

Pulsation Analysis from Spectrum Fluid Dynamics



Spectrum Fluid Dynamics is a world leader in the provision of pulsation analysis and dampener design services. Over the last 25 years, simulations and site measurements have been undertaken for all the world's main compressor manufacturers, and many of the leading engineering contractors and oil companies – a total of over 550 studies.

The majority of pulsation studies carried out worldwide follow the requirements detailed in API Standard 618: Reciprocating Compressors for Petroleum, Chemical and Gas Industry Services.

The work we undertake typically includes:

- Pulsation Studies in accordance with API 618, including the recent 5th edition of the standard
- Acoustic pulsation studies using Spectrum's well-established PIPAC® software
- Mechanical studies of the compressors, their pipework and support structures using the ANSYS finite element software
- Design of Pulsation Dampeners
- Worldwide on-site trouble shooting of pulsation induced problems in existing installations, including measurement of pipework vibration and pulsation levels

For more information or to receive a quote, email us at:

enquiries@spectrumacoustic.com

For lists of our completed Pulsation Analysis projects click on the link below:

[Spectrum's Pulsation Analysis Projects](#)

Spectrum Fluid Dynamics

27-29 High Street

Biggleswade

Bedfordshire

SG18 0JE. UK

tel. +44 (0)1767 318871

fax. +44 (0)1767 317704

www.spectrumacoustic.com

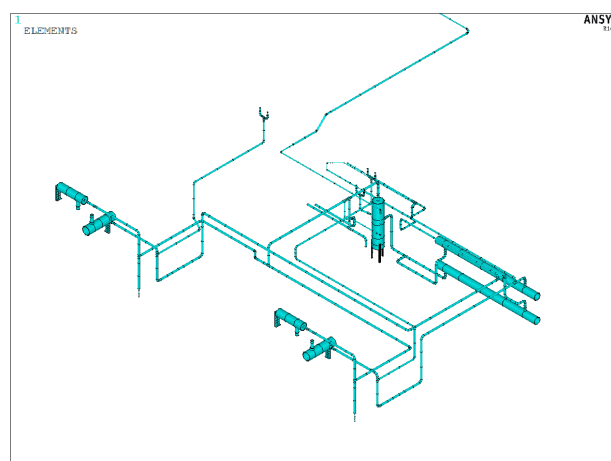
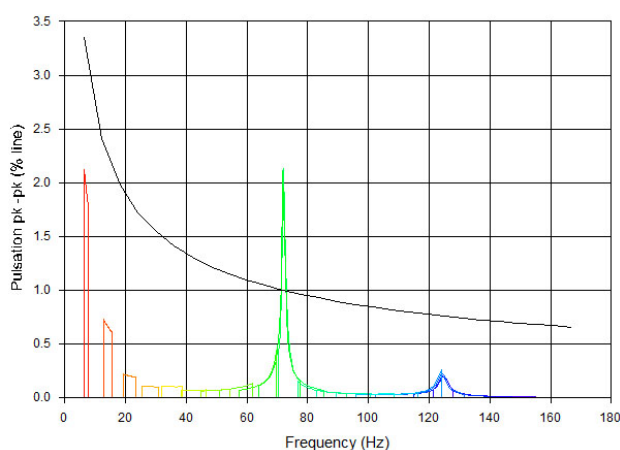
Why is Pulsation Analysis needed?

Reciprocating gas compressors and liquid pumps generate periodic pressure waves – pulsations. These can cause acoustic resonances in pipework systems and also excite mechanical pipework resonances. They can also lead to excessive vibration, pipe fatigue failures, compressor valve damage, process valve damage and can reduce the efficiency of a compressor system.

Acoustic Study

PIPAC® is Spectrum Fluid Dynamics' world renowned acoustic analysis software package, which provides a robust acoustic analysis of reciprocating compression applications and has over 30 years of proven success in the field. It is used to predict the dynamic acoustic pressures and forces in complex connected pipe systems.

Typical recommended solutions include internal pipework orifice plates to detune acoustic resonances and altering the diameter of sections of pipework to break up resonances. In extreme cases, additional vessels or alterations to pipe lengths are recommended. Care is taken to minimise the impact of recommendations on client's pipework, on the process itself and on pressure relief systems.



Mechanical Study

Spectrum undertake full modal and forced response stress and vibration analyses using ANSYS® software, to prevent coincidence between acoustic and mechanical natural frequencies and ensure residual stresses and vibration levels are kept within the limits set out in API 618.

The support spacing/structural stiffness is reviewed and recommendations made to the support design to detune mechanical natural frequencies.

Troubleshooting

Where pulsation induced problems occur on existing installations, Spectrum can visit site and measure in-pipe acoustic pressures via instrument tapping points, and measure external vibration on pipework and pipebridges.

Measured data is analysed, alongside acoustic and mechanical computer models of the system, to develop solutions. These solutions may include additional pipe supports; modifications to existing pipe supports or support structures; and installation of orifice plates to detune internal acoustic resonances.

