

4.18 Fluid Structure Coupling Technology

Statement: A game changing technology designed to suppress vibration and fluid sloshing.

Problem: To suppress vibration using an external resource with a small mass and minimum amount of energy.

Solution: The fluid can be leveraged to act like a classic harmonic absorber to control low-frequency vibrations. This mode leverages already existing system mass to decouple a structural resonance from a discrete frequency forcing function or provide a highly damped dead zone for responses across a frequency range.

Benefits: This technology has the demonstrated potential to mitigate a multitude of different types of vibration issues and can be applied anywhere where internal or external fluids interact with physical structures.

- Passive operation.
- Compact device: minimized size and weight, since fluid-structure coupling devices can leverage existing fluids in and around the system.
- Inexpensive: easy to retrofit to existing fluid systems.
- Reduced complexity as control is achieved with a single fluid source.
- Highly efficient, achieving complete control of the phase lag between fluid and structure.

Areas of application: This technology could be used in the following applications:

- Structural - multistory buildings, stacks, towers, bridges, pools for spent nuclear fuel.
- Oil & Gas - offshore oil rigs, above-ground storage tanks.
- Municipal - water tanks/towers.
- Marine - multi directional stabilization of vessels or platforms.