

**INTERNATIONAL AIRCRAFT MATERIALS FIRE TEST WORKING GROUP MEETING  
MINUTES**

**TRUMP MARINA HOTEL-CASINO, ATLANTIC CITY, NEW JERSEY**

**NOVEMBER 30-DECEMBER 1, 1999**

**TUESDAY, NOVEMBER, 30, 1999**

Radiant Heat Panel Discussion – P. Cahill

Summary of September 1999 Seminar - This seminar was designed as a 'hands on' workshop to give those who will eventually purchase a chamber an opportunity to learn to conduct tests on this equipment. The group size was kept small to allow all those attending an opportunity to use the equipment.

Comments from Workshop Attendees:

1. Flame location on specimen
2. Flame immersion (flame pilot angle) (new line burner will be tested 1, 2, 3, & 4)
3. Flame profile – pressure (new line burner will be tested 1, 2, 3, & 4)
4. Two inch radius circle measurement
5. Consistency of sample height- it should be level with sliding platform
6. Sample configuration – film over fiberglass – air out and tautness
7. "Zero Point" consistency – all positions (point of application where the ignitor is positioned over the sample and where the first calorimeter reading is taken)
8. Calorimeter specification and procedure (does this belong in the test method?)
9. Thermocouple use
10. Heat shield
11. Size of test sample – length and width
12. "Dummy" calibration sample

Additional Comments Made During this Meeting:

Specimen thickness is very important especially when the materials to be tested are four inches thick (for example) or rigid. P. Cahill: we may have to set criteria that the specimen be no thicker than the minimum thickness used in the aircraft.

Question on the reason for using 1.5 BTU ft<sup>2</sup>/sec. D. Hill: The decision to use 1.5 BTU ft<sup>2</sup>/sec was based on full scale testing and the size threat we are testing to in the radiant heat panel test.

Where did the two-inch radius originate? P. Cahill: It was discussed at the FAATC, and it was decided that because some materials have a little binder or scrim that we would allow a little 'grace' area.

There are some materials where it is questionable as to whether the sample shrunk away from the flame or actually ignited because there is a discoloration at the edge of the sample closest to where the flame was applied—this may be char or it could be discoloration from the sample shrinking away from the heat source.

Is there a standard material that can be tested to indicate that your test is set up correctly? D. Hill: No, we have been working on that for a number of other tests and have had no success with it.

#### Additional Discussion on Radiant Heat Panel:

Pat showed viewgraph of radiant panel test apparatus and explained importance of heat shield being installed correctly.

The FAATC will have some data to present at the March 2000 Working Group meeting from tests using the new chamber with the electric panel (currently under construction). If you go to using an electric panel, will you continue to allow a gas fire? P. Cahill: Yes.

J. Maillard (Jehier): Jehier built a radiant heat panel test chamber with an electric panel after attending the September 1999 Seminar at the FAATC. Jacques explained the specs of this chamber. Jehier has not conducted tests in their chamber yet— construction of the chamber was recently completed. Jehier's panel is 12"x19". V. Buffard: . It took approximately one hour to get a stable temperature (required). Presented Jehier's initial flux profiles from their electric panel chamber. Presented their conclusions on the heat flux measurements. They believe that something has to be adjusted--possibly the angle of the radiant panel can be decreased. Orcon also has an electric radiant panel but finds that their curves are consistent with the FAATC curves with the gas radiant heat panel chamber. There was some discussion on the use of a 'dummy' sample when taking heat flux readings. Make sure to specify the density of 'dummy' sample because that will make a difference. Orcon's panel is 12"x24". J. Maillard: What do we have to consider in order to fix our heat flux readings? J. Peterson: We have to consider more than just the first few positions as important. We need to look at equivalency in readings between the gas panel and the electric panel. P. Cahill: This is another thing we need to work out. A number of issues were raised that will need to be addressed in the near future. D. Hill: We will need more test data with the electric panel to evaluate the equivalency of the results.

#### Proposed Burnthrough Test Method Calibration Guidelines – T. Marker

Tim discussed work that has been done to establish calibration guidelines for repeatability. Reviewed the factors that can influence calibration. Tim explained some of the problems in calibrating the burner and how FAATC is attempting to resolve them. Presentation includes diagram of position of burner tab and ignitors and air velocity settings tested for calibration repeatability. Tim presented the Latest Calibration Procedure. J. Peterson suggested a round robin to identify and resolve burner calibration problems. Do you have a plan for resolving these problems? T. Marker: We have resolved a number of the problems that we discovered in burner calibration. S. Morgan: I think we have started to resolve some of these issues at Boeing recently. D. Hill: We have been using aluminum as a standard material for this test. Tim does not believe the aluminum should be used as a standard material any longer.

Burnthrough Round Robin discussion: Round Robin testing will be conducted in order to identify any problems with calibration and for comparison.

