INTERNATIONAL AIRCRAFT MATERIALS FIRE TEST WORKING GROUP MEETING MINUTES

Hosted by Orcon Corporation/Delta Airlines, Sheraton Buckhead Hotel, Atlanta, Georgia, USA

October 19-20, 2005

Wednesday, October 19, 2005

Burnthrough Presentation and Discussion – T. Marker

Review of Results of Round Robin VI – 3 Materials/8 Tests each at 9 labs using Boeing calibration tools. Each of the 4 labs visited experienced difficulty while FAATC representative was on-site. We found that there were differences in the burner castings (flanged vs. socket).

FAATC Experiments – Comparison of the three burner types. Exit area air velocity was mapped for the three burners. FAATC Burner A was shipped to Airbus. FAATC Burner B's stator was determined to cause heat flux differences compared to those of FAATC original burner. Various configurations were tested using combinations of original FAATC original burner's components and FAATC Burner B's components.

Airbus comment: Include statements in the Advisory Circular regarding the 6.5 gallon per minute burner nozzle being used by industry vs. the 6.0 gallon per minutes burner nozzles used in the FAATC original burner. Dick suggested contacting the FAATC Transport Directorate Standards Staff (Jeff Gardlin or Frank Tiangsing in Seattle) with concerns/comments/requests relating to the AC.

Boeing comment: It puts a huge burden on industry when there are only three burners that produce acceptable results. This creates a lot of difficulties. Dick reminded the group that this has been an on-going problem for at least the past six years. He recommended that industry become involved to work to get the problems solved quickly. Evan Chu asked about an indexing system instead of absolute numbers (base everything on a standard material). Dick commented that there already is a Burnthrough rule that has a certain number and that cannot be changed. Also, if the manufacturer stops making the standard material or changes the formulation of the standard material, this will create a problem.

New Burner Development – R. Ochs

Motivation: inconsistencies in burner performance, reproducibility of experiment critical for compliance, variability in construction (ie: flange-type burners, socket-type burners), and laboratory conditions

Operation of Oil Burner: Turbulent airflow is mixed with fuel spray, air/fuel mixture is ignited with high energy spark.

Problems: remove dependence upon electric motor, draft tube ignition.

A schematic of the Proposed Replacement Apparatus was presented and described. The Plan was reviewed/explained. This project is now in its beginning stages at the FAATC. Jim Peterson suggested testing several nozzles to ensure repeatability with different nozzles (considering the problems with the current burner situation). Dick explained that step 1 is to make this apparatus react like the current burner.

Difficult Areas for Burnthrough Implementation – S. Morgan

A copy of this presentation is available at www.fire.tc.faa.gov with the presentations from this meeting.

Issues include: unique configurations (Upper cheek: main deck floor beam and frame intersection).

Seat Round Robin – P. Cahill

Currently 8 industry labs in the United States have oil burners set up for seat testing:

Boeing – Seattle
Accufleet
Starr Aircraft Products
Custom Products
Flame Out
Skandia
Govmark Labs
Chestnut Ridge

Photos of test samples were presented.

Testing is complete in the United States.
Testing has not yet started outside the U.S. The FAA Transport Directorate is attempting to coordinate with EASA in Europe in order to conduct this Round Robin in Europe.
Peter Short mentioned that there would probably be funding issues with EASA.

Comparison of Test Methods

Presented results (Percent Weight Loss) for the following materials: Fire Hardened Foam 1 (with hook and loop closure), Fie Blocking Layer, Fire Hardened Foam 2.

There is no correlation in the pass/fail data among those labs that run according to the Rule or Handbook.

Future Round Robins – R. Hill

OSU Round Robin – Dick Johnson is doing preliminary work to collect materials for this Round Robin. Some details are to be determined as far as a representative from FAA ACOs and FAATC being present at each participating lab during testing. This RR will be overseen by the FAA ACOs.

NBS Round Robin – The FAA is determining if there will be an NBS Round Robin in conjunction with the OSU Round Robin.

Dick Hill explained that these Round Robins are an attempt to correct the major flaws that exist between test labs. The intention is to coordinate with international authorities to expand these Round Robins to labs internationally. The information has been presented to other authorities. The Handbook is an acceptable method of showing compliance for specific tests (refer to the letter from FAA Certification for a list of the specific tests).

Laboratory & Full-Scale Testing of Non-Traditional Lightweight Aircraft Seats – T. Marker

This presentation is available at www.fire.tc.faa.gov with the minutes/presentations from June 28-29, 2005, meeting.

An FAATC Technical Note will be published on these tests. The intent is to have a FAA Policy Letter prepared on Lightweight Cushions. A reference to this Policy Letter could possibly be added to the Handbook.

