



# *State-of-the-Art Review of the Assessment, Qualification and Use of Mechanically Lined Pipes*

## **Concept**

There are some specifications for the manufacture of mechanically lined pipes (MLPs), and some guidance on how to qualify them, but the information is incomplete, and not universally adopted. A review of current and emerging practices and existing specifications is essential to confirm the current state-of-the-art for the manufacture and use of MLP, which have significant differences to conventional clad or overlaid products. This review will allow the industry to identify gaps in existing guidance and focus research in this active area with the ultimate goal of developing comprehensive and specific guidelines for the assessment, qualification and use of MLPs.

Existing material specifications, standards and database searches will be used to gather information. TWI will also approach relevant organisations for information that is not in the public domain, if appropriate. This will enable the review to capture the state-of-the-art, and allow the gap analysis to be refined and updated with current developments regarding aspects that should be considered and the requirements that should be fulfilled.

## **Proposed Project Content**

### **1. Design, Manufacture and Qualification**

This work will involve a review of MLP design and MLP geometry. Manufacturing methods, techniques used to seal the liner, choice of liner thickness and CRA material and their implications for MLP service performance, as well as aspects relating to welding procedures and welding consumables, qualification testing and inspection will also be addressed.

### **2. Installation**

This section will review the existing methods of installation of pipes offshore and their implications for MLP. It will highlight the aspects of installation and MLP properties that may affect the integrity and operational capacity of MLP, and identify areas where more information is needed. Aspects covering the commissioning period will be included.

### **3. Operation**

Aspects relevant to the operation of MLP including fatigue loading, corrosive environments and accidental damage will be reviewed. In any pipeline, if a flaw is detected, a decision must be made on whether the flaw is acceptable and so this section will also review and identify gaps in existing guidance on mechanical testing and ECA of MLP. Similarly, the CRA liner is present to provide corrosion protection to the backing steel, and a review of available information on the corrosion behaviour of MLP will be covered here.

### **4. Inspection**

Inspection of pipelines is necessary throughout their life cycle, and the inspection requirements for post-manufacture NDT in existing guidance and standards will be reviewed.

### **5. Gap Analysis**

This information obtained in the review will be used to allow the gap analysis to be precise regarding the remaining knowledge and guidance gaps for manufacturing, installing and operating with MLP.

## **Price and Duration**

£5k per sponsor, minimum of 10 sponsors required. 9 months duration.

## **Deliverable**

A report, detailing the state-of-the-art, as well as a list of research gaps which will inform future TWI research proposals.

## **Further Information**

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