

F150 First Floor, Cherwell Business Village, Southam Road, Banbury 0X16 2SP t +44(0)20 7235 7938 f +44(0)20 7235 0074 e hqsec@pipeguild.com www.pipeguild.com

2022 TECHNICAL AWARDS ENTRY FORM

Entry Deadline: Friday 22nd April 2022

Please tick which categories you are entering (entries may be submitted in multiple categories)		
Landbased Pipeline Project Award		ward
Lan	dbased Pipeline Technolo	gy Award
Utility Pipeline Project Award		
Utility Pipeline Technology Award		vard
Subsea Pipeline Project Award		d
Subsea Pipeline Technology Award		
ilce	Award	
1.	Brief title of entry:	TCP with innovative weight coating
2.	Company name:	Strohm BV
3.	Signed:	96
4.	Date:	2010412022
5.	Company contact name:	Annemarie Jak
6.	Telephone:	DD +31 255 76 35 54/ M +31 642 30 71 05
7.	Email:	a.jak@strohm.eu
8.	Precis of your entry (50 w	rords):

Strohm developed and manufactured the industry's first thermoplastic composite pipe (TCP) with an integrated weight coating which provides on-bottom seabed stability. The first fully bonded TCP Flowline with this innovation was supplied to Trident Equatorial Guinea to support gas services in shallow waters offshore Africa last year and the lightweight pipe remains stable on the seabed.



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9. Summary of entry:

Strohm has the largest track record globally for the production and delivery of TCP. It is a strong, corrosion resistant composite pipe solution with a long, maintenance free service life. Compared to conventional steel alternatives, TCP is lightweight and spoolable. It is delivered in long lengths allowing operators to use existing field support vessels on long-term charter rather than mobilizing dedicated pipelay assets, delivering significant efficiencies and supporting lower emissions targets. TCP has a 100% track record of no failures.

To make use of the benefits of TCP in subsea flowline applications, the technology's light weight nature needs to be counteracted in order to keep the pipeline stable on the seabed during installation and over its design life. This can be achieved by bundling it with a steel cable, concrete blocks or coverage by concrete mattrasses. However, these optior add technical complexity, installation time and cost.

Strohm's unique and innovative weight coating, is a magnetite filled LDPE plastic that is extruded as an external additional layer to the TCP. It is a flexible weight coating that is fully bonded to the pipe. This way, additional weight is applied, resulting in a pipe weight and density sufficient to keep the pipe stable during laying and stable on the seaber afterwards.

The additional weight coating layer is flexible and is capable to bend with the pipe. Therefore, the weight coating does not influence the bend radius of the pipe and the pipe can be simply reeled off during installation with the pipe in a stable subsea condition.

The first fully bonded 2,5-inch ID, 2,200 meter TCP flowline with the weight coating innovation was supplied in December 2021 to Trident Equatorial Guinea to support gas lift operations at its Elon-C tie-back offshore the west coas of the Central Africa region.

The unique nature of the TCP Flowline and end termination methodology allowed the vertical section of the flowline to be pulled through smaller J-Tubes and terminated on a platform, providing flexibility in installation as well as reduced fabrication costs and de-risking the offshore execution.

The weight coating is foreseen as an essential addition to TCP as it makes it also the best solution for offshore hydrogen transport (for wind generated hydrogen). It's benefits in this market include:

- It is a reliable energy transportation method (cables account for 80% of insurance claims)
- No embrittlement or hydrogen induced cracking
- Flexible and fast installation, especially for pull-in into the WTG
- Fit for unmanned operations
- Low CAPEX (Installed) and scalability to meet LCOE/LCOH targets
- High strength and unmatched fatigue life
- Fulfilling International Standards in temperatures up to 80degC for 40 years without compromising safety.

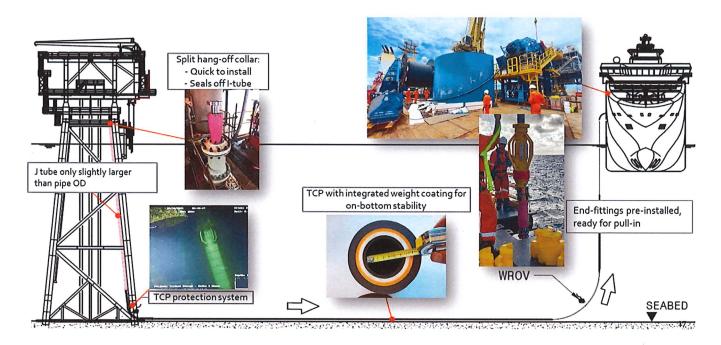
Strohm has also conducted an analysis of the CO₂ footprint related to the manufacture and installation of a TCP Flowline and found that it results in a 50+% reduction compared to that of a steel pipe alternative.

The company is continuing this work to assess the operational life, including the impact of the non-corrosive nature of TCP which negates the need for any injection of chemicals related to inspection and pigging.

The firm has also been investing in the development of TCP solutions aimed at CCUS, with a particular focus on offshore subsea pipelines. The main benefits in this sector for using TCP are total elimination of any corrosion, the ability to pull TCP through old pipelines, fast and robust termination in the field and the fact that TCP is a durable pipe lasting 20 to 30 years. Strohm's TCP Flowline eliminates corrosion and is the lowest total installed cost solution for greenfield, brownfield and hydrogen applications.



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1: This diagram demonstrates the simplicity of installing TCP with weight coating on location.



2: TCP is lightweight, flexible and spoolable



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3. Extrusion of the weight coating at Strohm's 24/7 plant in The Netherlands



4. Installation of the first TCP with weight coating offshore Equatorial Guinea