



**Federal Aviation
Administration**

International Aircraft Materials Fire Test Forum Meeting

Sonic Oil Burner Testing & Sonic Burner Video Update

Presented to: International Aircraft Materials
Fire Test Forum

By: Tim Salter, FAA Technical Center

Date: March 5-6, 2019, Savannah, GA



Presentation Outline

- **Cargo Liner Test Air Shroud Development**
 - Round robin interlab study in progress
- **Sonic Seat Cushion Air Shroud Study**
 - Round robin interlab study pending
- **Sonic Burner Video Update**
 - Assembly and Operation of the Sonic Burner

Sonic Burner Cargo Liner Test: Air Shroud Development and Round Robin Study



Shroud Study Background

- **What is the purpose of the study?**
 - Reduce test result disparities among burn labs
- **How are we trying to address this issue?**
 - Minimize disruptive airflow near sample
- **What is the anticipated outcome?**
 - Incorporate shroud into the test method to increase test result repeatability and reproducibility

Shroud Design

- **Design**
 - 18-gage perforated aluminum
 - Mounted with threaded rod on top of sample frame
 - No frame modifications
- **FAATC Results**
 - Reduced temperature fluctuations
 - Measured peak temperatures equivalent to unshrouded tests



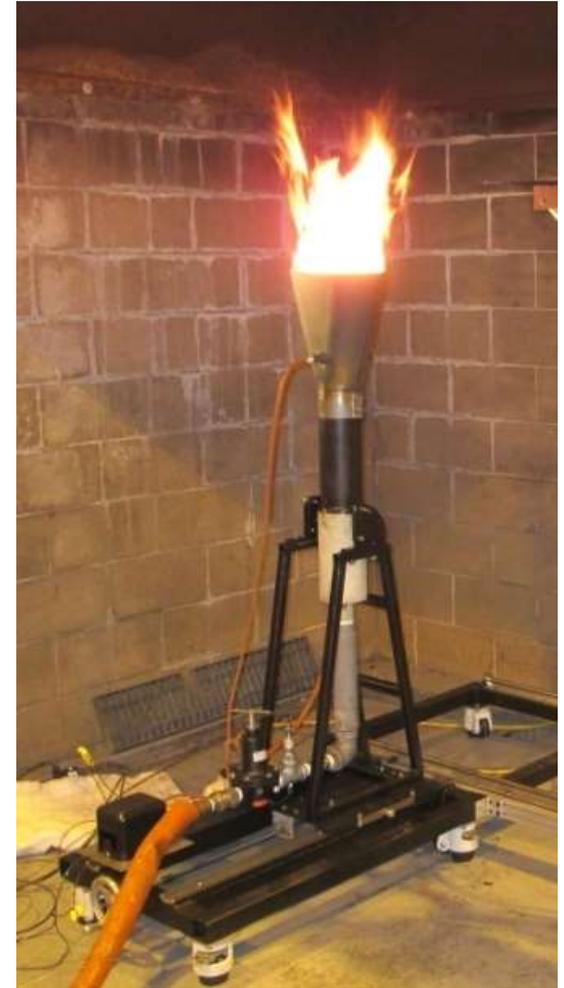


Cargo Shroud Round Robin Study

- **Test shroud in different lab environments to demonstrate shroud effectiveness**
 - No two burn labs are the same
 - Size, shape, airflow characteristics, temperature, etc.
 - Unique test environments produce unique results
 - Demonstrated in previous round robin studies
 - Shroud reduces the influence of these factors
 - Serves as a standardized “miniature test cell” around sample
 - Improved test result repeatability and reproducibility

