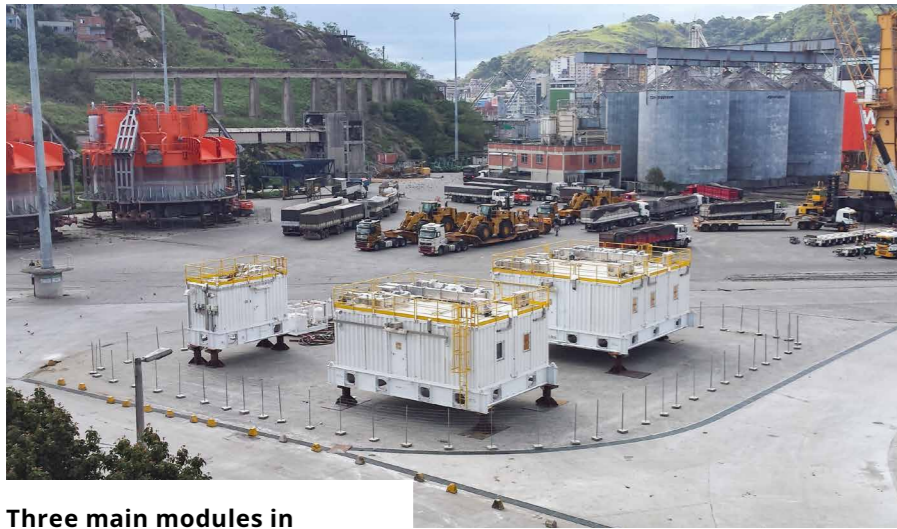


Main module of 85 MT being shifted alongside the berth

accommodation modules from the supplier SpecServe in the UAE to off the coast of Brazil.

deugro's scope of work

- Dive and bathymetric surveys to verify water depth at the private yard, Comagco Liwa Yard, where SpecServe was fabricating the accommodation modules
- Load-out by RO/RO operations onto 250-foot barge, sea fastening and towage to nearby Mina Zayed Port
- Load-in by RO/RO operations and shifting into temporary laydown area, including jack down onto stools and beams
- Shifting cargo alongside ocean vessel
- Chartering of MV *Industrial Sailor* on "last-in/first-out" basis, from UAE to Vitória, Brazil
- Receiving of cargo at CODESA Terminal in Vitória, Brazil, shifting and offloading at storage area
- Set up and rental of 1,000 square meter storage yard complete with fencing, armed security guards, office container, etc. for three-month storage
- Load-out by RO/RO operations onto 180-foot barge, sea fastening and towage to contractor's yard in Rio de Janeiro, Brazil
- Mooring tug/barge for 19 days on standby at contractor's yard awaiting arrival of installation vessel MV *Oleg Strashnov*
- Towing of barge from the contractor's yard to the offshore location at Guanabara Bay, Rio de Janeiro for direct transfer of cargo from the barge to MV *Oleg Strashnov*
- Complete HSE Management, including leading various hazard identification and job safety analysis (HAZID/JSA) meetings with the client and subcontractors
- Complete technical management, including naval engineering by dteq Transport Engineering Solutions (dteq), a company of the deugro group, and third-party naval architects



Three main modules in intermediate, fenced storage area at Vitória Port

Project execution

Whereas the actual transportation of the accommodation modules was rather straight forward and nothing out of the ordinary, the challenge was found by meeting SBM Offshore's and Shell's stringent requirements in regard to health, safety and environment (HSE) and engineering.



» Every single step of the operation was discussed and analyzed from a safety perspective. «

A total of six HAZID/JSA meetings were held in Kuala Lumpur, Abu Dhabi and Rio de Janeiro prior to each critical step of the operation. These important safety meetings were usually scheduled for an entire day, with participants of up to 25 people involving all key stakeholders of the respective operation. Every single step of the operation was discussed and analyzed from a safety perspective with the aim to further reduce the risk factors and improve safety even further.

deugro mobilized not only the project management team from Singapore to attend these meetings, but also deugro's QHSES specialists as well as dteq's transport engineers.

As common within the offshore oil and gas industry, the client also demanded first-class transport and marine engineering support from deugro. This was not only to satisfy London Offshore Consultants (LOC), the underwriters' appointed Marine Warranty Surveyor (MWS), but also Shell's and SBM Offshore's responsible project engineers. As such, deugro's standard method statement was extended to include towing manuals, Bollard Pull calculations, deck strength

calculations, and more. Additionally, sophisticated mooring analyses were carried out for each barge load-out/load-in, taking into consideration safety factors such as one line broke (OLB) conditions as a worst case scenario.

