

## Pipeline Engineering



### Pipeline engineering

Pipeline Engineering is a wide-ranging multi-disciplinary subject including structural design for installation and operation, hydrodynamic stability, pipe-soil interaction, materials and corrosion and integration with flow assurance. A good understanding of these wide-ranging issues is fundamental to good pipeline engineering and core to Crondall Energy.

### Structural design

The determination of the pipe wall thickness is one of the main activities in pipeline structural design. For the basic load cases such as internal pressure and external pressure, the requirements are well defined in the pipeline design codes.

Structural design of the global pipeline response is more complex and less well understood. Crondall Energy's engineers are world leaders in developing technology to address global pipeline response and elastic-plastic strain-based design. Our engineers have published many of the most frequently-cited papers on the challenging design issues associated with lateral buckling and pipeline walking.

### Operational experience

Crondall Energy has engineers with an extensive experience in evaluating operational performance, to provide integrity and condition monitoring, as well as detailed failure investigations and the engineering of remediation measures.

### Verification services

Crondall Energy has provided verification services to many projects including Peer-assist and Peer-review of pipeline design, focused on the most challenging deep-water and high-pressure, high-temperature pipeline systems.

### Software

To support the complex analysis of global pipeline response Crondall Energy use the general-purpose FE program Abaqus for non-linear structural analysis, as well as developing a suite of in-house software to address key design issues, including the probabilistic modelling of pipeline global response and structural reliability (PROBE) and Pipe-soil interaction (PSI).

### Benefit

Extensive experience from failure investigations and interpretation of integrity monitoring surveys allows Crondall Energy to provide well-founded advice and guidance on global pipeline behaviour and novel design methods as well as calibrating existing design models to provide greater confidence in the design, whilst minimising the risk of failure.

Pipeline design & operation is increasingly challenging, due to deeper water, HPHT and extended life. However, the safety, environmental and business consequences remain critical