

Relating Pressure Oscillations and Vortex Shedding in Solid Rocket Motors

Abstract:

Pressure oscillations in solid rocket motors have the potential to damage hardware and passengers when the oscillations reach resonant frequencies. Vortex shedding from combustion inhibitors is believed to be a source of these oscillations. A cold flow test chamber was created to better understand how pressure oscillations are induced by vortex shedding. The test chamber used pressurized air and various inhibitor configurations to replicate the fluid and acoustic properties of the Space Shuttle Solid Rocket Motors. An augmented z-type schlieren system visualized vortex shedding and the data acquisition system recorded microphone and pressure transducer readings in LabVIEW. Based on the data that was gathered, this research can provide future engineers with a stronger understanding of pressure oscillations that may lead to improvements in solid rocket motor design.

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