

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

**OCTOBER 21-22, 1997**

**Harrah's Casino-Hotel, Atlantic City, New Jersey, USA**

**TUESDAY, OCTOBER 21, 1997**

Presentations and Updates by Task Group Leaders

ALL TASK GROUPS ARE ASKED TO PROVIDE A SUMMARY STATUS OF WHAT THEY HAVE ACCOMPLISHED SINCE THEIR ESTABLISHMENT.

Continued Airworthiness – Jim Davis

Presented example of proposed format for Aircraft Seats Component Maintenance Manual and gave explanation of proposed format. F. Tiangsing: Does your group have any technical suggestions? J. Davis: We've looked at the issue of seat covers with velcro seat closures and the method of cleaning these. R. Hill: The original scope of this Task Group was to determine what material/information the seat manufacturer should provide to the end users for continued airworthiness of the seat materials they manufacture. J. Davis: We looked for a standardization of how the information is presented in the CMM. We will address the issue of the type of information provided by the manufacturers for continued airworthiness.

"Preventing Contamination that Affects Flammability" – Darren Nguyen

Explained concern of contaminated aircraft insulation blankets, gave description, explanation, described example incidents, statement of concern, actions taken, additional actions to be taken, and recommendations.

Certification Issues of Renovated Material Systems – Tim Marker

International Materials Fire Test Working Group  
Certification Issues of Renovated Material Systems (status)

Review. Original focus of subgroup was to investigate the occurrence of repair and renovation being conducted on previously certified material systems. After several initial fact finding meetings were held, it was determined that a large percentage of the repairs that take place in an aircraft involve the patching of damaged cargo liners. Other areas, including the seats and carpet, were found to be replaced more often than repaired. To a lesser degree, spot repairs were often made to interior panels using polyester fillers, but these repairs tended to be small and confined to specific areas. The cargo liner patching issue fit within the scope of the subgroup, so a more detailed investigation was initiated with the aid of several subgroup members more familiar with the issue. The investigation led to the development of more stringent pass/fail

criteria for cargo liner repair systems; the new recommended test methods have since been implemented into the Fire Test Handbook (chapter 15).

The subgroup then focused on a bigger issue, the renovation of cabin interior surfaces. It was revealed that this type of refurbishment was already commonplace, and becoming more prevalent. Because the issue was potentially more widespread and serious, it gained interest and attention amongst other Working Group members, including paint, laminate, and panel vendors, airframe manufacturers, and airlines. The subgroup participants discussed a variety of situations whereby used aircraft had undergone a cabin “refresh” in which all or nearly all of the interior surfaces were repainted or relaminated. The discussion also uncovered vast inconsistencies in the methods used to qualify the completed materials systems. In general, the subgroup was looking into ways of standardizing the certification process for qualifying altered cabin materials, which has created a hardship for the operators who still must show compliance when re-surfacing their interiors.<sup>1</sup>

A simplified example of the problem follows:

A new aircraft rolls off the production line, at which point it is within compliance of all applicable FAA flammability standards. After several years of service, the interior surfaces begin to fade, wear and tear take place, and as a result the interior becomes aesthetically unacceptable. The airline interior engineer is tasked with refurbishing the interior any way possible, but his options are limited. Repainting the existing surface is the most common solution, along with removal of the decorative laminate and installation of a new similar decorative (in order to remove the decorative, the panels must be of the strippable variety, as some incorporate a thermoset adhesive which is not strippable). If the panels incorporate the thermoset adhesive, another option is to piggyback a new laminate over the existing laminate. As a last resort, the interiors panels can be replaced altogether, but this is costly and not commonly practiced. In any event, any change to the interior surface must be accompanied with proof that the finished system is still in compliance with the original type certification of the particular aircraft. The only indisputable method for ensuring compliance is to conduct a laboratory test of the altered materials, which is difficult due to the test’s destructive nature. The next best solution is to run the test using panel spares that are built up *identical* to the in-service panels. This too is often difficult (if not impossible) since many of the build-up materials are no longer available or have changed significantly. For example, a request for panel spares to the manufacturer may result in panels supplied that have the same basic construction, but utilize a newer, more fire resistant resin. As a result, the lab test is conducted on a test coupon that has a lower heat release rate, which could give the applicant a false sense of compliance. In reality, the in-service panels may be 8 to 10 units higher, possibly rendering the interior non-compliant. Numerous suggestions from subgroup participants have been reviewed, ranging from the use of

