



The safety of knowledge

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By the end of October, the first shipment of transition pieces (TP) for the MERKUR offshore wind project had been completed. The brief was to take full responsibility for organising the transportation and associated engineering, to ship these components from the manufacturer's premises to the hub port for the transfer of TPs to the installation vessel. COORDINADORA, in charge of the engineered transportation, is thrilled to share this stunning case study exclusively with PES.



especially with regards to the lifting capacity of ship's cranes.

Thus, COORDINADORA, an expert in the shipping sector for over 35 years, prepared a particular RFQ for the ship owners to bid for the necessary consecutive shipments along the same route.

Time has demonstrated the importance of experience in handling such a complicated negotiation, resulting in full-warranty vessel features, for several consecutive shipments. It was done by matching the client needs, not only in terms of technical solvency, but also the flexibility to integrate into the manufacturing schedule.

Once the vessel selection process was completed in favour of the top category company Rolldock Shipping, a joint team headed by COORDINADORA's in-house engineers started to design the grillage and sea fastening solution, which is the key factor in the transportation of these particular type of cargo.

Transition pieces are in concept vertical cylinders, almost 30m high and about 6.5m diameter weighing 330mt. The cargo footprint is only a narrow ring for

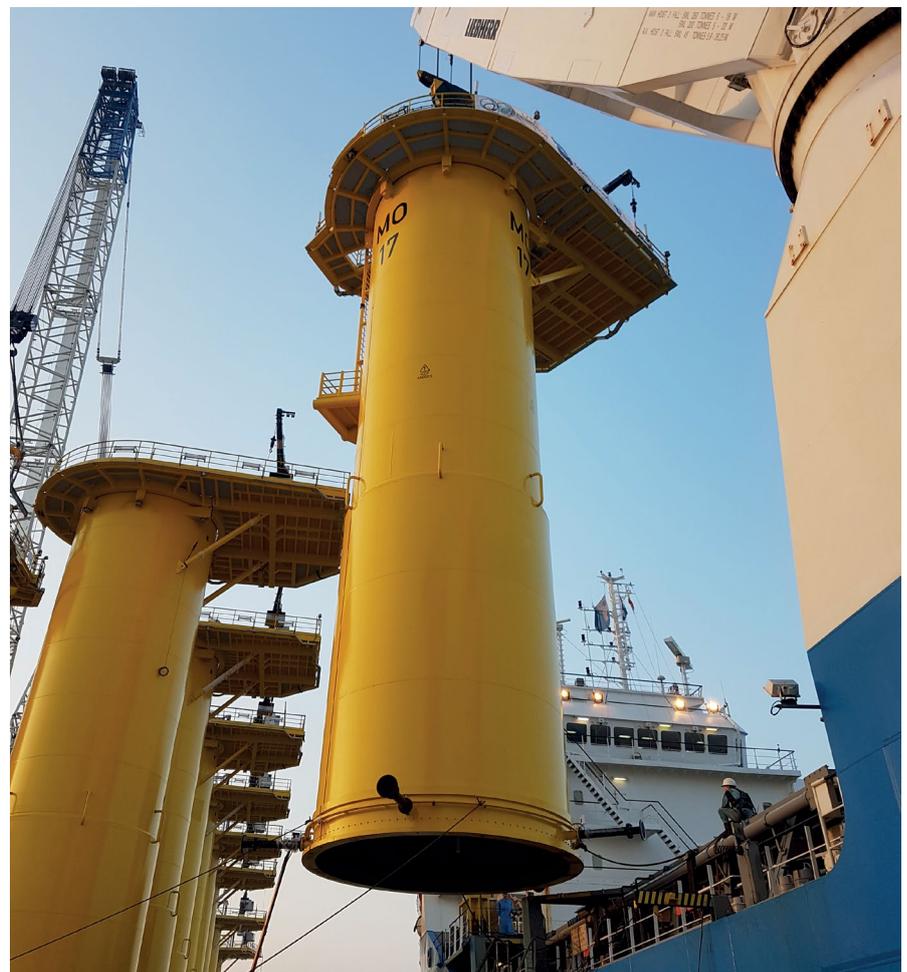
transmitting the whole load. That is the reason why it is necessary to employ load spreaders on the vessel deck to distribute the weight and inertia forces efficiently along the ship's own structure, within allowable threshold values.

The only permissible area where it is possible to connect any securing element on this cargo is at the bottom flange in contact with the load spreaders. Therefore, the mechanical seafastening solution has to be applied to the same load-spreading structures.

These were the clear and well-defined design constraints, together with minimising the amount of steel weight and welding requirements for economic and environmental reasons.

The solution developed by COORDINADORA consisted of a beams grid of 30 mt weight, mostly made with commercial HEB profiles in 900 mm height reinforced with plates directly welded to ship hold frames.

