Oil Burner Testing of Powerplant Components

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http://www.fire.tc.faa.gov
Background

• **Industry is currently utilizing legacy oil and propane burners**
  – Propane burner shown to be less severe than an engine flammable fluid flame
  – Recommending oil burner be used for all powerplant tests

• **FAA Tech Center Fire Safety Branch has been tasked by Transport Standards Branch (TSB) to develop burner performance standards for the Sonic fire test burner for powerplant fire testing**
  – Sonic burner much easier to calibrate, provides more consistent results, and is readily available for industry use
Current Status/Plan

1. Support Thermocouple Round Robin Testing for SAE
2. Support composite material testing round robin
3. Conduct internal comparative testing of Park vs Sonic burner to develop FAA recommended Sonic burner configuration for Powerplant testing
T/C Round Robin

- Initiated by Resonate Testing through Powerplant Task Group
- Objective is to investigate effect on temperature readings caused by:
  - External sheath diameter and wire gauge
  - Exposed junction vs sheathed
  - Thermocouple age
- Thermocouples have been procured
  - Testing to be completed by end of March 2019
- 14 labs in agreement to participate
T/C Round Robin

• Four T/C types to be evaluated:
  – 1/8” exposed junction
  – 1/16” exposed junction
  – 1/8” Grounded/Sheathed
  – 1/16” Grounded/Sheathed

• Testing to utilize four rakes with a center control T/C in each

• Initial comparison testing of 5 measurements per rake

• Cycling test to consist of 20 measurements per rake
Composite Material Evaluation (Spirit Aero)

- Cantilevered weight installed on rear center portion of 4-ply and 8-ply composite panel
- Initial testing at NIAR showed promising results with burnthrough occurring in 2-3 minutes without vibration.
- Burnthrough occurs at the time the weight detaches from panel
- Testing ongoing at NIAR to refine weight loading and ensure repeatability
- Testing at additional labs to ensure reproducibility
Comparative Testing with Park Burner

• Intent is to develop FAA recommended practice for Sonic burner, given current AC 20-135 calibration requirements.

• FAA’s Park oil burner will be operated using current AC 20-135 calibration requirements and utilized as our baseline

• Run back-to-back comparison testing of materials using both the Park and Sonic burner

• Recommended Sonic burner settings and operating parameters which result in comparable results
Comparative Testing with Park Burner

TexTech PAN Felt

0.125” 2024-T3 Aluminum
Questions?

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