

Case Study

Donghae-2 Tie-Back Project



Case Study: Donghae-2 Tie-Back Project

To supply the Donghae-2 gas field, Subsea 7 (Singapore) Pte Ltd awarded deugro the contract to transport three laden reels and accessories to Loyang, Singapore.

deugro was able to secure the contract based on previous successfully executed projects for Subsea 7 in the UK, as well as on local expertise, early involvement and detailed knowledge of the logistics requirements. Some of the main requirements were the management of complex loading operations, sourcing local contractors, pre-setting operations, flexibility during barging operations and securing the availability of suitable equipment.

Although the amount of reserves is not massive, the field is meaningful because it represents the country's first commercial hydrocarbon development. In March 2014, the Donghae-2 gas project, located approximately 5.4 kilometers from Donghae-1, was explored.

The Donghae-1 gas field was previously planned to be shut down in 2016, but due to the discovery of the Donghae-2 gas field, with an additional 22 billion cubic feet of natural gas and 190,000 barrels of crude oil in its reservoir, its life was extended by three years to 2019. The reels and accessories were to supply this gas field production.

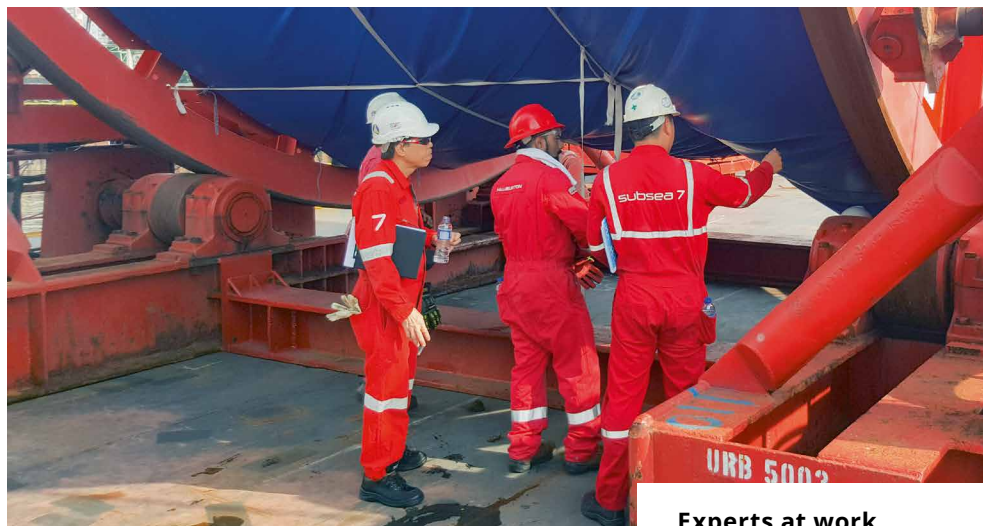
Project background

A gas field in the East Sea, the Donghae-1, is located about 60 kilometers from Ulsan in the southern region of South Korea.

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The challenges

- Tight time frame for ocean voyage from Europe to Singapore
- Strict sequence loading order for transpooling operations directly from barges
- Complex pre-setting/dismantling of under roller bases and stand-by operations of barges
- Managing of flexible barge delivery schedules in Singapore



Experts at work



Industry
Oil and gas



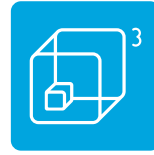
Client
Subsea 7
(Singapore)
Pte Ltd



Project Owner
Korea National
Oil Corporation



Cargo
2x flow line reels,
1x umbilical reel,
accessories



Volume
1,973 FRT in total



Max. Heavy Lift
245 MT



**Rigging operation of a
spreader beam on board
the MV Palabora**

Project execution

Once deugro was awarded the contract, our team started with the project planning and provided a method statement, risk assessment and detailed project execution plan. Besides the subcontractor management for shipping, handling and other logistics services, deugro's project team worked together closely with dteq Transport Engineering Solutions, a company of the deugro group, to provide detailed lifting drawings and lashing calculations.

The main challenge presented by this project was the pre-setting of the barge equipped with under roller bases for the reels. With this

set-up, the reels were lifted on the barge and directly placed on their bases. This required exact planning with no room for error.

Though deugro has broad experience in offshore oil and gas projects, this was the first time that deugro supported logistics for transpooling operations. This involved transpooling the flexible flowline coiled on the reels directly from the reels positioned on barge to the receiving reel at Subsea 7's installation vessel. From here on, the flowline could be prepared for further installation at the Donghae-2 gas field.

» deugro's project management team kept in close contact with all involved subcontractors and the client at all times. «



Thanks to extensive pre-planning, clear communication and close collaboration among all parties involved, deugro was able to draw up a final transportation concept that satisfied the client's requirements. deugro was also able to assure them of our ability to execute the operation, although the team did not have any previous practical experience with this specific process of transpooling.

The pre-setting operation was planned over two days and included a back-up plan to extend the operations if needed. The biggest challenge was synchronizing the vessels' schedule, pre-setting operations and barging to Loyang in order to ensure the most cost-effective transportation schedule and to reduce storage charges. In order to align the vessels' schedule with the pre-setting of the barge, our project management team kept in close contact with all involved



Side-by-side discharging operation from the MV Palabora onto the pre-fitted reel-powered under roller and then onto the barge

subcontractors and the client at all times.

Not only the usual considerations like weather, export and import procedures, but also the multiple ports of loading—Kalundborg in Denmark and Rosyth in the UK—as well as the readiness to receive, upon request of Subsea 7, added many challenging factors to be considered for a smooth execution of this project.



Ongoing lifting operation of the 245 MT flowline reel: The 205 MT umbilical reel (blue) is sitting safely and securely on the pre-fitted reel-powered under roller.

After loading in Europe, the MV *Palabora* arrived in time at Jurong Port, Singapore with the cargo of two 6-inch flexible flowline reels and one umbilical reel on a Last-In/First-Out basis. The pre-set barge was positioned alongside the MV *Palabora*. The reels were discharged directly to the barge with a single hook lift. In order to

ensure that all operations were executed within time and budget constraints, it was essential that all subcontractors had the right equipment available in time to receive the heavy loads from the vessel directly. All smaller cargo was discharged ashore for road transportation to the Loyang Offshore Supply Base.

Upon request of Subsea 7, the barge moored for storage in a deugro-nominated berth at the nearby Tuas yard while waiting for Subsea 7's installation vessel to arrive. With this barge storage solution, deugro provided the needed flexibility to the client and ensured the most cost-effective and timely delivery of the reels. The transpooling operations conducted by Subsea 7 at Loyang took place directly from the barge. During

the operations, deugro provided access as well as manpower and equipment for ballasting to keep the barge stable. This also included unlash and re-lashing of reels before and after transpooling operations.

Once Subsea 7 finished the seven-day procedure, deugro arranged re-lashing of the empty reel on the barge and delivery of them to the *MV Atlantic Dawn* at Jurong Port.

Again, the vessel's crane performed a single-hook lift alongside the barge to receive all empty reels. Finally, the *MV Atlantic Dawn* returned all empty reels to the fabrication yards in Kalundborg and Rosyth as part cargo under deck within the agreed transit time. The client was delighted, since this arrangement helped to minimize the empty reel rental charges with the respective owners.

» deugro provided the needed flexibility to the client and ensured the most cost-effective and timely delivery of the reels. «