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<sup>1</sup> The real push for implementing a standardized procedure was for the benefit of the operators, who must maintain and continually update their fleet. By following a standardized set of procedures, the operators could save time and money when making repairs, resurfacing panels, re-decorating, etc. In order to develop a comprehensive and accurate set of standardized procedures, a multitude of comparative testing is required. However, there has been very little participation on the part of the domestic operators to this point.

common substrates to standardized test panels. At subsequent meetings, the subgroup further developed a standardized procedure for re-certifying altered material systems to ensure compliance. The standardized procedure would incorporate a safety factor to allow for the use of non-identical materials, commonly referred to as surrogates. The surrogates could be used in cases where the appropriate build-up materials were not available to construct exact test coupons.

Discussion. At the Orlando meeting, the Transport Directorate reviewed the proposed standardized procedure and concluded that it could not be implemented into the Handbook because the basis of the procedure relied on the use of surrogate materials. Although a surrogate panel could be manufactured to resemble the original panel substrate, it could not be made identical in many cases due to the improvement in resin formulas, etc., and as such, it would not enable a 100% confidence level. Until more data become available on the accuracy of surrogate materials at predicting the heat release/smoke output of cabin materials, individual test plans must be submitted and reviewed prior to initiation of any cabin refurbishment (i.e., reviewed on a case by case basis). The purpose of the test plan is to describe the tests that will take place to ensure a compliant finished material system is achieved.

Research tests will continue to investigate the accuracy of surrogate panels at predicting the heat release/smoke output of refurbished/altered interior panels. Currently, a typical phenolic fiberglass/nomex honeycomb panel has been specified by the subgroup, and several panel manufacturers have submitted their version for testing. The panels will be painted and laminated by a variety of vendors, and the results of heat release, smoke, and flammability tests compared. Figure 1 depicts the current test matrix. This will give the subgroup a first look at how much scatter occurs between various manufacturers of a singular specified panel. If the results indicate very little difference between the various manufactured panels, the subgroup would investigate a second case utilizing a different panel specification.

**SUBGROUP ON MATERIAL SYSTEMS RENOVATION & REPAIR**  
**Surrogate Test Matrix and Panel Description Code**

	Paint A (HSH)	Paint B (Boeing)	Paint C (Mank)	Dec A (Schneller)	Dec B (Boeing)	Dec C (possibly Spectra)	
Panel A (Heath Tecna?)	panels not supplied yet HAPAX	panels not supplied yet HAPBX	panels not supplied yet HAPCX	panels not supplied yet HALAX	panels not supplied yet HALBX	panels not supplied yet HALCX	
Panel B (Boeing)	already painted (15), ready for test HBPAX	already painted (15), ready for test HBPBX	already painted (15), ready for test HBPCX	already deced (15), ready for test HBLAX	already deced, ready for test HBLBX	? HBLCX	
Panel C (C & D)	already painted (15), ready for test HCPAX	send 15 to Boeing, test when returned HCPBX	already painted (15), ready for test HPCPX	already deced (15), ready for test HCLAX	send 15 to Boeing, test when returned HCLBX	? HCLCX	
Panel D not specified yet	?	?	?	?	?	?	

**Panel description code:**

Test type	Panel fabricator	Finish type	Finish fabricator	Renovation	Renovation Supplier
H - Heat release	A - Heath Tecna	P - Paint	A - HSH Aerospace	X - no renovation	A - unspecified
S - Smoke chamber	B - Boeing	L - Decorative laminate	B - Boeing	Y - Paint	B - unspecified
F - Flammability	C - C & D		C - Mankiewicz	Z - Decorative laminate	C - unspecified
	D - not specified		A - Schneller		
			B - Boeing		
			C - Spectra		

note: heat release matrix shown, others for NBS smoke testing and Bunsen burner flammability testing are identical

