ONSHORE SMALL BORE CONNECTION (SBC) PIPEWORK VIBRATION EASY-BRACE® SOLUTION

Working to identify vulnerable small bore connections (SBCs) using the Machine Sentry® Mobile system, and reducing the risk of fatigue failures with AVT Reliability's universal, retrofit bracing system, Easy-Brace®.

THE PROBLEM

SBC fatigue failure is one of the leading causes of accidental release from process pipework, potentially resulting in serious safety and financial consequences.

Small bore connections (SBCs) often lack stiffness and exhibit higher levels of vibration than their parent pipe, leading to high stresses at the welded connection of the SBC branch.

SBCs are also frequently poorly designed, requiring additional support to minimise the risk of fatigue failure.

EASY-BRACE®

Easy-Brace® is a universal, retrofit bracing system designed to prevent small bore connection (SBC) fatigue failures in process pipework.

- Quick, secure installation with no hot work required
- Universal clamp design fits a wide range of configurations
- Reduces vibration at SBCs to meet EI guidelines
- Enhances process safety and reliability
- Minimises risk of unplanned downtime
- Cost-effective alternative to bespoke bracing solutions

AVT RELIABILITY ...it's in our DNA

THE SOLUTION

A Pipe Vibration (PV) survey was carried out on the orifice horn pipework, where high levels of vibration had been observed on-site. The team conducted an initial visual assessment to identify common faults, followed by a vibration assessment using the Energy Institute (EI) 'Concern' and 'Problem' levels.

AVT Reliability® has developed a simple scalar measure for vibration severity based on the EI criteria, but independent of frequency. During the vibration survey, AVT Reliability® recorded vibration levels exceeding the Energy Institute (EI) 'Concern' threshold, with a maximum 'Problem' critical factor (CF) of 1.5.

The vibration was believed to be flow-induced and exacerbated by poor SBC geometry and insufficient support. Bracing was recommended to reduce vibration in the vulnerable SBCs.

Installation of Easy-Brace®, our universal bracing system, was carried out using a bolted clamp design that allows for quick, safe installation without the need for hot work (welding). The adaptability of the Easy-Brace® system enabled four SBCs to be braced together, forming a robust and cost-effective support frame.

Due to the complexity of the brace configuration, static structural analysis was performed using Ansys Finite Element Analysis (FEA) software to verify structural performance. Post-installation vibration measurements showed a reduction to the Energy Institute (EI) 'Acceptable' level, with a resulting critical factor (CF) of 0.6.

THE OUTCOME

The customer received an Easy-Brace® validation report, detailing the reduction in vibration levels and including photographs of the installation.

Without Easy-Brace® in place, the SBC would have continued operating within the 'Concern' region, with an elevated risk of fatigue failure and associated safety, financial, and production loss consequences in the event of failure.

If your plant is facing similar issues, reach out to AVT Reliability for expert support in condition monitoring and lubrication management. We're here to keep your operations running smoothly.

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AT A GLANCE

MACHINE SENTRY®

CUSTOMER:	*Oil & Gas Production*
LOCATION:	Gas Terminal, Aberdeen
INDUSTRY:	Oil & Gas
PROCESS:	Oil & Gas Refining
EQUIPMENT:	Small Bore Connection (Orifice Pipework)
PRODUCTS:	Easy-Brace®
SERVICES:	Pipe Vibration (PV) Survey Computer Aided Design (CAD) Finite Element Analysis (FEA)

"This application highlighted the adaptability of the Easy-Brace® solution and resulted in a significant reduction in vibration and likelihood of failure."