

International Aircraft Materials Fire Test Working Group Minutes

Hosted by Lantal Textiles, Zurich, Switzerland

July 12-13, 2004

MONDAY, JULY 12, 2004

Welcome from Heiko Nuessel and Urs Rickenbacher of Lantal Textiles. Heiko provided meeting logistics.

The FAA Regulates the U.S. only. The FAA does not certify materials. The FAA certifies airplanes. Part 25.856 has (as of Jan 2004) the new test methods in it. This year's FAR Part 25.856 does not have the Bunsen burner test for thermal acoustic insulation, however, this FAR is for newly certificated airplanes. The certification base has been changed. In the U.S., there are two groups that have to show compliance with the rule: those that make airplanes and those that operate airplanes. A foreign aircraft manufacturer has to meet this requirement if they want to sell an aircraft to a U.S. airline that operates under Part 121. If the plane is N registered (one year from this September), all aircraft operating under Part 121 all new materials must meet the new requirement. J. Peterson: For all existing models currently in production must meet 12-second vertical even though it also has to meet the radiant panel test. Boeing has requested that the radiant panel test replace the 12-second vertical test since the radiant panel test will be required. R. Hill: The FAA Regulatory group is working on a letter.

Handbook: Dick spoke to the FAA (NWM Region) Certification and Standards Staff about including a Q&A Section in each section of the Handbook. The orchestration of this is currently being discussed on the regulatory side.

Burnthrough Presentation and Discussion - T. Marker

Tim discussed the process of the Standardization of the Burnthrough Test in which three broad measures have been implemented. The objective is to ensure lab-to-lab correlation of test results. The three methodologies were explained. Tim explained the initial burner adjustments and general set-up of the burner. Photos of the use of the measurement tools designed by Boeing lab staff (Steve Morgan and Scott) were shown and explained. A diagram of the burner-test-frame measurements was shown. They also created tools for cone shape and cone alignment to stringer. A photo of the ignitor/stator clocking tool was shown and its use described. They are currently working on the turbulator clocking tool.

There are eight labs (in addition to the FAATC lab) - four of those labs have been visited by FAATC engineers since the March 2004 Working Group meeting. Tim reviewed some of the observations made at each of the four labs visited that needed to be adjusted/changed/corrected (labs kept anonymous). The FAATC lab was also checked after these visits, and Tim explained some of the reasons for the FAATC lab's measurement differences.

Round Robin VI - the FAATC lab has tested Material A and reported the results. Tim is waiting on the results from the other participating labs.

One of the differences noted between labs was a different draft tube and the mounting of the ignitor wire inside the draft tube. These differences will be discussed further in the Task Group meeting.

A question on the measurement of the allowance of the warpage of the cone should be included in the guidance material. Tim explained that this would be addressed in the future as it was not

noted in the rule.

Intake Airflow Measurement - J. Davis (Accufleet)

Jim reviewed the combustion effects and the burnthrough effects resulting from conducting a test. He discussed the flow control issues and flow measurement issues. They created a flow control alternative device for initial testing. Improved airflow measurement was investigated, and it was decided that the Venturi device would be tested in the near future. Jim explained the measurements that will be taken with during the Venturi test series. Next steps: set up a test rig that has Venturis at the both the inlet and the outlet. A diagram of this rig was shown, and the test series that will be conducted was explained.

Aircraft Seats Worldwide Round Robin - P. Cahill

The presentation made by Ethel Dawson at a recent Working Group meeting and two small round robins conducted about one year ago have prompted the decision to conduct a worldwide Round Robin for aircraft seats. The FAATC has ordered the materials - 3 sets of 3 different types of seat materials. Pat requests that the participating labs not make any changes to their seat test oil burner rigs until the data is collected. The samples for this round robin are currently being constructed. This will be a recommended round robin in the U.S. The FAA will work with foreign aviation authorities to coordinate this round robin internationally as it will be conducted by the U.S. labs. If a lab in the U.S. ever plans to run certification data, it will have to participate in this round robin.

