



# Technical Paper

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## **Resolving flow induced pulsations and vibrations in the suction line of a large volume axial compressor peroxide production process**

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## **Abstract**

**In modern LNG production installations large axial flow compressors are applied to cool the natural gas as part of multi stage refrigeration process. The suction flow requires large size inlet piping. In order to reduce costs tabletop mounted compressors with bottom inlets are designed with minimum tabletop elevation. However, as a consequence this requires relatively sharp pipe bends in the vertical leg of the inlet. In order to mitigate the distortion of the flow pattern downstream of a relatively sharp bend, internal flow straightening devices in the shape of guide vanes are installed.**

**The case discussed concerns the suction line of an axial compressor, containing a short radius bend with guide vanes that showed serious vibrations just after start-up of the plant. This was a large contrast to the full-scale tests at the factory where no vibrations and noise were experienced. As this vibration problem limited the production capacity the urgency to solve this problem was very high. There was only one time slot of ten days to implement corrective measures. On short notice a Root Cause Analysis was made that was based on measurements and model calculations. The measurements showed that the most likely root cause of the vibrations was vortex shedding at the two guide vanes in the bend.**

**This paper describes the measurements and the analyses that have been made and the final solution that cured the problem. This final solution has been designed and implemented as a result of a good co-operation between the compressor manufacturer, the end user and a specialised consultant.**