After shipping the accommodation modules from the supplier's site via a transshipment at Mina Zayed Port, UAE, to the storage yard at Vitória Port, Brazil, the final transportation phase started. From the storage yard, the modules had been loaded out onto a 180-foot barge that had passed a tough inspection in order to elevate all equipment to the client's safety standards. After heading to the contractor's yard at Rio de Janeiro,

the tug and barge had to be secured for standby until arrival of the vessel *MV Oleg Strashnov*. This state-of-the-art offshore installation vessel, owned and operated by Seaway Heavy Lifting, has a length overall (LOA) of 183 meters, a beam of 47 meters and a maximum lifting capacity of 5,000 metric tons, with a main hook lifting height of 102 meters. This vessel is the perfect candidate due to its technical specifications, and was therefore engaged by SBM Offshore for the installation and integration of the accommodation modules onto BC-10's FPSO Espírito Santo. Bringing the tug and barge alongside the impressive *MV Oleg Strashnov* just in time offshore in Guanabara Bay, Rio de Janeiro was

a challenging and critical interface move.

This project was an example of excellent teamwork—not only within the deugro team but with SBM Offshore and Shell as well, considering the numerous parties and nationalities involved. Both SBM Offshore and Shell highlighted and appreciated how well deugro's offices worked together to make this project a success. deugro not only delivered the whole project scope on time and on budget, but most importantly with zero harm to persons and cargo.

» deugro aligned and coordinated well to ensure a smooth execution of the project as expected from the client. «

Project challenges

Requirements and engineering

Given Shell's deep knowledge and experience, this project included complex offshore requirements and, subsequently, very complex technical requirements. This involved a lengthy and in-depth approval process between Shell and deugro, covering the method statement and the respective engineering documents.

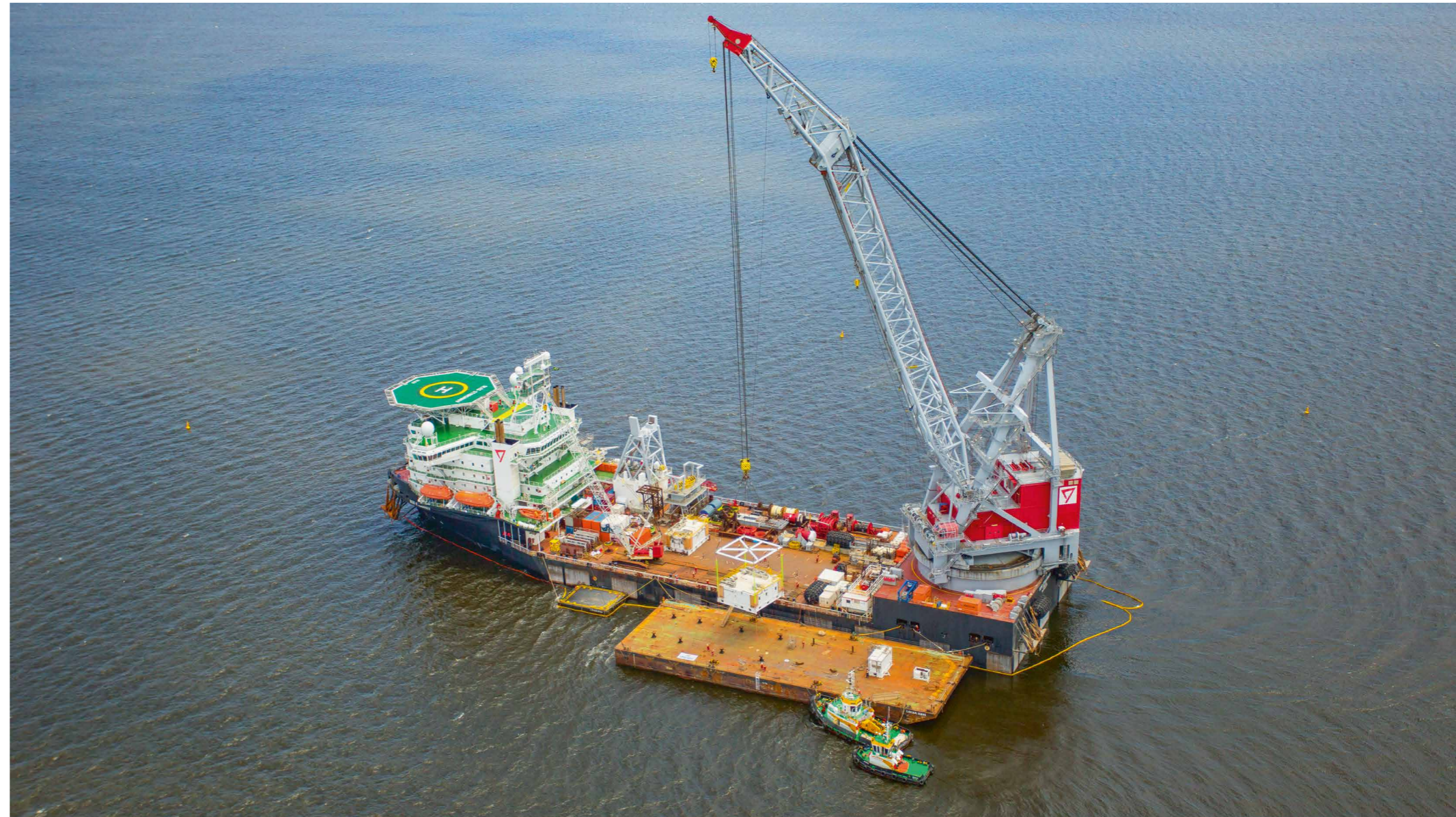
In addition, the scope of surveys had been expanded to include bathymetric surveys in Abu Dhabi, since a rock was blocking part of the jetty and was considered "unsafe." A dive survey as well as an echo sounding survey were also conducted by deugro to prove that the operation could be conducted in a safe manner.