Cargo Shroud Round Robin Study

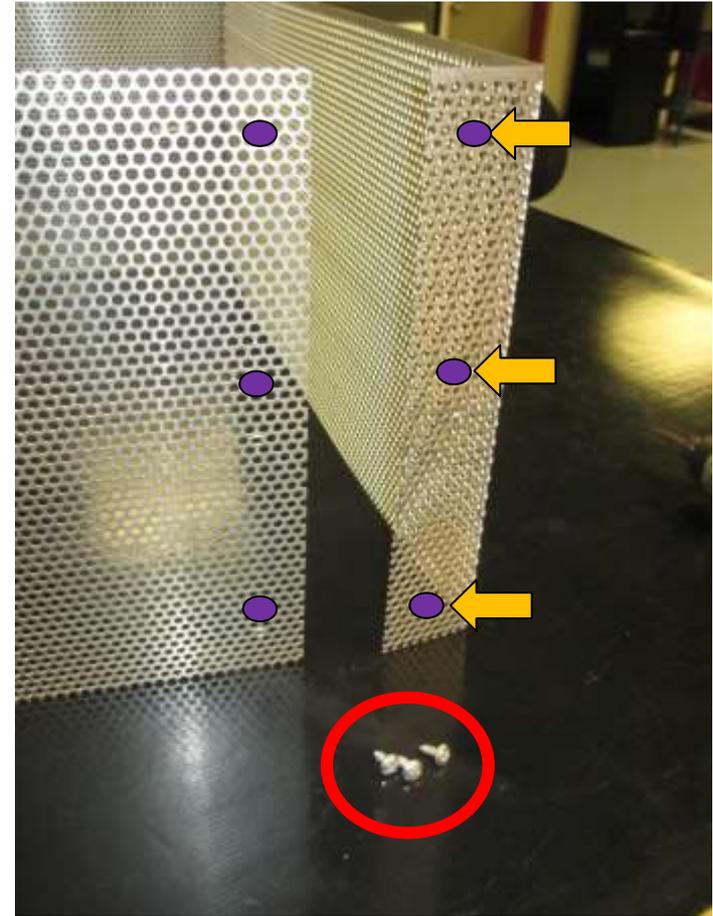
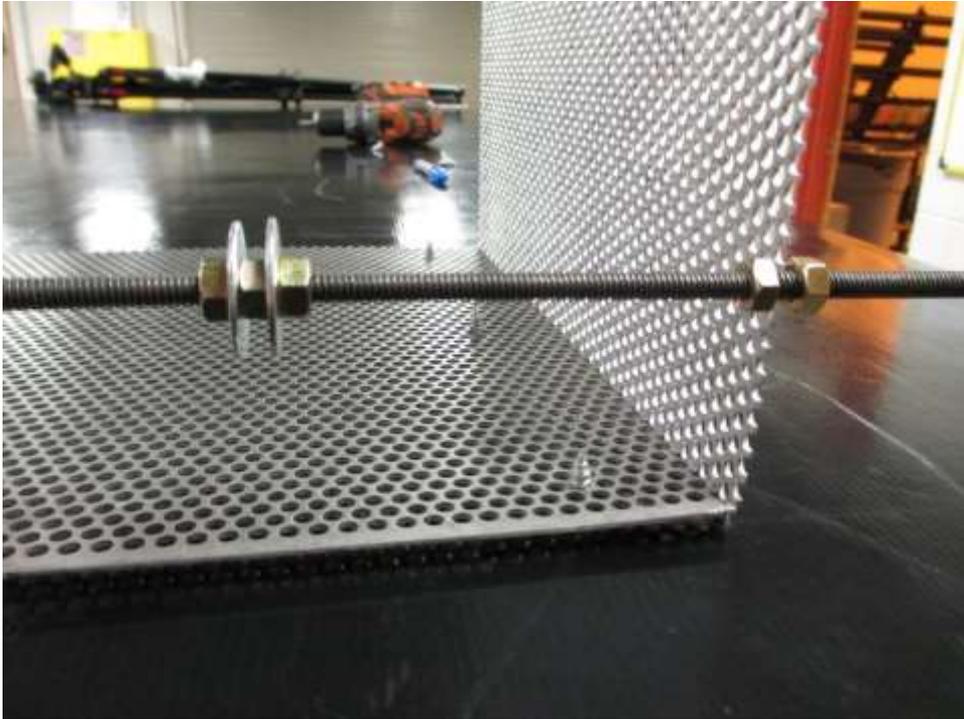
- **TEST BURNER**
 - Study oriented towards Sonic burner
 - Legacy-type burners also welcome to participate
- **SHROUD**
 - Shipped in pieces for packaging purposes
 - Minor assembly required
 - Rests on top of ceiling panel mounting frame
- **SAMPLES**
 - 10 epoxy resin infused liner samples
 - 5 samples to be tested **with** the shroud
 - 5 samples to be tested **without** the shroud
 - Sample tested in ceiling panel position only
 - Fire resistant board used vertical sample position



