

## DOF SUBSEA

### SKANDI HERCULES CONSTRUCTION VESSEL: FLEXIBLE PIPE LAY SYSTEM

#### Conceptual Design, Detailed Design and Fabrication Support

ICON Engineering was engaged by DOF Subsea to undertake the detailed design of a Flexible Pipe Lay System (FPLS) for use on the Skandi Hercules construction vessel. The purpose of the FPLS was to facilitate the deployment / retrieval of subsea flexible pipelines including export pipelines, flowlines and risers.

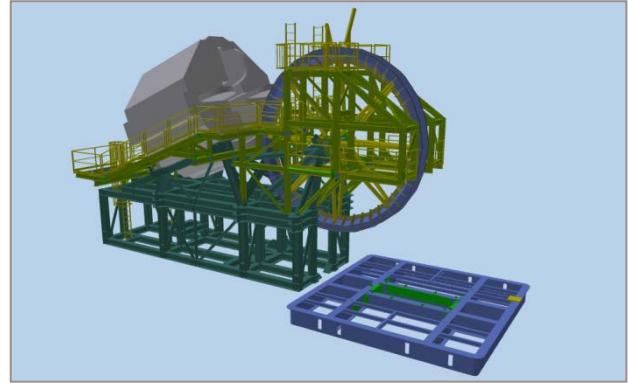
The FPLS was initially used on the Stybarrow H4 Remediation project on Australia's North West shelf. That project involved the replacement of a section of the existing subsea H4 flowline. The FPLS was designed as a generic piece of equipment, with the capability of being re-used on future projects.

The overall FPLS assembly consisted of a track type tensioner, a lay-over wheel, tensioner and lay-over wheel support structure, moonpool platform and hang-off beams, and storage reels. The assembly was designed to be installed on the aft main deck of the Skandi Hercules with the flexible pipe being laid through the moonpool.

#### Scope of Work

ICON's scope of work for the project included conceptual design, detailed structural design and preparation of fabrication drawings of the following components:

- 7.6m diameter lay-over wheel to suit the minimum bend radius of the flexible pipe
- Primary structural support frame for mounting the proprietary tensioner unit and lay-over wheel
- Secondary structure for access and safe operations
- Moonpool platform, removable hang-off beams and hang-off collars to temporarily support pipe sections while making up end terminations / pipe connections
- Winch foundation to mount a 10T SWL winch, which was used to assist with onboard handling and initiation of the pipeline through the tensioner
- Sheaves to route the vessel's abandonment and recovery (A&R) winch wires over the lay system to pay-out or retrieve the subsea pipelines
- Seafastening of all equipment and structural assessment of the vessel's deck to support the design loads



ICON Flexible Pipe Lay System – Structural Model

ICON also prepared procedures and provided technical assistance during fabrication and mobilisation.

#### Design Features / Achievements

- Fast tracked design schedule
- Design performed in accordance with DNV offshore standards and DNV ship rules
- Designed to suit a proprietary tensioner unit – 95T maximum operating line pull and 95T self-weight.
- Innovative modularised design for quick installation / set-up with minimal deck welding
- All equipment designed and seafastened for unrestricted sea transport
- Primary structural components were proof load tested for operational loads
- Lifted items were designed and certified to DNV Standard for Certification No. 2.7-3, "Portable Offshore Units"



ICON Flexible Pipe Lay System during Mobilisation