Tower Mooring & Loading System

Penglai FPSO located in Bohai Bay
The Soft Yoke Mooring System (SYMS) is part of the Bohai Phase II development project. Located in the Bohai Sea off the north-east coast of the People’s Republic of China (PRC), it is approximately 140 miles from Tanggu and 85 miles from Dalian. The FPSO is permanently moored to a fixed tower. The transfer of all production fluids, power and control signals from the FPSO to and/or from the other field facilities will be through this system.

The SYMS is fixed to the seabed by means of a jacket, supporting risers and J-tubes. The fixed decks facilitate the pig launchers/receivers, drain tanks and control equipment.

The rotating deck transfers the mooring loads exerted by the yoke arms into the main bearing and allows 360° rotational freedom. This deck houses also an offshore crane, the multiple product swivel stack including E & I and utility swivel, and a hose connection deck. The purpose of the hose connection deck is to support the jumper hoses and jumper cables which cross-over from the rotating deck to the hose connection deck on board the FPSO.

Each pendulum with the ballast blocks at the bottom end is supported by the Pendulum Support Structure, located on the forecastle deck of the FPSO. Two retractable gangway bridges provide access from the FPSO to the rotating deck via a stairway on both yoke arms.

Tower Mooring & Loading System Details

- Designed and built by: Bluewater Energy Services BV
- Client: ConocoPhillips China Inc. and CNOOC
- Project: Bohai Development Project
- Completed substructure: 2007
- Completed upper structure: 2008
- Location: Offshore Bohai Sea, 140 miles from Tanggu and 85 miles from Dalian
- Water depth: 28 meters
- FPSO length: 323 meters
- FPSO Displacement: 390,000 T
- Over-all height: 78 meters
- Footprint jacket: 36 X 36 meter
- Pendulum length: 28.5 meters
- Thickness of flat level ice: 25.5 cm
- 1/100 year wave height: 11 meters
- Number of swivel modules: 7
- Number of paths in utility swivel: 7
- Number of risers: 7
- Number of J-tubes: 8