FPSO Hull brackets repair by cold bonded reinforcements
Project lessons learnt from a world first Offshore West Africa

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Outline

• The context
• A cold work repair solution for structural hull maintenance
• Challenges of implementing innovation
• Lessons learnt of Project execution and Offshore implementation
• Conclusions and limitations
The Context

• Permanently moored FPSO located in deep-water West Africa
• set of corroded brackets in a void located close to two crude oil tanks
• Classification society imposed steel renewal for 4 brackets

The challenge

Hot works would yield to
  o a highly detrimental production disruption (~3 MUSD)
  o Risks linked to the explosive environment
A cold work repair solution for structural hull maintenance

Functions:
- Restore Initial Structural Capacity
- Protect Against Further Corrosion

Standard shape

0.5 to 5 m²
How to deal with a first of a kind?

- **coldshield**, an innovative cold work solution for structural reinforcement
- **INNOVATION**, yes but how?
  - How to deal with innovation?
  - Is it class approved?
  - How to manage the risks?
  - Can I trust them?

- In 2016, COLD PAD was

  1st prize winner at Innovation Award

  2015
  GEP AFT
  Prix PME-PMI de l’Innovation

  3+ years of R&D
  3M€ of co-development
A True Partnership towards one goal

- Build confidence
- Transparency in objectives
- A clear Final goal with intermediate Milestones
- Obtain ABS class approval
- An Entrepreneurship spirit where CLIENT and SUPPLIERS are in the same boat

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- Obtain AIP
- Survey
- Preliminary Engineering
- Detailed Engineering & Class Review + Fabrication
- Offshore installation
Lessons learnt on the Project Execution

- Creation of a 3-party project team with regular communication

- Overall Evaluation
  - Good command of Safety
  - On time delivery
  - Respect of budget
  - Good Reactivity during engineering

- FPSO operations team – West Africa
- Cold Pad – Paris
- SBM Asset integrity - Monaco
Lessons learnt from offshore Campaign

- **Coldshield** proved to be highly compliant with surface irregularities (including weldments)
- The installation process proved to work offshore
  - In a confined space
  - Dehydration under Coldshield <1% HR
  - Surveyed and class approved

→ INDUSTRIAL PROCESS

- 4 brackets were installed within 3 days
- Planning was overall respected
- To improve
  - Interface with Offshore personnel & permitting
  - Clamping device
The offshore Campaign
Way forward and Limitations

- SAFETY WISE, **coldshield** is an important improvement (No Hot Works)
- From a COST PERSPECTIVE, **coldshield** is an attractive solution if hot works result in production disruption or use of cofferdams
- **coldshield** offers a unique solution for bottom shell repair of COT in direct contact with Produced waters
Overall Lesson learnt

• through that project, **COLDSHIELD** proved to

  Reduce exposure to HSE risks for offshore personnel

  • Maximize FPSO uptime & generate savings
  • reduce contingencies

  4 people crew
  16 mandays offshore
Thank you + author information and contact

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