Strict safety standards

The clients SBM Offshore and Shell, as well as deugro, are well known for their safety standards—and the BC-10 project was no exception. The scope of this project went beyond the standard requirements. As an example, an on-site safety induction in Brazil was executed, with all stevedores and onshore personnel involved

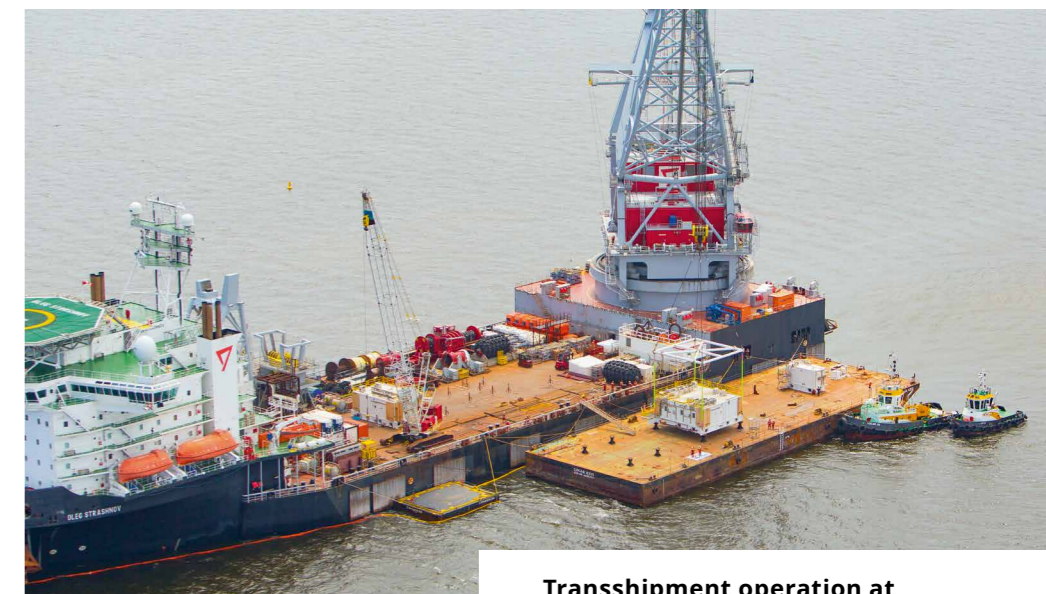
in the operation, and included the showing of Shell's safety video about the 12 life-saving rules.

Another interesting challenge came with Shell's request to build a fence around the valuable cargo and have 24/7 armed security guards looking after the equipment during the two-and-a-half-month storage of the cargo at Vitória Port, Brazil. Security guards noted the details of every individual entering the fenced area and turned in these reports on a daily basis.



Geographical distances

Considering the vast geographical distance the accommodation modules had to overcome, close cooperation of all involved deugro offices worldwide was required. Covering multiple time zones, the Singapore, Middle East and Brazil offices were part of the project team. They aligned and coordinated well to ensure a smooth execution of the project as expected from the client.



Transshipment operation at Guanabara Bay, Rio de Janeiro

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