Installation of Pipeline End Manifold (PLEM) and Subsea Tie-In of Expansion Spools

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INTRODUCTION
  • Background Information
  • Scope of Presentation

INSTALLATION PRELIMINARIES
  • Pipeline End Manifold (PLEM)
  • Expansion Spools
  • Installation Barge
  • Final Assembly

INSTALLATION PROCEDURE
  • Pipeline End Manifold (PLEM)
  • Expansion Spools
  • Final Assembly

CONCLUSION
Pipeline End Manifold (PLEM):  
- commonly used for subsea manifold to tie-in of underwater pipelines.
- used to comingle 2 or more pipelines together and eliminate the need for additional risers.
INTRODUCTION:
Background Information
Installation of PLEM and expansion spools:

- require great precision
- sensitive to weather conditions
- high installation cost
1. Installation of PLEM.
2. Installation of 2 expansion spools.
INSTALLATION PRELIMINARIES:

Pipeline End Manifold (PLEM)

- Designed Weight: ~ 70 MT
- Dimension: 14m x 6m
- Water Depth: 114ft (43.9m)
• 16” diameter
• Full Well Stream (FWS)
INSTALLATION PRELIMINARIES:

Expansion Spools
DP DLB Lewek Champion

- 358 person accommodation
- 1 x 800MT main crane
- 2 x 30MT secondary crane
- Dynamic Positioning with 6 Azimuth thrusters (max thrust 378.7kN)
INSTALLATION PRELIMINARIES:
Final Assembly

PIPELINE TO CPP

MOPU Leg Footing

For future expansion

Expansion spool

PLEM

Expansion spool

Pipeline to CPP
INSTALLATION PROCEDURE:
Pipeline End Manifold (PLEM)

Pre-installation:

USBL beacons
INSTALLATION PROCEDURE:
Pipeline End Manifold (PLEM)

Barge setup for PLEM installation
INSTALLATION PROCEDURE: 
Pipeline End Manifold (PLEM)

PLEM footprint and debris survey.
INSTALLATION PROCEDURE:
Pipeline End Manifold (PLEM)

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Installation Procedure
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INSTALLATION PROCEDURE: Expansion Spools

Barge Set-Up for Pipeline / PLEM Spool Installation
INSTALLATION PROCEDURE: Expansion Spools

ISOMETRIC VIEW

Pipeline on an A Frame

Lifting Riggings on Expansion Spool
INSTALLATION PROCEDURE: Expansion Spools

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Stage 1
Stage 2
Stage 3
INSTALLATION PROCEDURE: Expansion Spools

Expansion spool tie-in to PLEM
INSTALLATION PROCEDURE:
Expansion Spools

1. Installation Preliminaries

2. Installation Procedure

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SPOOL

DRIFT PIN

RISER/PLEM

PLET

+/- 300mm
INSTALLATION PROCEDURE: Expansion Spools

Expansion spool tie-in to pipeline
INSTALLATION PROCEDURE:
Expansion Spools

Flange Protector Drawings
INSTALLATION PROCEDURE: Expansion Spools

INSTALLATION PROCEDURE:

- Expansion Spools

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Barge Set-Up for PLEM / MOPU
Spool Installation
INSTALLATION PROCEDURE: Final Assembly

Introduction

Installation Preliminaries

Installation Procedure

Conclusion
CONCLUSION:

- Similar approach is used for deepwater installation.
- However, the challenges are greater. Due to the depth;
  - human divers are out of bound. Thus extensive use of ROVs
  - high-accuracy beacons are needed for positioning.
  - DP vessel are required as apposed to anchor handling.
THANK YOU