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Boeing Proposal for OSU Round Robin

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2012 FAA Round Robin Statistical Analysis

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Variable data in test results and standard deviation

- 36 heat release units
- PRR = 40 73 kW/m², 1-10 % variability

Light Brown Honeycomb Panel Peak HRR vs. % STDEV Avg = 54 kW/m²; 16% STDEV



http://www.fire.tc.faa.gov/pdf/materials/June12Meeting/Burns-0612-OSU_HR2_Prototype_Data.pdf

2012 FAA Round Robin Statistical Analysis

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Conclusion

- Identified several equipment/setup parameters that significantly affect variability
 - Machine type
 - Blower vs. compressor (air source)
 - Gas pressure
- Not all variation is explained by observed parameters (less than 50%)
- Too many <u>uncontrolled parameters</u> and not enough data to explain the variability

Recommendation

Conduct focused round robin with controlled parameters

Proposed Plan for OSU Improvement Task

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OSU Improvement Task		
Current Regulation		
Proprietary Information		
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Activity Phases		
Phase 1 Checklist Development for AC	Checklists for Inclusion into AC	
Phase 2 Develop Test Plan For New Round Robin Study	Deve lop Proposal Define Define DOE Test Define Standard Parameters Configurations Set up/Checklist/Conformity Reviews 1st FAATC 2nd Tark Group Kick off Pound Polyin	
Phase 3 Implement Round Robin Test Plan	Implementation Testing Meeting Complete	
Phase 4 Analyze Data Develop Conclusions and Next Steps	Analyze & Data Nest Steps	
Phase 5 Define Updates For Handbook	Checklists Handbook Update Pass/Fail Criteria, etc. Concurrence	e
Phase 6 Develop AC Incorporate New Guidance	Initiate Incorporation New Guidance New AC Checklists, etc. Concurrence	
Phase 7 FAA Coordination of AC Release	FAA Coordination of New AC Releas	e Released

Other sources of variability

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Identified over 60 variables in heat release testing (2010)

- Cleanliness of chamber
- Distance of lower pilot from coupon
- Cleanliness of thermocouples
- Cleanliness of chimney
- Length of upper pilots
- Chamber preconditioning
- Sample holders
- Heat flux determination
- Heat flux gauge calibration

Most variables identified can be controlled

Developed daily and monthly checklist to check/maintain machine

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Boeing Round Robin

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Objective

Pinpoint other major sources of variability in heat release testing

Focused and Controlled

- Start with small focus group
- Labs must conduct unit preparation to show units are under control
- Labs must follow unit preparation procedure
- Labs provide unit preparation record sheet
- Heat flux gauge calibrations done by Mike Burns at FAA Tech Center

Round Robin Flow (Participating Labs)

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Mike Burns

- Calibrate HFG
- Gives labs unique ID
- Forwards raw data with unique lab ID to Boeing



Unit Preparation

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Control as much as we can to correctly identify major variables

- 1. Cleaning and maintenance checklist
- 2. Pressure check
- 3. Heat flux calibration
- 4. Determine calibration constant

4-5 hours of prep work

Testing / Analysis

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3 sets

- Sandwich Panel (core and decorative)
- Laminate
- Aluminum with single layer of tape

10 samples per set

30 individual tests (about 3 hours)

Analysis

Raw data analyzed by Boeing Math Group

OSU Fire Test Working Group

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- Concurrence of Plan
- Lab Participation
- Timeline / Propose Schedule
- Concerns / Suggestions