Radiant Heat Panel Discussion – P. Cahill

Composite sample ventilation: 2-inch vs. 4-inch slits.

Hook and Loop: comparison testing of two different sample sizes (testing performed at Aplix, Inc.). Pass/fail data was presented for 4"x12"x2" size samples and 6"x13"x4" size samples.
Mexmil has been performing a lot of hook and loop testing and has found that a sample size of 6"x13"x4" works well with the size of the frame and does not curl up (also, there are no gaps between sample and frame).

Discussion for Task Group: Use of flat frame, flame exposure time (longer than 15 seconds, and temperature inside the chamber at calibration.

Nozzle Update – M. Spencer

Feedback is requested from the users.

Radiant Panel Test/Extended Flame Time – S. LeNeve (CEAT)

With this extended flame time (60 seconds) is Radiant Panel Test still more severe than Vertical Test? The study was Radiant Panel test vs. vertical test. The results indicated that the Radiant Panel test was more severe than the Vertical test.
A copy of this presentation is available at www.fire.tc.faa.gov with the Presentations from this meeting.

THURSDAY, OCTOBER 20, 2005

Task Group Reports

Burnthrough Task Group Report – T. Marker

The FAATC described the planned activities in the coming months. As discussed in the general meeting, the FAATC had outfitted, checked, and tested 2 flanged-style burners for use by Airbus and Boeing. The first burner was shipped to Airbus, and FAATC personnel visited the Airbus facility during the third week in September to confirm proper operation. The second burner was delivered to Boeing on October 20, and FAATC personnel plan to visit their facility as soon as possible. In return for supplying these 2 flanged style burners, Airbus and Boeing have agreed to ship their socket-style burners to the FAATC. The first burner has arrived from Airbus; the second burner from Boeing is expected to arrive by the end of October.

The FAATC plans to work with these 2 socket-style burners, since industry feels they produce results that are slightly more severe than the results obtained using the flanged-style burners. Once the FAATC determines a suitable fix, a small round robin will be conducted involving labs that currently use the socket style burner (Lab C, Lab I, and Lab J), and the results compared to the FAATC original burner. FAATC personnel will focus on the length of the draft tube, the stator, and the fuel nozzle in order to achieve results that correlate as close as possible to the original FAA burner.

During the Task Group session, participants suggested that a tolerance on the location of the heat flux measurement might solve the problem of low heat flux readings obtained during calibration. As presented during the general session, the FAATC tests indicated that low heat flux levels do not necessarily correlate to longer burnthrough times. During the FAATC's tests, the 2 flanged burners being prepared for industry both showed lower measured heat flux values, despite having nearly identical test results to the FAA original. The participants agreed it was possible that the highest heat

flux was simply not in the location where the heat flux transducer was positioned. By having a "window" or area that the transducer could be moved around in, the highest heat flux could be located, thus alleviating problems during calibration. Another similar suggestion was to simply have a larger tolerance on the heat flux than the present 16.0 +/- 0.8 Btu/ft^2 sec, for example 16.0 +/- 1.5. Although both of these suggestions are well-intended, the reality of the situation is that the Rule cannot be changed, and it will be necessary to find an appropriate solution so that the existing calorimeter position will allow calibration within the tolerances set forth in the Rule. That is the reason the FAATC will continue to investigate the dynamics of the current socket burners.

Another request from the participants involved the procurement of additional 6.5 gph "F-80" style nozzles. These were the type sent to the 4 labs during the most recent mini-round robin. Although the flow rate is slightly higher than the FAA original nozzle, the fuel pump pressure can easily be lowered in order to deliver the required 6.0 +/- 0.2 gph flow rate. The FAATC contacted Monarch Inc. and confirmed that additional nozzles are available. Several participants suggested that the nozzle that produces the proper heat flux and test results be "blueprinted" in order to allow for reproduction. The FAATC described how this effort was attempted, in which Monarch disassembled and measured the original FAA 6.0 gph "F-80" nozzle in order to replicate or "reverse engineer" it. The problem involves the process by which the nozzles are manufactured. The swirl disc in the old style nozzle was produced using a stamp process, whereas the new style nozzle utilizes a machine-cutting process. Although the manufacturer claims all critical dimensions and angles are the same, there are measured differences based on the new vs. the old style nozzle testing. The FAA requested an engineering drawing of the original nozzle, so that it could be reproduced by industry at their expense, but this was not possible due to copyright protection. Additional information regarding the torque specifications for the backing nut on the swirl disc was requested, since it is conceivable that this specification has an influence on the spray pattern. The manufacturer agreed that the fuel spray pattern is impacted by the backing nut torque, but did not provide information; the manufacturer stressed that the nozzle should not be disassembled.

