

## PIPELINES AND UMBILICALS

The design and installation of subsea pipelines requires the detailed assessment of shallow seabed soils and their geotechnical properties. SEtech provide input throughout the development cycle of a project, from FEED stage and detailed pipeline design through to installation.

At FEED stage, it is important to identify the seabed risks to ensure that appropriate geotechnical investigation and testing is carried out. The use of a geotechnical risk register ensures that all the identified seabed risks are identified and addressed during the pipeline survey. Depending on the project specific requirements, specialist testing may include; soil pipe friction, thermal conductivity, centrifuge testing and sample dating.

A range of design activities require geotechnical input during pipeline design including:

- Pipe sinkage
- Pipeline soil interface friction
- Slope stability
- Upheaval buckling analysis
- Liquefaction potential

It is also important to integrate the findings of the geophysical and geotechnical route surveys to unitise the seabed soils and to provide appropriate parameters for pipeline engineering. This is normally presented in a soil parameters and engineering report for use by the pipeline engineers.



There are also a number of construction and installation issues that need to be addressed including:

- Pipeline initiation
- Pipeline floatation
- Pipeline and cable crossings
- Landfalls (for example foundations, cofferdams)

SEtech is an industry leader in providing advice and performance predictions for pipeline and umbilical trenching. Calling on an extensive in-house database and unrivalled experience worldwide, SEtech is able to provide an independent assessment on the suitability of trenching equipment and undertake performance predictions in a wide range of seabed conditions.

Trenching assessments include:

- Integration of geophysical and geotechnical survey data
- Identification of relevant geotechnical parameters for trenching
- Performance predictions for different trenching methods
- Identification of hazards to trenching

Trenching reports can be tailored to the specific requirements of the client. For operators, different trenching techniques and equipment are evaluated within a matrix and can be used as part of the tender appraisal. Alternatively, for installation contractors, a detailed assessment of trenching conditions is used to optimise the trencher set up and depth of burial achieved.

SEtech has also been at the forefront of establishing the use of the burial protection index and quantitative risk assessment techniques for determining appropriate protection measures for both pipelines and umbilicals. Significant cost savings have been achieved over the use of traditional protection methods such as rock dump.

