

# Pipeline Vibration Compliance

Reducing the risk of vibration-induced fatigue failures  
of process pipework



## Pipework Vibration Services

AVT Reliability® provide a full range of Pipework Vibration assessments, problem solving solutions and training based upon the good practice guidelines in the Energy Institute publication:

### 'Guidelines for the Avoidance of Vibration Induced Fatigue Failure in Process Pipework', 2nd edition, 2008 (current edition)

Supplemented by over 30 years' professional experience in on-site measurements, assessment and problem solving.

### Pipework Vibration Assessment Services

AVT Reliability® offers a full range of predictive and on-site measurement services, including:

- Calculate Likelihood of Failure (LOF)
- On-site visual surveys which identify potential problem areas
- On-site vibration surveys and screening against EI Guidelines
- On-site strain measurement and fatigue assessment
- Specialist Techniques including FEA, Modal analysis, ODS and Motion Amplification
- Machine Sentry® allows cloud based data storage and presentation, automatic trending, action notes, reporting.



### Pipework Vibration Training

Develop the necessary in-house expertise to be able to identify, assess and rectify many basic pipework vibration problems.

AVT Reliability® offers a range of practical on-site training courses to provide a detailed understanding of the subject of pipework vibration. This training raises the competence and confidence of your staff to be able to perform their own visual inspection and basic pipework vibration surveys and assessments. They also gain a good knowledge of common remedial solutions and other specialist techniques available to them.



## Small Bore Connection Vibration Solutions

Vibration induced fatigue failure is a major cause of pipework failure, in particular welded connections between Small Bore Connections (SBCs) and Main Lines.

The likelihood of failure increases if the main line pipe experiences high operational vibration or transient vibration events or if the frequency of vibration of the SBC matches any of the operational frequencies. The likelihood of failure is highest in the case of large unsupported valves on excessively long, small diameter SBCs.

The most common retro-fit solution is to fit bracing in accordance with the Energy Institute Guidelines. This commonly requires the SBC to be braced back to the parent pipe with high stiffness supports to provide restraint against movement in all 3 planes.

AVT Reliability® frequently encounters cases where operators have fitted braces which are ineffective and so not satisfy the EI Guidelines. One of the main problems in designing a substantial retrofit brace is obtaining sufficiently accurate dimensions for often complex compound pipe geometries to enable the brace to be designed and fabricated offsite. Consequently, it is common for braces to be of poor fit which can result in incorrect and ineffective installations.

### Easy-Brace® - Universal SBC Brace

AVT Reliability® has developed a universal SBC bracing system which is guaranteed to fit any SBC geometric configuration and which typically requires as few as 3 basic dimensions to specify.

#### Key Features

- Suitable for all environments, the Easy-Brace is manufactured entirely from grade 316 stainless steel
- The brace split clamps are isolated from the pipe using Tico-Flex®.
- The design incorporates both angular and linear dimensional adjustability in all required dimensions to fit any SBC configuration.
- The bracing system is designed to incorporate a triangular truss arrangement, offering high stiffness in all planes in order to offer effective pipe support.
- To specify a Brace for a SBC application, 3 key dimensions are required: the diameter of each of the 2 split-clamp locations and the approximate length between them.
- Clamp-on retrofit design - No on-site welding is required to assemble or install the Brace.
- Fasteners include Nord-Lock anti-vibration washers.
- Brace can be easily be installed and removed by non-specialist fitters.
- Supplied in kit form, complete with full installation instructions. Installation service also available.
- Easy-Brace® is covered by US and UK patents GB2517297.



## Main Line Vibration Solutions

### Visco-Elastic Damper

AVT Reliability® is a UK distributor for specialist supplier GERB of Berlin, suppliers of visco-elastic damping solutions for main-line pipework.

These have many advantages over fixed pipe support systems, including:

- Provide dynamic restraint whilst permitting thermal movements
- Work over a wide range of frequencies
- Work in all degrees of freedom
- Maintenance free
- Protect against steady-state and transient shock events
- Available in a range of sizes

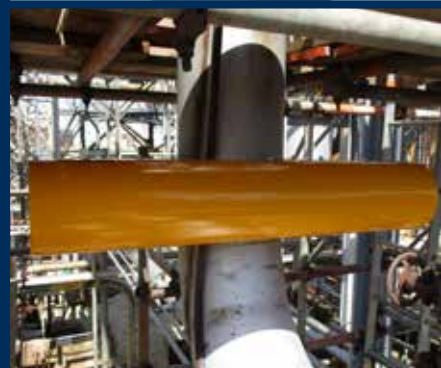
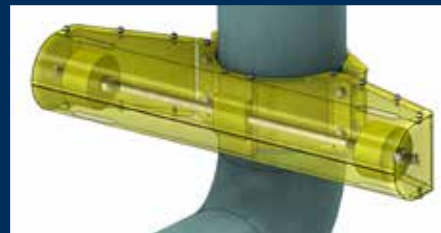
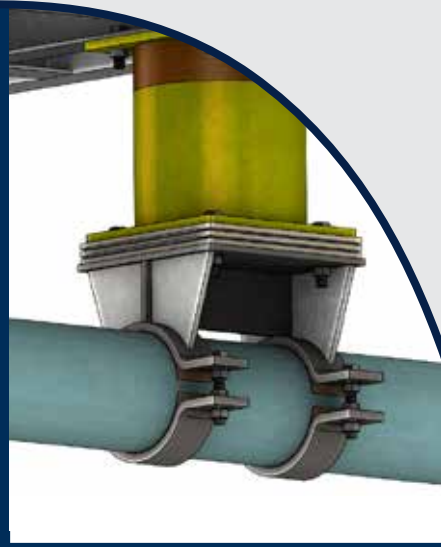
AVT Reliability® use 3D CAD software to design bespoke brackets to integrate the visco-elastic dampers into a pipe support system, where possible utilizing existing structural steelwork.

### Dynamic Vibration Absorber (DVA)

Another highly effective main line solution is the Dynamic Vibration Absorber which actually cancels out resonant vibration.

These have advantages for certain applications:

- Simple stand-alone design can be used in locations where there is no suitable surrounding steelwork
- Can be scaled to a range of pipe sizes, forces and frequencies
- Highly effective cancellation of target frequencies
- No-weld design avoids fatigue problems



## AVT RELIABILITY®

The comprehensive AVT Reliability® program covers Asset Integrity, Performance Monitoring, Training, Maintenance Consultancy and Total Pump Management / Products to industry. AVT Reliability® are certified to ISO 17359 and ISO 9001. AVT Reliability® are ICML and BINDT members.

Distributed by:

### Head Office:

AVT Reliability Ltd

Unit 2, Easter Court, Europa Boulevard  
Warrington, Cheshire, WA5 7ZB, UK

t: +44 (0)161 486 3737

e: [info@avtreliability.com](mailto:info@avtreliability.com)

[www.avtreliability.com](http://www.avtreliability.com)

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