UCCS MAE Research Seminar Series
UNIVERISTY OF COLORADO **COLORADO SPRINGS**

Vibration in Piping Systems: Mechanical or Acoustic Resonance?

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Abstract

Vibration in piping systems is a significant issue for many fluid handling facilities. Damage to pipe supports and fatigue effects on pipes, supports and equipment can lead to catastrophic failure of the system.
Much effort goes into minimizing vibration in such systems. However, vibration can result from resonance of the pipe mechanical structure or the fluid acoustics inside the pipe. Solutions to reduce vibration differ whether the cause is mechanical or acoustical in nature. It is therefore important to determine which one is causing the vibration.
A discussion is given on how to determine whether an excited vibration frequency is mechanical or acoustic in nature with an emphasis on acoustic vibration. Solutions for each type of resonance are discussed. For acoustic vibration, a brief discussion will be given on determining undesirable pump rotational speeds so the system operation can be designed to avoid pump operation at particular RPMs.

Biography

Trey Walters, P.E., is the Founder and President of Applied Flow Technology in Colorado Springs, Colorado. AFT develops simulation software for fluid transfer systems. At AFT Mr. Walters has developed software in the areas of incompressible and compressible pipe flow, waterhammer, slurry systems, and pump system optimization. He has performed and managed thermal/fluid system consulting projects for numerous industrial applications including power, oil and gas, chemicals and mining. He actively teaches training seminars around the world. Mr. Walters founded AFT in 1993. He has 34 years of experience in thermal/fluid system engineering. He has published 24 papers and articles.
Mr. Waltersfi previous experience was with General Dynamics in cryogenic rocket design and Babcock & Wilcox in steam/water equipment design. Mr. Walters holds a BSME (1985) and MSME (1986), both from the University of California, Santa Barbara. He is an ASME Fellow.

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