The final discussion involved the internal stator. As discussed during the general meeting, tests done at the FAATC indicated substantial differences in measured heat flux by simply adding small pieces of tape or sealant to one of the blades of the stator. Although this was a significant finding, the fix is not so simple. These tests suggested that there are very subtle differences in the castings, resulting in lower heat flux in many instances. One participant suggested that the best stator be blueprinted, so that future replicate stators could be machined, with a much higher degree of accuracy. This was a good suggestion, and the FAATC has agreed to investigate this possibility.

Contamination Task Group – D. Slaton (Boeing)

Continue evaluation of cleaners and solvents, contaminants on real in-service blankets (obtain actual in-service blankets from airlines), evaluation and discussion of different test methods that exist to evaluate in-service blankets (Bunsen burner, cotton swab, etc.), electrical wiring (proposed A/Cs and NPRMs), proposal from Ray Cherry sponsored by Transport Canada (Claude Lewis) investigation of contaminants and their risks/zonal types of inspections.

Lufthansa Technik Presentation on Contamination – B. Albert

Presented photos of contamination on blankets (dust and lint buildup) from various areas of the aircraft (business class, first class, economy class, inside cargo compartment). Vertical Bunsen burner tests were conducted on samples of these contaminated insulation blankets. Additional testing and investigation will be conducted on these insulation blankets.

British Airways Contamination Investigation – P. Short

Samples of Boeing 747 blankets (aircraft delivered May1996) were made available during the meeting. These blankets will be given to Boeing as part of their contamination investigation/study.

Ducting Work Update – J. Reinhardt

John provided answers to the questions raised by the Task Group members during the June 2005 Task Group meeting.

The materials tested were samples donated by Task Group member organizations. Tests conducted in this program included:

12 and 60-second Vertical Bunsen burner tests
Intermediate-Scale Test
Radiant Panel Test
Radiant Panel Experimental Test
Heat Release Rate (OSU) Test
Smoke (NBS) Test
Micro-Scale Combustion Calorimeter Test

AIRCRAFT DUCTING TASK GROUP MINUTES – J. Reinhardt

The Aircraft Ducting Task Group had their second meeting on October 20, 2005. During the meeting the following items were discussed:

· John Reinhardt, FAA, indicated that the fire test result data of ducting materials was available at the FAA FTP site for download. The FTP site can be accessed by using the following information: Host Name: 155.178.136.36, User ID: ftpguest, Password: fire
If you use a browser to access the data, you may find the host by typing ftp://155.178.136.36/. Then, visit the subdirectory entitled “Aircraft Ducting Test Program” to access the information. For the people without Internet access, he will mail a compact disk with the information.

· In order to define the boundaries of what is considered to be aircraft ducting, the task group members were asked to interpret what they will consider to be the boundaries and why; especially when a part is not included. If certain part of the ducting system is not included, an explanation must be provided in order to assure that this part will not be detrimental during a fire in an inaccessible area. Some task group members will submit samples for evaluation.

· Even though it was mentioned during the conference that this working group forum was not intended to address FAA regulations and policies, a series of questions were raised with regards to these issues; the questions planted by the task group members were as follow: (1) Should insulated covered ducts be regulated under FAR 856 or should it be regulated by the test protocol that it is been developed in the working group (new test protocol)? (2) Should ducts that transition between the cabin and inaccessible areas be regulated by current cabin federal regulations or the new test protocol? (3) During the repair/replacement of an existing duct, should the repair/replacement meet the previous regulation test or the new test protocol? (4) When the duct is an integrated part of the structure, should it meet the new test protocol or the old one?

· The task group members will review the test result data to determine if the proposed radiant heat panel test (modified) is appropriate as a candidate for the new test protocol. If a

member feels that a different test protocol is more appropriate, he/she will propose a new/revised protocol to the task group members for review.

·The group also discussed the subject of protecting less fireworthy materials with coatings or covers (taped, insulation, samples to the FAA Technical Center for a complete evaluation.

Electric Wire Insulation Study – R. Ochs

Review of current wire insulation flammability requirements
Review of pros and cons of 60-degree test
Typical Aircraft Wiring (chart of types)
Polymer Combustion diagram and explanation
Quantifiable Fire Performance Parameters
Investigation into pre-existing fire test methods
Results of Preliminary Radiant Panel Testing presented

Working Group Member Presentations

Developing of an Insulation Responding to the FAR 25.856 by The Integration of Mica Flame Barrier – A. Jacques (COGEBI)/N. Orance (DAHER)

A copy of this presentation is available at www.fire.tc.faa.gov with the other presentations from this meeting.

Next Meeting

The next meeting will be held in Atlantic City, New Jersey, in spring 2006. The meeting location and details will be available at www.fire.tc.faa.gov once the arrangements have been confirmed.