Round Robin VII - Radiant Panel - P. Cahill

Three heat fluxes were used for each material tested. Pat presented the test data results for the materials tested: Polyimide Film-Metallized Tedlar Tape. A photo of the FAATC post test samples was shown.

The concern is the adhesive tape and the amount of influence it has on the tests. Brian Joyal noted that air pockets in the adhesive make a significant difference in their lab's test results. Pat said that the FAATC lab had also seen that.

Pat expressed concern that some labs are building their radiant panel rigs as airtight units. These are not supposed to be airtight units.

Damping Material - P. Cahill

Four types of material were investigated. The FAATC will conduct some intermediate scale tests at the end of July. A photo of the intermediate scale test rig was shown.

The FAATC has started to investigate the thermal acoustic insulation bags that are used around ducting in the aircraft. They are kept in place with hook and loop. Dick Hill: It is the opinion of the certification personnel that damping material is thermal acoustic insulation. If it looks like insulation, it should be considered thermal acoustic insulation. The FAATC is investigating how the damping material will be tested realistically in the radiant panel test rig. This is why the FAATC is running an intermediate scale test on the damping material. The plan for the intermediate scale test is to run one test with just the damping material and ceiling material and the other will use thermal acoustic insulation bags with the damping material.

Heat Flux Transducer Work Update - R. Hill

The rule calls out the type of transducer to be used and exactly how it has to be calibrated for the radiant heat panel test and the oil burner tests. All labs must ensure that their transducers are calibrated in compliance with the rule for these two tests. At this point Vatel is the only

company that will tell us they are calibrating their transducers using the calibration method required by the FAATC. The FAATC has calibrated transducers for round robin participants in the past using this method. The calibration method is specified in the new FAR. If the insulation is encapsulated where it is bonded together, then it is tested as a component. If the insulation is glued onto a duct, the component has to be tested (When the ducting material is bonded to the insulation material, it is tested as a component).

Aging/Contamination Issues

Aging/Contamination Task Group - D. Slaton

Artificial Aging Test Status - Update on controlled aging testing on a thin PET film. Dan reviewed the Q-tip test results on Aged PET Film (AN-36W).

Flammability of Corrosion Inhibiting Compound on Insulation Blankets: Evaluated radiant panel performance of Cor-Ban 35 on various film types. The radiant panel and Q-tip test results for these were presented. Photos of CIC Radiant Panel Test Results for Control, Single Coat, and Double Coat were shown. Observations: CIC as a "contaminant" behaves as a fuel source on non-shrinkable materials such as a polyimide film and ceramic paper, and scrim and film residue can have a significant role in flame propagation results. The results clearly indicate the need to better understand contamination effects on flammability performance. Dick provided a clarification on the FAR for in-service materials. This is why contamination of materials is such an important issue. There is already built into the rule that the airplane is continually operated as it was certified. Peter Short: Does Airbus address contamination of materials to their customers regularly as Boeing does? Ingo Weichert: I report discussions from this group back to Airbus, however, I suggest that airline customers request this through the Airbus customer service department.

Flammability Test Requirements for Cleaners/Disinfectants/Insecticides is addressed through Boeing Service Letter 767-SL-20-2-B (Approval of Vendor Materials for Use in General Aircraft Maintenance). Dick Hill: It is very difficult to pinpoint if any of these compounds play a role in starting fire-related accidents. However, there were two fires that destroyed aircraft during ground maintenance that were directly related to the cleaning solvents being used during this maintenance.

In-service Blanket Test Status (update to November 2003 Presentation): photos of the in-service Q-tip test results were shown. Peter Short asked for a description of the Boeing Q-tip test method.