Fig 1

### Similarity of Fabrics – Sally Hasselbrack

The final report was turned in at the last WG meeting. There was some discussion on the recommendations although they did not go into the report. Reviewed revised recommendations. R. Hill: The report will be published as a Task Group report through the FAA Technical Center, however, prior to publication the WG will be given the opportunity to review and comment on the report. Contact April Horner if you would like to review and comment on the report. If you comment on the report, your name will be included as a Task Group member, and you will be put in contact with the other Task Group members. S. Hasselbrack: Everyone was given the opportunity already to provide data and make comments. R. Hill: The review and comment period will have a quick turnaround time. What words/phrases can your Task Group come up with to apply as 'similarity' that can be proposed to the regulatory authorities? It will be a recommendation to the regulatory authorities of the definition of similarity to be used by the ACO's, etc.?

### Handbook on Materials – Sally Hasselbrack

Presented summary of the handbook. When this Task Group meets it will determine what type of information should be included in this handbook. This Task Group should meet and determine what additional information should be included in the handbook.

### OSU Quality Assurance – Mike O'Bryant

Discussed this group's next round robin. He will coordinate with Dick Johnson so that results of this group's next round robin are distributed prior to Dick Johnson's January 1998 Round Robin. F. Tiangsing: Possibly the name of this Task Group could be changed to something like: "OSU Lab Quality Assurance Round Robin". H. Helsdingen: Will the same labs be involved in the next round robin? M. O'Bryant: We have 20 labs for the next round robin. Some have dropped out and there are 7 new participating labs.

### 1996 Round Robin – Richard Johnson

Presented and discussed results of this round robin. Participants in this round robin will receive a complete copy of all the results.

### January 1998 Round Robin – Richard Johnson

Proposed moving the date of this Round Robin to February 1998. He has not determined which materials will be tested in this round robin yet. The regulatory offices will also be involved in this round robin. All test specimens will be sent through the regulatory offices.

### New Design Seats Fire Testing – Pat Cahill

Brief description of New Design Seats test program. Explained purpose of New Design Seats subgroup meeting to be held October 22, 1997, at the FAATC.

### Thermal Acoustic Insulation/Cotton Swab Test – Pat Cahill

Gave explanation of the Cotton Swab Test. This test method will be included in the new copy of the Aircraft Materials Fire Test Handbook which will be published in 1998. Industry asked us to standardize the cotton swab test for testing thermal acoustic insulation.

Description of tests recently done at the FAATC on PE Foam. This foam passed the 12-second vertical Bunsen burner test. It was then tested using the Cotton Swab Test and failed. The question arose: Do we need a test other than the Bunsen burner test for materials like these. R. Hill: Presented OSU results of the PE Foam as compared to other commonly used insulation materials with films. This PE Foam is used to replace thermal acoustic insulation in large pieces in the bottom of the aircraft.

### Standardized Forms for FAR/JAR Burn Tests – Hanns-Joerg Betz

Explained data collected in this Task Group. Presented proposed “Flammability Material Test Certificate” for the various materials fire tests. Explained why standardized test forms are important. J. Davis: What computer program did you use to generate these forms? H. Betz: MSEXCEL. C.L. Foushee: Can we have these forms included in the Handbook? R. Hill: We can include these forms as advisory material in the Handbook, but we cannot mandate it. The major airframe manufacturers will have to agree to use these forms in order help encourage use through the test labs in the field. R. Hill: Is there agreement among the group here is there a need to have a single format to be referenced somewhere such as in the Handbook as a recommended form (not mandated) and also have it available electronically? Consensus: Yes. R. Hill: Anyone who is interested in being part of the evaluation group on these standardized forms, tell April Horner and she will send you a copy of the forms to comment on and return the comments to Hanns-Joerg Betz for review and conclusions. We want to have this finalized by the next WG meeting (March 1998).

### Task Group Leaders Reports/Assignments

Thermal Acoustic Insulation/Cotton Swab Test Task Group – P. Cahill

Continued Airworthiness of Seats Task Group – J. Davis, S. Hasselbrack

Certification Issues of Renovated Material Systems – T. Marker

We are looking for other manufacturers to participate in the surrogate panel test.

