Carbon composite riser and integrated deployment system to reduce the cost and risk of hydraulic light well intervention

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Asaf Hisherik
Tackling industry challenges

m-pipe® is designed to replace existing non bonded flexible and steel components

- m-pipe® fully installed project costs are comparable to NBF or steel pipe but with expected 25 year field life
- m-pipe® pressure rated at 5-15ksi can be ‘flexed’ to required subsea geometries, reducing installation costs
- m-pipe® subsea jumper spools reduce jumper weight and complexity, enabling Capex and Opex reduction
- High flexibility and strain capability means simpler riser and jumper design and lower interface loads
- m-pipe® low thermal conductivity reduces the criticality of insulation requirements in the North Sea
- m-pipe® light weight enables ROV manipulation without a support vessel above and / or under a drill ship

Replaces complex jumper geometry

Simplifies heavy steel riser assemblies

Reduces in-service damage risks
m-pipe® is an enabling technology

m-pipe® is a high strength thermoplastic carbon fibre / PEEK pipe that is one tenth the weight in water of equivalent steel or NBF pipe and resistant to degradation

- Uses the highest quality materials – carbon fibre, Victrex PEEK & S-2 Glass
- m-pipe® manufacturing is a fully automated robotic 3D laser printing process
- Interfaces with all types of oilfield standard hub, flange or threaded end fittings
- m-pipe® 2in to 6in production in up to 4km continuous lengths - fully spoolable

m-pipe® 10x lighter than steel
Subsea applications

The light weight and high strength of m-pipe® benefits all subsea projects

Riser systems and SURF packages

Ongoing m-pipe® qualification for riser tieback and SURF packages with clearly quantified technical and commercial benefits

Jumper spools and flowlines

Extensive m-pipe® qualification with new arrangements to greatly simplify current subsea architecture and speed up installation procedures

Hydraulic light well intervention lines

Strong market demand to solve limitations with current coiled tube technology like pressure, corrosion and fluid flow rate and to reduce costs and risks
Qualification

DNV contracted as 3rd party verification body to observe and audit Magma downline qualification programme – to follow approved industry best practice guidelines

DNVGL RP F119 for TCP

- Published by DNV GL December 2015
- Streamlined DNV-OS-C501 for TCPs
- Guides our thermoplastic composite pipe qualification test programme
- Foundation for forthcoming API-RP-17Z
- m-pipe® also has third party approval by DNV for previous project deliveries
m-pipe® client projects

High pressure risers for tiebacks and new and brownfield developments

- Total 6in 5ksi hydrocarbon pipe
- BP 6in 10ksi riser spool JIP
- Deepstar 4in 20ksi riser

High pressure jumpers, process flow spools and boost lines

- Statoil 2.5in 5ksi process flow loop
- Transocean 5in 7.5ksi boost line
Intervention challenges

Cost effective, time efficient and low risk intervention is needed to improve well production, especially challenging in deep water where LWI rigs are currently used.

- 4,500 subsea wells globally
- 70% are now over 5 years old and in need of work
- Global intervention will be a $17bn market by 2018
- 50% of intervention LWI but current technology has limits
- Subsea wells getting deeper, complicating LWI operations
Coiled tube and NBF risks

- Damage and collapse
- Fatigue failure
- High mobilisation weight
- Weight
- Corrosion
- Pressure
- Flow rate
- Tension control failure
m-pipe® light well intervention

Animation with commentary goes here
Light well intervention strategy

m-pipe® and m-IDP delivers cost savings via an integrated vessel back-deck system

- Light weight m-pipe® with low interface loads and dedicated reeler deployment system
- Single line deployment minimises operational complexity versus usual 2 - 4 CT or NBF units
- Broad vessel capability – 3,000m / 3in 15ksi of m-pipe® as a complete system for rental
- High tolerance to commonly used and highly aggressive intervention and stimulation fluids
- Large volume high pressure pumping means a shorter time working on each subsea well
- Reduced downtime due to larger operational windows (m-pipe® strength and low fatigue)
Intervention cost savings

m-pipe® and m-IDP system high pump capability for efficient hydraulic intervention

Cost saving $1.5m
m-pipe® system saves 10 days over a 3 well 1 month CT campaign

Campaign cost saving 30%
- Higher fluid flow rate
- Reduced pumping time
- Less operational downtime
- Result = faster LWI campaigns

2 x CT units 28 days
m-pipe® & m-IDP 18 days
m-IDP and 3in 15ksi m-pipe®

Back deck package managing m-pipe® riser transportation, deployment and retrieval

- Pipe chute
- High pressure swivel
- Level wind
- Reel drive
- Spares container

- 3,000m of m-pipe®
- Two track tensioner
- Reel with 3 partitions
- Side or moonpool m-pipe® deployment
- Controls cabin
- Deployment platform
- Hydraulic power unit

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Light well intervention system

Complete equipment system:

- Integrated Deployment Package (m-IDP)
- High pressure deployment swivel
- 3 m-pipe® riser sections
- Flying lead configurations
- Static or dynamic jumper spools
- Ballast weight and buoyancy
- m-IDP staffing and spares

- Full systems engineering provided
- Day-rate rental commercial strategy
- System excludes EDP, foundation, controls or deck hoses, ROV spread
m-IDP system details

Operator controls cabin

Hydraulic power unit

Reel and hydraulic fluid connections

26Te two track tensioner system

Deploying buoyancy through a vessel moonpool
m-IDP system details

- Hang-off beam to clamp EDP, ballast and buoyancy
- Work platform with retractable moonpool & bellmouth
- 25Te pivoting initiation winch
- Deployment chute with pipe containment
m-pipe® and m-IDP system

Hydraulic light well intervention system provides:

- Rapid vessel mobilisation and ease of m-pipe® handling
- Accommodates high pumping pressure and fluid volumes
- Intervention fluid compatibility / pipe corrosion resistance
- Reduced risk - high pressure capability via a single pipe
- Long life with no need to regularly replace the riser pipe
- Robust operational envelopes for reduced downtime
- Reduced interface loads and reduced hardware costs

m-IDP system launch in Aberdeen April 2016
Magma Global - Questions

www.magmaglobal.com

Asaf Hisherik

44 (0)23 9387 2800

See MDL on stand 27 - the manufacturers of the Magma m-IDP intervention system