Cargo Shroud Round Robin Study

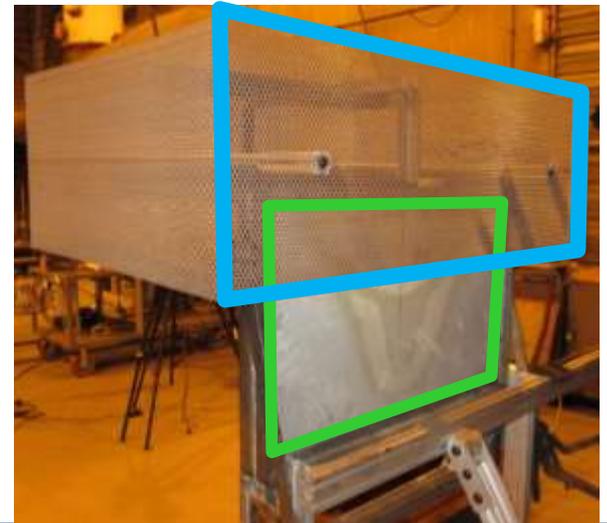


Cargo Shroud Round Robin Study



Cargo Shroud Round Robin Study

- **Anticipated outcome of round robin study**
 - May incorporate shroud into cargo liner test method
 - Based on round robin study test results
 - Feedback from working group members
- **Items to address prior to addition of shroud**
 - Update and improve shroud design
 - Eliminate possibility of dislodgement
 - Simplify sample replacement procedure
 - Prevent interference with clamping fixtures
 - Issues found during round robin
 - Based on feedback from participating labs



Cargo Shroud Round Robin Study

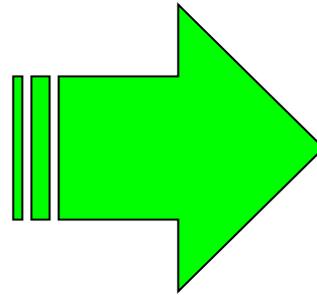
- **Current status**

- 6 labs have agreed to participate
- Shroud construction completed
- Shrouds and test samples are currently being shipped
 - Need shipping info from some labs
- Looking for more participants

Sonic Burner Seat Cushion Test: Air Shroud Development and Round Robin Study



Seat Cushion Shroud Testing



Seat Cushion Shroud Testing

- **Next step for shroud development**
 - Adapt shroud concept to seat test method
- **Same purpose as cargo shroud**
 - Reduce influence of airflow at sample
- **Modified cargo shroud design**
 - Perforated aluminum
 - Shrouded on three sides
 - Open on flame side
 - Does not interfere with sample mounting
 - Mounted to seat frame with threaded rods



Seat Cushion Shroud Testing

- **Current Status**

- Round Robin is temporarily on hold
- Supply of available test samples insufficient for performing study
- Need to purchase test samples
- Still planning to perform study
- Looking for participants

Sonic Burner Assembly and Operation Instructional Video



Sonic Burner Instructional Video

- **Addresses topics not previously documented**
 - Burner assembly, air/fuel cooling system, flame validation thermocouples, etc.
- **Shooting of video footage completed**
- **In final stages of editing for release**
- **Video delayed due to government shutdown**
- **Viewing planned for task group next meeting**
- **Final cut to be released before June meeting**
- **Video will be posted on Fire Safety website**

<https://www.fire.tc.faa.gov>

Questions?

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