A LOW RISK, LOW COST METHOD FOR THE INSTALLATION OF SUBSEA STRUCTURES

A STEP CHANGE IN SUBSEA INSTALLATION

Subsea Deployment Systems Ltd.
The Task

• Large structures
• Deep water
• Hostile environments
Installation Problems

• Vessel capacity
• Weather restrictions
• Vessel availability
• Schedule constraints and delays
• Cost
The Subsea Deployment System

- Simple, safe
- Water depth 80m to 3000m
- Capacity 100t to several 1000t
- Essentially independent of weather
- Low cost
SDS Key Differences

• Structure connected to a buoyancy frame
• Submerged tow to site
• Payload depressed to seabed
• Negligible dynamic loading
• Very soft set-down
• No “point of no return”
The Tool / System Main Components

- TOW CHAIN CLUMP WEIGHT
- CONTROL CHAIN
- CONTROL CHAIN TOWER
- TRANSVERSE SUPPORT FRAME
- SOLID BUOYANCY
- CASTLE
- BALLAST LOCKER
- TOW BRIDLE
- STRUCTURE
- FULLY FLOODABLE HULL

PATENT GB2464714
PCT/GB2009/051383
Control Chain Towers

- CONTROL CHAIN
- CONTROL CHAIN TOWER
- CHAIN REACTING AGAINST TOWER (PROVIDING LATERAL CONTROL)
- \( \frac{1}{3} \) SUSPENDED ABOVE CHAIN TOWER (REDUCING LATERAL OFFSET)
- \( \frac{1}{3} \) ON FLOOR OF CHAIN TOWER (NEUTRALISING VESSEL BUOYANCY)
- \( \frac{1}{3} \) SUSPENDED INSIDE CHAIN TOWER (PROVIDING LATERAL CONTROL)
Dynamics

• Natural period > 120s
• Response < 20% of vessel motions (regular waves)
• Minimal dynamic loading
• Low set-down velocity (< 0.1m/s)
Operating Window

ANNUAL AVERAGE WAVE EXCEEDENCE

- Arctic
- C North Sea
- Brazil (Campos Basin)
- Brazil (Santos Basin)
- NW Africa
- Gulf of Mexico
- NW Australia
- W Africa (Angola)
- W Africa (Nigeria)
Operation

Tow

• Shallow surface tow
• Deep surface tow
• Transition
• Submerged tow
Operation

Parking

• Lower clump weight
• System floats above seabed
Operation

Installation

• Lower control chains

• Position

• Lower to seabed
Operation

Ballast

• Install ballast weight to balance the payload weight
Operation

Disconnect

• Activate release system
• Reconnect control chains
• Raise chains
Inherent Safety

• Critical operations avoided offshore
• Operations can be suspended at any time
• Insensitive to weather changes
• Negligible dynamic loading
• Reduced risk of catastrophic failure

Tow wire Failure (Heavy)
Tank Test

Tank Testing of 1:75 Scale Model
Summary

• Installation and decommissioning
• Basic proven technology
• Low risk / inherently safe
• High capacity
• Deep water & harsh environments
• Low cost
• Good solutions are simple
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