



For **Severe Service** Control Solutions, Turn to Fisher Technology and Innovation

## PROPER VALVE SELECTION ELIMINATES ISSUES WITH VALVE OUTLET VELOCITY AND SUBSEQUENT NOISE

Several years ago, a gas production plant in Saudi Arabia experienced cracking of a 54-inch Acid Flare Header made of Inconel. The site engineers carried out vibration tests to determine the cause of the damage and proposed several changes to the piping system. The changes were implemented, but the vibration problem continued. Eventually, the piping and the header supports also cracked.

Site engineers conducted another historical review of the problem, but this time, they included process data in the evaluation. A fluid dynamics calculation was performed utilizing computational fluid dynamics (CFD) software to simulate overall process conditions. The detailed simulation included sonic velocity calculations, gas velocity and vibration correlations, and pressure drop calculations.

The analysis revealed that the 10-inch valves in the header system were the main contributors to the excessive vibration. Though the valves incorporated noise abatement trim, they were undersized and generated outlet velocities over 0.7 Mach. This not only created unacceptable noise levels, but also led to velocity-induced vibration of the piping system. The original vendor suggested that they install a new type of noise attenuating trim, but adjusting only the trim would have had no effect as the valve outlet velocity was the driving factor behind the excessive noise.

The Fisher Severe Service group recommended a 16-inch valve that incorporated WhisperFlo® noise abatement trim. WhisperFlo is a multi-path, multi-stage noise abatement technology that can reduce noise by up to 40 dBA, surpassing conventional noise trims by five to ten dBA. This solution incorporated the necessary level of noise abatement coupled with the correct body size to eliminate any outlet velocity effects. The Fisher solution reduced the velocity at the valve outlet to 0.3 Mach, which significantly reduced the noise at the valve and eliminated the vibration affecting the downstream piping.

This example is typical with some manufacturers in the control valve industry. A control valve is selected based on the required  $C_v$  to pass the flow and address the noise generated by the trim. The outlet size of the valve is generally ignored. If an inadequately sized valve is chosen, the valve, piping system, and downstream equipment are at risk of premature failure.

The Fisher solution eliminated all issues with noise, vibration and subsequent piping damage. These valves have been running without issue for the past three years.

For more severe service solutions see us at [www.fishersevereservice.com](http://www.fishersevereservice.com).



Severe Service