INTERNATIONAL AIRCRAFT MATERIALS FIRE TEST WORKING GROUP MEETING

MARCH 2-3, 1999

Hosted by Boeing Commercial Airplane Group, Everett, Washington

TUESDAY, MARCH 2, 1999

Thermal Acoustic Insulation Test Method Development Presentation – T. Marker

Presented results of tests conducted to date
The pass/fail method used to date has been visual

***NOTE**: See 'Thermal Acoustic Insulation' Section of Website for related information.*

E. Nielsen: Are you planning to make this test so that the fire barrier will have to be part of the insulation blanket? R. Hill: Not necessarily.

S. Campbell: Is the failure mode in the various configurations the same? T. Marker: All but one.

D. Indyke: There has been some concern about the availability of the type of burner used in these tests. T. Marker: We will confirm that the burners will be manufactured before we include them as part of the test method requirement.

F. Foushee: Has there been any testing done concerning the smoke generation of these materials or will there be any requirement on smoke generation of these materials? R. Hill: We have run full-scale tests with the various materials and have not seen smoke as being a problem until there is burnthrough.

Fastening Systems – D. Dodd

Phase I – Criticality of Overlap/Gaps
Phase II – Test Program Using Realistic Fastening Materials – tests of fastening methods
Presented preliminary conclusions from tests conducted to date

Thermal Acoustic Insulation In-flight Test Method Development – P. Cahill

Described tests conducted in both test configurations: 45-Degree and "Jelly Roll" experimental test configuration. Described results of tests conducted to date.

Presented OSU data on some of the materials tested. The samples tested in the OSU were all scrimmed materials.

***NOTE:** See documents on Configuration and Thermal Acoustic Insulation Facts at end of minutes.*

R. Hill: The reason for looking at rate of heat release (OSU)—the numbers from heat release tests are representative of flame build-up and flashover. Two tests are needed: one dealing with the heat release and one dealing with the flame spread.

Medium & Full Scale Thermal Acoustic Insulation Testing – T. Marker

Described test configuration—compartmentalized tests and tube tests. Tubes represent set up in aircraft attic. Presented some of the results of these tests.

R. Hill: We are conducting the medium scale tests to be sure that we have a representative configuration prior to conducting full scale tests. We are looking at counting corrosion inhibiting compounds as an ignition source. We have already done some tests with corrosion inhibiting compounds with varying

results depending on the consistency of these compounds; ie: do they dry or remain tacky to the touch, etc?

Concerns with OSU testing of thermal acoustic insulation materials. R. Hill: We may have to do some round robin testing to prove repeatability/reproducibility of the tests. We will have to ensure that whatever test method we develop is repeatable/reproducible.

All the information (materials required and where to purchase those materials) on how to set up the final test method will be put on the Fire Safety Section Website.

J. Peterson: Are you (FAATC) going to conduct OSU work at other heat fluxes? R. Hill: If Boeing is going to do that work at other heat fluxes, then maybe we'll (FAATC) look at your results.
J. Quintiere at the FAATC is looking at other heat flux levels in test set ups other than the OSU.

Discussion on Current Test Methods/Problems

Bunsen Burner Tests

P. Cahill: There is a question on the determination of failure in vertical Bunsen burner tests on silicon materials. When a small piece of the material continues to burn, do you count that as a failure? Consensus: Yes.

H. Lutz: Every time we run a round robin on the OSU, the participants in the round robin get different results and we never do anything to produce the same results in all the labs. R. Hill: We (FAATC) came up with a draft standard for the calorimeter and calibration method. The problem is that all the labs want their numbers to be the numbers that the other labs are based on. The labs do not want to change the numbers they get.

Task Group Leader Updates/Presentations

Continued Airworthiness of Aircraft Seats – J. Davis

Seat Fire Blocking Materials Textbook – S. Hasselbrack

> Revisions made to Chapter 20 of the Textbook. Copies distributed to the original Task Group. This Task Group has concluded its work.

OSU Calibration Round Robin – M. O'Bryant

> Presented round robin results from last year.

Seat Material Similarity – I. Weichert

> This group was originally started to investigate justification by similarity of seat material similarity. Is there interest to continue the work of this group on other materials?

Standardized Test Data Forms – H. Betz

> The electronic version of these forms will be made available on the Fire Safety Section website for any lab that would like to use them.

Flammability Requirements for Other Materials in Hidden Areas – R. Hill

> This Task Group is relatively new.

Production Quality Assurance – C. Lewis

Is this still of interest to the group? If anyone is still interested in this work, e-mail Claude Lewis or April Horner. Claude will put together a short summary of the issues/status of this Task Group for the July 1999 meeting.

Surrogate Panel Research – T. Marker

I will publish a Tech Note on the research done on this work. The Tech Note will be available on the Fire Safety Section website.

Thermal Acoustic Insulation – R. Hill

Will meet to discuss the sharing of test data and possibility of tests being done at other labs.