A securing system was installed on top of the grillage grid, consisting of 16 mobile clamps, which were mechanically activated to slip



The challenge came from an established customer IDESA-WINDAR, the joint company in the DANIEL ALONSO Group, they were awarded the order to manufacturer 66 transition pieces for the Merkur Project. They were manufactured in their Aviles facilities and had to be delivered to GeoSea, part of the DEME Group, in Eemshaven Port who was the main contractor.

The first task was to select the most suitable vessel to match the obvious competitive requirements and the technical reliability needed to carry this crucial cargo,

View of the pieces ready to be uploaded vertically. Each piece weighs 330mt, 30 m high and about 6.5m diameter.

over rails and clip the TP bottom flange.

Each of these clamps are fixed by means of a couple of M52 bolts, which are pre-tightened with hydraulic tensioner, to keep the bolts working in a constant stress regime to reduce the fatigue effects.

All engineering was overseen by COORDINADORA according to DNV-GL and ASME standards and regulations. Deliverables were produced in record time due to the tight schedule pressure and included 3D modelling, manufacturing detailed drawings, FEM analysis, cargo integrity check-outs, Method of Statement and the hydraulic system user's manual among others.

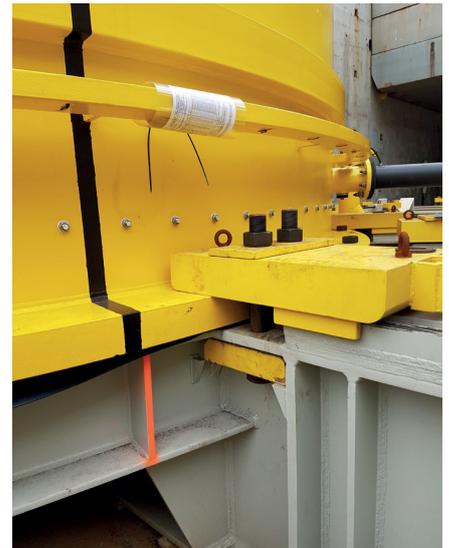
The design and associated technical documents were immediately approved by a recognised MWS, Marine Warranty Surveyor, contracted by the end client.

Eight pieces of grillage were produced in local workshops, under the joint supervision of COORDINADORA and IDESA-WINDAR, who both checked the quality of the manufactured structures.

Besides the grillage itself, 16 guide posts were produced. The aim of these auxiliary structures is to provide some visual guidance to the ship crane operator during



Model clamp



Real clamp

the load-out of TPs, in order to ensure its proper location on exact stowage positions, centred onto the grillage grid pieces.

Once finished and painted, the structures were installed on board the vessel. Full contact to the bearing plates was possible because of the proper and particularised,

shimming solution monitored by optical and laser levels; they were finally welded on hold according to MoS. These jobs took four consecutive days working in double shift for 24 hours.

Last October 13th, the first six transition pieces were ready for transport and COORDINADORA received the go ahead to load. First it was necessary to access the TP's for a transportability inspection, to check that no loose items were inside the TP, all internal securing elements were properly connected, lifting points were as they should be etc. Some guidance was previously given to the manufacturer to ensure the seaworthy condition of cargo. No major issues arose during inspection.

These inspections require the certification personnel working at height, which of course is something which the company has been implemented for a long time, as well as special machinery handling and several safety training courses, which shows their commitment to the highest standards.

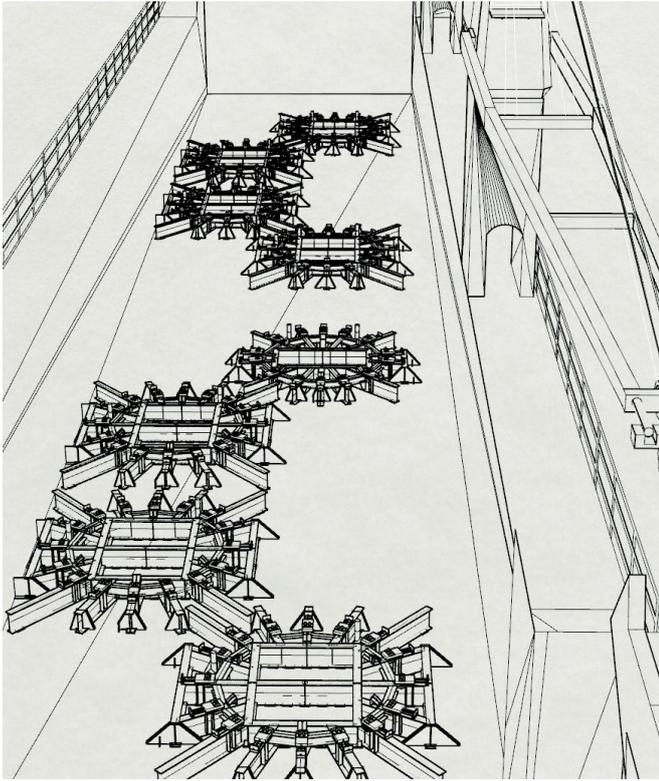
The loading operation was well coordinated and done within the two days as planned, according to all previous methods of statement. Mr. Ignacio Serrada, Projects Engineer in charge of this MERKUR Project, lead the operations with 2 other colleagues, and he declared operation a success, following on from the dedicated preparation over the previous weeks.

