Flexible Solution for FLNG Offloading

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Ideal Solution
What is the Ideal Offloading Solution?

- Safe
- Available
- Standard LNGC Fleet

Does it exist?
Safety

- **Collision risk**
  - Distance
  - Approach & mooring procedure

- **Escalation risk**
  - Distance

- **Leak risk**
  - Number leak sources / interface
  - Flange & Swivel
Availability

UKOOA e.g. for tandem envelop

Environmental Conditions

System

LNGC Requirements

Design Envelop

JAH - 2013
www.gep-aftp.com

LNG 17 - Flexible Solution For FLNG Offloading
Technologies

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Amplitude LNG Loading System - ALLS

- Cryogenic Flexible Pipe
- Multifunction connecting system

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Quick Connector and ERS

Cryogenic flexible pipe

Ship manifold
Connection winch
Guiding devices
QC/DC
Emergency Release System
Flexible pipe

Technip & KSB
LNG Flexible Pipe Mark 1 & 2

**Mark 1**
Aerial

- Aerial Environment
- Catenary Deployment
- Short Lengths (< 170 m)

MAWP = 12 barg

**Mark 2**
Floating & Aerial

- External Water Tightness
- High Fatigue Strength
- Harsh Operations
- Long Lengths (>300 m)

MAWP = 18 barg
Predictability and Pressure Drop

- **Predictable behavior**
  - Use of well-known material in elastic domain.

- **Complex CFD study**
  - Completion of a LES-VMS study to confirm level of friction coefficient and explain it.

- **Optimized Transfer Loop**
  - From offloading pumps to LNGC tanks.
  - Creation of a predictive model.

We can guarantee the flow rate
Configurations
FLNG Offloading Configurations

- Side by Side
- Tandem
Side-by-Side Configuration: Flexarm

- Counter weight
- Swinging arm axis and damping
- Flexible Pipe 2
- Rigid arm
- Winch
- Rotating mechanism
- Pedestal
- Connecting system

Flexible Pipe 1
- Gooseneck
- Wire
- Swinging arm

LNG 17 - Flexible Solution For FLNG Offloading
Aerial Stern-to-Bow Configuration: ALLS
Aerial Stern-to-Bow Configuration: ALLS

Azimuth

Pay In
Pay Out

Pay In
Pay Out
Configuration: ALLS
Floating Stern-to-Midship Configuration: ALLS
Conclusion
**Conclusion**

- Cryogenic flexible Mark 1 & 2\(^{soon}\) ready for market
- Flexible systems to answer the client needs

**Environmental Conditions**

- SAFeTY FIRST!

**System**
- Flexarm
- Aerial StB
- Floating StB
- Floating StM

**LNGC Requirements**
- Spot market or dedicated
- Size
- DP or not
- …

**Design Envelop**
- Large or Restricted
Thank you

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