Aging Wiring Results Summary available at:

http://www.mitreccaasd.org/atrac/final_reports/Task_1&2_Finan%20August_2000.pdf

Fleet Issue on Flammability of Insulation Blankets: including the situation, targets (to aim for), and proposals. Criteria are not defined on what constitutes an unsafe condition, in accordance with FAR 39. Need industry consensus. AC guidance does not exist regarding aging/contamination. Not well-defined because it is not well-understood. Move focus forward from an "AN-26 level". TARGET: How do we get a chartered harmonization Working Group (similar to ATSRAC)? Integrate with Structures Maintenance Conference? PROPOSAL: Aging/Contamination Working Group chartered and supported. Dan detailed the stages/steps of the proposed plan. Dick Hill: There is a method for telling upper FAA management the industry concerns, etc., and requesting such funding/support. It is REDAC. There is a Boeing representative. **ACTION**: Dick will provide Dan with the name of the Boeing representative in REDAC.

Demonstration of Influence of New Modified Hook and Loop Tapes to Airbus Specification ABS-1133 C-F - H.P. Busch (Airbus)

The tests were conducted on June 16, 2004, on a 2mx3m fuselage cut out of A-300 Widebody. Heinz-Peter presented a diagram of the test rig and described the test set-up. A photo of the medium scale test set-up was shown as well. A sketch showing the insulation blanket overlapping and hook and loop tape placement was shown. The test results were presented and explained. Photos of the materials after the test were shown. Conclusion: The new modified hook and loop tapes to Airbus specification ABS 1133 C-F are not significant to fire propagation if used in the mentioned configuration.

Task Groups meeting on Tuesday morning: 9am Burnthrough, 9am Radiant Panel, 8:30am Contamination Task Group, 9am Seat Cushions.
Main WG Meeting: starting at 10am.

TUESDAY, JULY 13, 2004

CEAT Fire in Hidden Areas Material Tests Update - A. Mansuet

CEAT conducted radiant panel tests on materials in combinations representative of materials in inaccessible areas. The inaccessible areas represented included insulation ducting, ceiling materials, cable ties placed on insulation blankets and insulation blankets.

Task Group Reports

Burnthrough - T. Marker

Further discussion on the Venturi testing that Jim Davis will conduct. The FAATC will continue the lab tour with the burner tools to ensure the other labs are running the tests according to what is specified in the rule. The Round Robin will be continued. The FAATC lab may re-conduct their tests. There are some tolerances on the burner missing in the rule. The FAATC will run some cause and effect tests to see if these tolerances make a difference.

Radiant Panel - P. Cahill

Round Robin VII data was distributed to the Task Group members. There are discrepancies in the data. Pat is going to plot the data to determine if there is a specific reason for the outliers in data. Jim Peterson requested that the FAA Regulatory office develop a means to deal with rogue samples. **ACTION:** The FAATC will follow up with the FAA Regulatory office on this. Heinz-Peter Busch: Has a conclusion been drawn by the FAA as a result of all the Round Robins that have been conducted? Dick Hill: The early Round Robins were conducted on film, and the recent Round Robins have been conducted with tapes. HP Busch: As a result of these Round Robins, we have noticed that the material combination and the test equipment does not link very well together.

Contamination – D. Slaton

Follow up on REDAC with FAATC. Contact Boeing ATA representative on REDAC as well. Follow up with airlines that have been participating in addition to the airlines who attended this WG meeting (to define list of cleaning, insecticides, etc., from a contaminant standpoint). The group discussed the aging wiring results - information not very applicable to contamination. Follow up on criteria maintenance intervals. Create list of aging methods. Brian Joyal will attempt to obtain some insulation blankets.