Round Robin Burnthrough Testing Material Selection: We will have to develop a list of possible materials for the round robin. A list of Test Facilities and Material Suppliers

who showed interest (during the July 1999 meeting) in participating in this round robin was presented. A rough count of those who are ready to participate at this time was taken. The labs attending this meeting who are ready to participate in this round robin were asked to contact Tim Marker during this meeting. B. Wulliman: It will be important that all the insulation blankets be fabricated in the same way. I suggest the same facility fabricate all of them to ensure they are uniform. Tim suggested a target date for shipping materials to the labs participants of January 2000. D. Hill: Tim should be supplied with calibration information from the labs that will participate in order to ensure they have calibration. Also, consider the different types of materials and how they degrade during this type of test.

A question was raised about the second calorimeter being added to the back of the burner. Tim explained that the two calorimeters were added prior to July 1999. Tim also presented some recent burnthrough test results.

D. Hill: Explained the burnthrough testing is a result of the cost/benefit analysis study that was completed by the FAA. E. Nielsen: Flammability test changes are different than burnthrough test changes for the aircraft manufacturers. Burnthrough test changes are major--flammability test changes are minor.

#### Other Lab Experience:

##### Daimler-Chrysler Aerospace Airbus Burnthrough Testing - Wolff (Airbus)

Presented results of burnthrough tests conducted at Airbus. Tests were conducted in a large-scale, steel test rig also. He posed two questions regarding the FAA Burnthrough test:

- Does it reflect real designs and fire scenarios (real threats)?
- Does it contribute to improved fire safety?

FAATC comments on the DA test: you have to remember that the FAA ran full-scale test using a 707 fuselage, and we designed the burnthrough test to that test. Wolff: In a full-scale (real design features) test, there are not the supporting structures that there are in the FAA burnthrough test. The FAATC was testing the materials and performance not the supporting structure.

#### Discussion on Fastening Systems – D. Dodd

Fire Resistance Testing of Thermal Acoustic Liners at Darchem Flare – Darren gave a brief overview of the program and reasons for this program.

#### Future Testwork at Darchem Flare:

- Aluminum Fixing Pins and Aluminum Washers (heavily instrumented test sample)
- Plastic over-frame fixing clips

- various stringer configurations
- rigid foam insulation systems
- influence of breaks in insulation system

### **WEDNESDAY, DECEMBER 1, 1999**

#### General Seat Questions Discussion – P. Cahill

#### Lanthal Seat Preparation Survey – A. De Regt

After the July 1999 meeting, Lanthal contacted 21 companies in Europe to find out if there are differences in preparing the test cushions for the Oil Burner Test. H. Betz: There may be some confusion in how the rule and the Advisory Circular (A/C) are written with regard to testing 'seat components as installed in aircraft'. D. Hill: The A/C explains how the 'seat' should be tested. There is a problem with the interpretation of the rule. We (FAA) will develop better instructions for testing the various seat material configurations taking into consideration the intent of the rule.

#### Continued Compliance – J. Davis

We hope to have some information to present at the March 2000 meeting.

#### Electrical Tests – P. Cahill

Pat presented an update on Arc Fault Circuit Interrupter (AFCI) Technology.

#### Task Group Reports

##### Hidden Fire Threats – D. Hill

##### Topics discussed:

How to define hidden area.

Fire source and what to protect against.

Discussion on the need for different tests because of different types of materials in the hidden area (especially wire and cable).

Ask airframe and end suppliers of materials to supply the materials for testing so that results may be presented at the March 2000 meeting.

##### Burnthrough Round Robin Task Group – T. Marker

9 Labs will participate in the testing. Mexmil will fabricate all the blanket packages. 6 samples of each material will go to each participating lab. The FAATC will run some preliminary tests next week. We plan to report on the round robin results at the March 2000 meeting. Becky Wulliman (JM) suggested that Tim make up a form to indicate all the information he would like collected by the participating labs. J. Davis suggested creating an Excel spread sheet listing all the information required.

##### Production Quality Assurance – C. Lewis

The production process was discussed in detail for better understanding. We will look at production assurance from start to finish of a product's production. We plan to capture the elements of the process as the first step in resolving this problem.

Mike O'Bryant (Boeing) is continuing with the OSU Round Robin and plans to present some results at the March 2000 meeting. If anyone is interested in running a smoke round robin as well contact Mike O'Bryant.

#### Working Group Member Presentations

New Fire Resistant Silicone – R. Cull (Dow Corning)

#### Additional Discussion

S. Campbell described recalibration problems experienced by their lab with Vatell.

#### Next Meeting

March 7-8, 2000, in Denver, Colorado, hosted by Johns Manville. All details are available on the Fire Safety Section website under "Upcoming Meetings".