Getting to Grips with Deepwater Handling Operations

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Agenda

First Subsea
Trends in Offshore Handling
Deepwater Handling Challenges
Ball and Taper Technology
Case Study 1 - Riser Handling
Case Study 2 - TAD Lashing
Case Study 3 - MODU Mooring
First Subsea is a specialist in the development and supply of subsea mooring, riser connector and tubular handling systems.

World leading, patented ball and taper connection technology.

Full design, build and testing capability.

Based in Lancaster, UK with representatives in Aberdeen; Kuala Lumpur, Malaysia; Perth, Australia; United States and Brazil.

Over 50 employees, mostly qualified engineers.
Trends in Offshore Handling

Greater development of seabed structures

Longer tie-backs to production platform

Growing importance of deepwater exploration and production

Renewable energy - offshore wind farms and current turbines

Decommissioning
Deepwater Handling Challenges

Further offshore, lack of infrastructure

Environmental Risk

Engineering Challenge
- water depth
- mooring rather than fixed structures
- greater subsea equipment payload

Handling Safety

Cost of vessel time
Handling Tool Requirements

Flexible deployment: dedicated offshore installation barge through to anchor handling vessels

Ability to withstand high loads

Avoid damaging payload

Easy and quick connection

Ease of recovery
Ball and Taper Technology

Patented 'Ball and Taper' Ballgrab® technology

Self aligning, Self activating

Simple mechanical mechanism

Grip elements in compression, proportional to load

No release under load - zero failures

Ability to connect and reconnect
Ball and Taper Applications

Characterised by: powerful yet gentle grip, high load resistance, speed of deployment

Shallow water and deepwater mooring connectors

ROV-plies and diverless bend stiffener connectors: riser and umbilical connections

Pipeline handling tools

Buoy pull-in

Drilling pipe handling tools
Case Study - Riser Handling

Problem: deployment of risers to Tweedmuir (2005), Galley & Duart, AUK North and now Arkwright fields, North Sea

Handling requirement for multiple risers in main caisson during welding operations
Case Study - Riser Handling

Solution:

Riser Handling Tool developed:

- grip proportional to load
- pure mechanical mechanism

No modification to risers required

No damage to risers

Ability to independently move each riser within main caisson

Ability to purge lines / inspection cameras through the riser handling tool
Case Study - Riser Handling

Next caisson section is prepared with Ballgrab riser handling tool engaged in each riser.

Riser handling tool allows independent lifting and positioning of risers for welding to lower caisson section supported on the drill floor.

Risers are welded out. A purge line can be connected through the tools.

Once weld is complete riser handling tool can be disconnected ready for repeat procedure with next caisson section.
Case Study - TAD/SPAR Lashing System

Kikeh field - Spar - 4,364 ft (1,330 m) water depth, offshore Malaysia

First use of semi-submersible Tender Assist Drilling Unit (TADU) alongside Spar

TADU - reduces weight and cost of Spar topsides and increases drilling efficiency

Semi-submersibles for TAD include West Setia, West Alliance and West Menang for up to 3 years
Case Study - TAD/SPAR Lashing System

Problem:
- Reduce cost of installation
- Optimise mooring processes

Solution:
- Ballgrab connectors
- Faster installation
- Ease of changes in mooring line deployment
- Greater connector integrity
- Convenience and dependability
Case Study - TAD/SPAR Lashing System

Ballgrab connections:

TAD Bow mooring
TAD Lashing connection in DTU Spar
DTU mooring

Ballgrab male connectors removed and serviced between TAD moorings
Case Study - MODU mooring

100 subsea wells in 18 drill centers at 700 - 1435m

Drill centers in close proximity to optimise subsea architecture

Conventionally moored MODUs selected by field operator, up to four rigs operating simultaneously

Taut-leg mooring to allow MODU to moor safely over three drill centers
Case Study - MODU mooring

Problem:

Risk of damage to subsea infrastructure

Needed easy to deploy and recover mooring tool, without dragging along seabed

Solution:

Permanent, pre-set moorings

Sepla anchor and Ballgrab mooring connectors
Case Study - MODU mooring

Anchor prohibits ‘normal’ pile mounted Ballgrab receptacle

Ballgrab receptacle held in mudmat

Ballgrab connector (and mooring line) lowered from AHV to receptacle to complete mooring

Mooring connector disconnected at end of drilling schedule - retrieved to surface

Ballgrab receptacle returned to mudmat
Ball and Taper - Simplicity over Complexity

Offshore handling becoming more complex, more challenging

Ball and taper tools provide a flexible approach to many offshore handling tasks

Simplicity of operation - dependable in-service

Broad offshore handling experience: subsea mooring, riser handling, TAD Lashing

Pipeline recovery, drill pipe handling, buoy retrieval, riser connections...
Thank You