Systems and Methods for Launching and Self-Up-Ending a Spar Hull in a Body of Water

Lead Inventor

Sanghun Son
Ocean Engineering

Richard Mercier, Ph.D.
Professor, Civil and Ocean Engineering
Shell Director, Offshore Technology Research Center

Research Interests

- Experimental and numerical hydrodynamics
- Global design and analysis of offshore structures
- Dynamics of deepwater mooring systems
- Scale model testing of floating structures

Contact

Sheikh Ismail, Ph.D.
Licensing Associate
Texas A&M Technology Commercialization
(979) 862-3273
smismail@tamu.edu

Docket: TAMUS4590

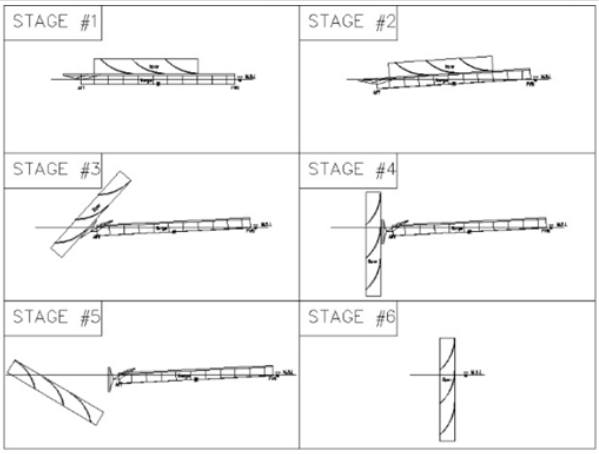
Overview

The installation of a spar (single point anchor reservoir) hull structures for "floating" oil rigs is a costly, high risk exercise. The time window for the installation of a spar hull is dependent on surface weather condition and subsurface currents. The entire installation must occur in fair weather conditions in an environment that is constantly changing, with unexpected weather delays leading to drastically increased installation costs. The installation also requires a specialized crew and equipment. A crane barge and specialized welders/divers are need to weld steel structures of the spar before upending. The companies that contract the installation charge a premium for the specialized equipment and workers.

Technology

This method is a simpler barge launching technique. Using this method, the spar structure and strakes are fully assembled onshore and placed on a semisubmersible barge. Once to the site, the ballasts tanks are filled such that the fore of the barge is inclined, aft declined, and hydraulic jacks activated leading the spar hull to slide into the water using its own weight. A rocker arm ensures that the spar hull upends itself once in the water. The spar hull then separates from the barge in its final upended stage.

Developed method - Launching and self-upending method



Stage 1: Transport the spar to position with preassembled strakes. Fill with ballast water
Stage 2 – 4: Incline the barge and slide the spar with self-gravitational weight
Stage 5: The spar is separated from the barge. The spar will then upend itself
Stage 6: Install the spar once it is in a stable condition

Advantages

- Less complex method
- Reduced cost (less specialized equipment and labor needed for launch)
- Shortened period of environmental risk
- Reduced launching, upending, and installation time
- Enables larger spar launches

Applications

- Launching spar hulls during the installation of offshore floating structures

Stage of Development

- Rigorous simulation was performed to develop and optimize the spar launching method

Patent Status

Patent Pending