Seats - E. Dawson

This group will be conducting some Round Robin tests on fire hard foams, etc., as Pat Cahill presented on Monday. They will request some specific data in the form of a detailed questionnaire to be completed by the participating labs when conducting these tests. The questionnaire will be completed by the labs and returned with the test data to Pat Cahill. Claude Lewis: I suggest including temperature, relative humidity, and pressure at location of test apparatus as well as altitude. Ethel Dawson: Yes, all that information will be requested. Will this be strictly U.S. labs or worldwide? Dick Hill: It will start out with the U.S. labs worked through the FAA Certification offices, and the FAA will be working with EASA and other international authorities to design a plan where labs in other countries conduct the tests in the same manner (witnessed by authorities). Heiko Nuessel: What is the time schedule for testing at the international labs? Dick Hill: We are hoping to have all the U.S. labs data by the spring 2005 WG meeting as well as a start on the testing at the international labs by that time. The FAA does not have authority over labs in other countries, so it has to work with other authorities it has international agreements with to coordinate this test program on an international level. The intent over the next few years is to conduct this type of Round Robin for all the test methods and tabulate all the data to provide worldwide authorities with specific information on the labs in their specific countries to make some determinations out in the field. Dan Slaton: Have you guys thought about the measurable criteria for the seat burner test to look at parameters similar to those investigated for the oil burner for cargo liners test (as the Burnthrough Task Group has done resulting in the design of the measurement tools, etc.)? Ethel Dawson: Yes, we plan to investigate the parameters. There will be checks on the equipment similar to those done within the Burnthrough Task Group. I believe all the labs seek more guidance. Claude Lewis: Commented on the sensitivity of the results with respect to the equipment. Jim Peterson: Approximately 20 years ago similar information was researched and may be documented through the ASTM. **ACTION:** Ethel Dawson will discuss this further with Jim Peterson. We are open to advice and suggestions relating to this Round Robin.

Aircraft Materials Fire Test Handbook Discussion/Update - R. Hill

Many of the comments/changes that were submitted during the review the last couple of years have been reviewed and many are being considered by the FAA Regulatory group at this time. Some have already been incorporated into the Handbook. The FAATC is currently discussing including a "Question and Answer" section for each Chapter as general practice. We hope to have a decision by our next WG meeting.

International Aircraft Fire and Cabin Safety Research Conference - R. Hill

There will be no separate Materials Working Group meeting in fall 2004, because there will be presentations related to Materials during the conference in Lisbon (November 15-18, 2004). However, any Task Groups that would like to meet during the conference will be provided a meeting space during the conference. **ACTION to Task Group Leaders:** Let April know if your Task Group would like to meet during the conference by August 31, 2004. Let her know how long your Task Group needs for its meeting, how many people you expect, etc., so that she can secure the proper size meeting room at the conference facility.

The next regular Working Group meeting will be held in the late winter/spring 2005.

Fire in Hidden Areas Updates - R. Hill

FAATC Materials: Ducting and composite flat panel materials will be investigated. John Reinhardt (FAATC) will be developing the test program for ducting. We plan to use the radiant panel test apparatus for the tests. If anyone is interested in participating in this test program,

please contact John Reinhardt at the FAATC or contact April to express your interest in participating.

Aircraft Wire Flammability Test Development - P. Cahill

The report on this will be issued in August 2004. It will be available on the FAATC Fire Safety website as soon as it is approved for printing. Pat explained how she investigated keeping the wires straight, etc., during the test (via photographs of the wire holder that was initially developed). The wire holder will be redesigned. Two conclusions as a result of initial tests: The flame impingement time needs to be increased. Dan Slaton: Have you asked or do you want to ask wire manufacturers and/or OEMs for proposals on holders for wires? Pat Cahill: I have not done that yet. I am open to doing that. Dick Hill: Wire in the U.S. for aircraft is regulated by MIL specs. MIL specs are being phased out, so the FAA through the ASTRAC group has been looking at other standards that can be used such as TSOs or some other standard. This is being done through SAE (Greg Dunn in the Seattle Transport Directorate is coordinating with this SAE group).

Use of Composites in Aircraft - R. Hill

The replacement of metallic parts with composite parts in aircraft is beginning. There is no need to have a flammability requirement for an aircraft skin when it is made of aluminum, however, a skin made out of a composite material may be combustible and may need to have a flammability requirement. A change in technology should not decrease survivability. The FAATC will be producing a white paper for the FAA Regulatory group to suggest some possible tests for these composite materials.

Working Group Member Presentations

New Developments in Low Smoke Fire Resistant Floor Coverings and Low Smoke Fire Resistant Interior Repair Compounds - J. Green (Akro Fireguard)

Plasma Technology: An Environmentally Friendly Innovation for Aircraft Industry - M. Pauwels (Europlasma NV)

Close of Meeting