WEDNESDAY, MARCH 3, 1999

Task Group Leader Summaries

Continued Airworthiness of Aircraft Seats – J. Davis

This group was established to look at seat cushions, fire blocking layers and upholstery systems' continued airworthiness. We are focusing on including stronger recommendations for maintenance inspection during C&D checks. We plan to have a draft of this available at the next meeting.

Seat Fire Blocking Materials Textbook – S. Hasselbrack

This group has concluded its work.

OSU Calibration Round Robin – M. O'Bryant

Scott Campbell – We discussed the need to put together a handbook on tips for OSU operation ie: damage to airflow plate, different variables to be looked at and inspected to help bring the numbers of the different labs closer together).

Seat Material Justification by Similarity – I. Weichert

We will test Trevira (one defined weave style—different specific weights). A Metzeler fire hardened foam will be tested with this. These materials will be tested in one lab. We will also test Ultrasuede with a different foam. We plan to have results available at the next Working Group meeting. This Task Group is open to any other suppliers who are interested. We will perform approximately three test on each of these configurations.

Flammability Requirements for Other Materials in Hidden Areas – R. Hill

Brief discussion on sound dampening materials that are affixed to the skin and whether they are part of the thermal acoustic insulation or part of the structure. The group members are going to make a list of the materials that are used in the cheek or tunnel areas, electrical wiring in hidden areas (the power and distribution systems of wiring), electronic bays, sidewalls and overhead of the aircraft. This list will include the type of material used and its application. This list will be tabulated.

Thermal Acoustic Insulation – R. Hill

Established a burnthrough test round robin group. Approached labs currently doing R&D work on insulation materials to make their results/data available to the Working Group.

Lightweight Seat Work – J. Davis

Reevaluate the flammability requirements for lightweight seats. A full-scale test was run at the FAATC. Do we need to revisit the flammability requirements for lightweight seats? We will review the test data to determine if the requirements need to be reevaluated.

In-Flight Materials Testing

R. Hill: Approximately 10 labs are doing some R&D testing of insulation materials. Are any of these labs willing to share test results/data with the whole Working Group for comparison? Please contact April Horner if you have test data on this that you would like to share.

Next Meeting

The next meeting will be hosted by CTA located in Alava Technological Park in Vitoria, Spain, July 8-9, 1999. Check the Meeting Details Section of the Website for further details as they are available.

The information below is Pat Cahill's meeting presentation:

CONFIGURATIONS

PLAIN PET FILM

45-DEGREE

- IGNITION AND PROPAGATION OF FIRE ON A HEAVIER WEIGHT PET FILM/0.34 PCF FIBERGLASS AT THIS ANGLE APPEARS TO BE CONSISTENT (TESTING TO DATE).
- HEAVIER PET FILM APPEARS TO "STICK" TO THE 0.34 PCF FIBERGLASS MORE SO THAN OTHER DENSITIES.
- THE LIGHTER WEIGHT PET FILM APPEARS TO SHRINK AWAY QUICKER THEN THE HEAVIER WEIGHT FILM AND DOES NOT APPEAR TO PROPAGATE FLAMING TO THE SAME EXTENT.

"JELLY ROLL"

- PROPAGATION OF FIRE ON PET FILM IN THIS CONFIGURATION APPEARS TO BE REPRODUCIBLE. TESTING BAS BEEN PERFORMED BOTH WITH AND WITHOUT A CRUMPLED PIECE OF PET INSIDE THE ROLL FOR IGNITION PURPOSES.
- BOTH DENSITY OF FIBERGLASS AND WEIGHT OF FILM DO NOT APPEAR TO INFLUENCE FLAME PROPAGATION IN THIS CONFIGURATION.
- A "BLOCKING LAYER" OVER THE FIBERGLASS DID NOT PREVENT FLAME SPREAD IN THIS CONFIGURATION.

THERMAL/ACOUSTICAL INSULATION

FACTS

- PLAIN PET, METALLIZED PVF, AND POLYIMIDE (FILMS AND SANDWICH COMBINATIONS) PASSED VERTICAL BUNSEN BURNER TESTING AND COTTON SWAB TESTING WHEN TESTED WITH 0.42 POUNDS PER CUBIC FOOT (PCF) FIBERGLASS AND FILMS SUPPLIED BY MANUFACTURERS AT THAT TIME –1996 (ROUND ROBIN TESTING)

- A CERTAIN METALLIZED PET FAILS BOTH VERTICAL AND COTTON SWAB TESTING. IT IS ALSO EASILY IGNITED ELECTRICALLY AND PROPAGATES FLAME CONSISTENTLY

- A CERTAIN PLAIN PET FILM/FIBERGLASS ASSEMBLY (COMPRESSED) FAILED 12 – SECOND VERTICAL FLAMMABILITY TESTING (BURN LENGTH AND AFTERFLAME) – WITH 0.34 AND 0.6 PCF FIBERGLASS – THE 0.42 PCF SAMPLE PASSED (~7 INCH BURN LENGTH)

- **PLAIN PET FILM WILL BURN AND PROPAGATE FLAME UNDER CERTAIN CONDITIONS : CONFIGURATION OF THE TEST SAMPLE IS A CRITICAL PARAMETER**