### Quality Assurance – C. Lewis

There is a need to address production quality assurance, and there is a need to restate the objective of this Task Group as originally chartered. Please give your names to April Horner if

you are interested in participating in this Task Group. This Task Group will probably meet for ½-day prior to the March 1998 meeting in California.

#### Aircraft Blanket Test – Pat Cahill

Presented Aircraft Blanket Test fixture designed at FAATC (the fixture was shown and described at this meeting). Pat is open to suggestions on changes in the design of the test fixture. This test is not an FAA required test at this time but was released as a Flight Standards Information Bulletin (FSIB).

#### Oil Burner – Nozzle and Calibration – Pat Cahill

Get info for this from Pat. It is an 80° cc (constant capacity) 2 gallon/hour Monarch nozzle.

#### Update of Status of Transducers – Richard Johnson

Awaiting calibration by NIST.

#### Discussion on OSU/NBS Videos – Richard Johnson

NBS Video: He is satisfied with this video. There have not been too many changes in the NBS Chamber recently. OSU Video will incorporate some Appendix items.

## WEDNESDAY, OCTOBER 22, 1997

### Formation of New Task Groups

#### Product Quality Assurance – Claude Lewis

Look at the issue of production quality assurance after items have been certified. There were cases where systems had been put on aircraft that have compromised flammability requirements. The first objective is to find out how things are being done throughout industry and then take it from there. If you are interested in participating in this Task Group, contact Claude Lewis or April Horner.

#### Potential Fire Threat Materials – Richard Hill

Identify materials that pass the required flammability test but may cause a potential fire hazard. These materials may cause a fire threat in a real fire situation. Do the required tests for these materials represent the fire threat that the material should withstand. Example: the PE foam which met the required Bunsen burner test but failed the OSU Test and the Cotton Swab Test. This is an area the FAATC will look into in the future anyway. Contact April Horner if you would like to participate in this Task Group.

Ingo Weichert – Similarity issue of the entire seat component. R. Hill: In the process as to what you think is needed in your review of the Test Evaluation Forms. We will then determine what the next step will be after we have the comments on the standardized forms compiled and after we have the definition of ‘similarity’ from the Similarity of Fabrics Task Group.

#### Proposal on Similarity of Colors (Industry Task Group)

Most of the time this is done on a case by case basis in certification because there are so many different situations. M. O’Donnell: Shouldn’t this be done through a Task Group within the ATA? R. Hill: Yes, you are probably right about that.

#### Discussion on Current Test Methods/Problems/Development of New Test Methods

R. Hill discussed a question that was brought up to him concerning the use of water-based glue used to glue seat foam cushions together. Only certain glues can be used because of OSHA regulations. These glues will no longer pass the Bunsen burner test when used with the foams because of this there have been some exemptions for this combination, but these exemptions are time limited. A few companies attending the meeting said they manufacture an adhesive that will pass the required flammability tests. J. Peterson: Maybe the newly formed Task Group on Potential Fire Threat Materials can look into this issue. R. Hill: We can look at this area through that Task Group. F. Tiangsing: All the potential exemptions are published in the Federal Register for comment.



R. Hill: Is it worthwhile looking into different methods of igniting the upper pilot burners in the OSU? M. O'Bryant: Yes, it's worth looking into.

### Aircraft Materials Fire Test Handbook

Comments on this Handbook are no longer being accepted. The Handbook should be published in early 1998. All Working Group members will be notified when the new version is available.

## Discussion on Burnthrough

### Small Scale Burnthrough Test at CEAT – Jean-Francois Petit

Presented diagrams and photos of test apparatus and provided an explanation of tests conducted and the test apparatus. Presented proposed test specimen configuration and showed photos of specimens tested. We have to develop test criteria, as this is the beginning of the development of this test method.

### Medium Scale Burnthrough Test at Faverdale Technology Centre – Darren Dodd

Summarized previous work and test results. Explained results of tests conducted on plain aluminum panel and stylized panels. Gave summary of stylized fuselage test work. Explained their future considerations for testing.

### Final Discussion/Next Meeting/Closing

The next meeting will be held in Oakland, California, March 9-11, 1998.