IDENTIFICATION OF HIGH-FREQUENCY TRANSVERSE ACOUSTIC MODES IN MULTI-NOZZLE CAN COMBUSTORS


Problem
• Destruction of combustion chamber¹

Why?
• Resonance (vibration)
  • Bottle = Chamber
  • Blowing air = Flame

How?
• Use damping device
• Device to dampen the vibration
• Where should we install the device?

Quiz
• Where would you locate your finger to suppress the vibration?

Case 1

Case 2

Case 3

• Finger (damping device) location depends on the vibrating pattern.
• Important to identify the pattern

Methodology²
• Install multiple sensors along the chamber
• Experimental data + Model equation ➔ Estimate vibrating pattern

Results
• Reconstruct vibrating pattern using three sensors.

Takeaway
This methodology can reconstruct the vibrating pattern and, thus, provides the information of optimal location for the damping device, which is used to suppress the combustion instability.

Reference