In order to be present during the execution of the whole project, a temporary modular office was set up within the port, this meant the personnel were not dependent on Madrid HQ for daily tasks.

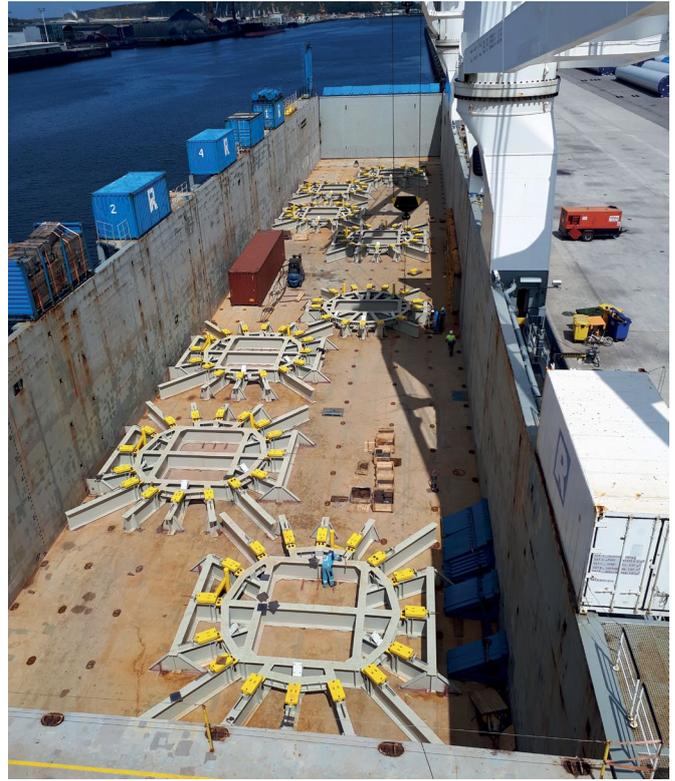
A special mention to our partner in PoL (port of loading), Maritima del Principado, in charge of stevedoring, communications with Port Authorities, auxiliary means, documents issuance and general support.



View of the first pieces placed on the grillage, on the vessel specifically selected to cover the project needs.



Model grillage



Real grillage

Operations were closely watched by nominated MWS who finally stamped his signature on the CoA (certificate of approval) supporting the resulting jobs carried out under their warranty.

The transportation was during the autumn / winter season, when the sea voyage needs a favourable weather window. This meant monitoring the weather forecasts to ensure certain parameters, such as wave significant height or wind speed did not exceed the defined thresholds. These

thresholds were fixed after a detailed engineering study, linking the sea state with the resulting accelerations suffered by cargoes in transit, which had to be kept under maximum values defined by the manufacturer to assure cargo integrity.

Due to the effect of hurricane Ophelia battering the English Channel and the Bay of Biscay on certain dates, the sail away had to be postponed for two days. The expectable sea condition was not deemed safe for sailing within the maximum allowable motion response and thus the vessel was kept at anchor, whilst the weather was monitored to find a suitable window.

The COORDINADORA project team, again lead by Mr. Serrada travelled to PoD (port of discharging), one day in ahead of the vessel arrival to check all the preparations.

Once in Eemshaven, the base port chosen by the main contractor, coordination meetings were held with all parties to ensure the smooth discharge of these first six TPs.

After a short trip, lasting three days sailing, the ship arrived at the port with all cargo safely stowed on board. During the voyage, visual seafastening check-ups and random hydraulic testing were carried out according to implemented protocols and good practice routines.

The unloading operation itself took two days. According to the procedure, 50% of the seafastening elements were released in

advance and the cargo was completely unsecured once connected to the ship crane and a certain minor percentage of the load on the hook. TP's were unloaded onto steel beam grillage previously prepared on the quay.

Once they were discharged and unhooked, a joint survey was carried out inside each TP to detect any eventual damage suffered during transportation. The result of all inspections was no damage at all to the main body or secondary elements.

TP's were shifted to a temporary storage area by crawler crane, where they now stand waiting for the installation vessel, MV Sea Challenger, to pick them.

The operation was a new and total success of COORDINADORA's ETM policy (Engineered Transport Management) which consists of the detailed, comprehensive and exhaustive study of all the involved transport parameters before it takes place, and leadership attendance at operations. Global coordination is the only way to ensure a safe job.

Now, all efforts focussed on the upcoming shipments, concluding the transportation of the 66 TPs, expected to be done in a total of nine shipments, which we in COORDINADORA are proud to manage as part of the whole value chain in the offshore wind industry.

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