INTERNATIONAL AIRCRAFT MATERIALS FIRE TEST WORKING GROUP MEETING

Hosted by Schneller, Inc., Orlando, Florida

February 25-26, 1997

FEBRUARY 25, 1997

Presentations and Updates by Task Group Leaders

Continued Airworthiness - E. Dawson

Presented data on *Component Maintenance Manual* comparison conducted for a number of seat manufacturers. Explained format developed by this Task Group. A copy of her presentation is attached.

Minor Changes to Qualified Materials - R Hill

'OSU Test for Different Decor Foils-Similarity' - H Betz

Explained reasons for similarity tests. Explained similarity tests conducted and results of these tests. A copy of his presentation is attached.

Certification Issues of Renovated Material Systems - T. Marker

Explained objectives of this Task Group since its creation in 1994. Explained types of interior panel renovations. Described test options for renovated or repaired panels. See attachment.

Similarity of Fabrics - S. Hasselbrack

Explained results of tests conducted. She presented her conclusions and recommendations based on the findings of the tests conducted.

Handbook on Materials - S. Hasselbrack

This handbook was taken from a Boeing document on aircraft materials by permission of Boeing management. Some of the information from the document will be published as a Working Group report (this report will be referenced in the Aircraft Materials Fire Test Handbook).

OSU Quality Assurance - M. O'Bryant

Presented results of the first round robin (14 labs participated in this round robin) completed by this Task Group and showed samples of the panels tested in this round robin. Another round robin will be conducted in Fall 1997.

New Seat Design - P. Cahill

Presented viewgraphs of the new vertical seat back.

Thermal Acoustic Insulation - P. Cahill

Presented results of thermal acoustic insulation tests conducted using the Perkowski test.

Metalized Mylar, Non-Metalized Mylar, Metalized Tedlar Materials, Etc. Tests - J. Peterson

The AIA (Douglas and Boeing) decided to run some larger scale tests with metalized mylar, non-metalized mylar, metalized tedlar, etc. These tests were conducted at the FAA Technical Center.

Heat Flux Transducer - Specification Discussion - R Hill

Gave background on round robin for heat flux transducer standardization. The round robin will be underway in the near future. The spec would be for a specific type of transducer and a specific type of calibration. The FAATC has written a draft calibration procedure.
This spec would apply to the OSU and the NBS Chamber if you are using the new furnace, but would not apply to the Oil Burner.

Oil Burner For Seats - Calibration Operation - Follow up to 10/31/96 Meeting - P. Cahill

Gave background on the calibration problems of the Oil Burner She presented the proposed adjustment to *Section 7.7.3* and *Section 7.7.5* of *Chapter 7* of the Aircraft Materials Fire Test Handbook based on outcome of 10/31/96 meeting.

Presented a correction to *Section 7.7 Calibration* of the Aircraft Materials Fire Test Handbook.

Working Group members are asked to provide feedback on the information Pat presented. Contact her via telephone (609-485-6571) or fax (609-646-5229) with your feedback.

Discussion on the Need for More Airline Participation - R. Hill

Stressed importance of airline participation in this Working Group.

Aircraft Materials Fire Test Handbook - R. Hill

A portion of the Handbook is currently undergoing review by the FAA Northwest Mountain Region. Upon completion of final review the Handbook will be published as an FAA Technical Center document. The Handbook may be referenced in an Advisory Circular or a similar document.

FEBRUARY 26, 1997

Task Group Discussion/Reports/Assignments

Similarity of Fabrics - S. Hasselbrack

The report will be sent to the Task Group members that did not receive it for comments. These Task Group members will have a short period to review and comment on the report. It will be published as soon as the comments are received and edits are made (if necessary).

New Seat Design - P. Cahill
Explained discussion during Task Group meeting.

ACTION: Videos of a series of previous tests that showed the seat foam dripping and its behavior in these tests will be shown at the next Working Group meeting.

FAATC does not plan to run a large-scale test to get an exemption for one manufacturers seat design. If there is a problem with a particular new seat design, then a test should be designed to prove an equivalent level of safety. This would be the development of an alternate test to prove an equivalent level of safety.

Pat will review reports of the previous tests that were conducted and write up a draft plan.

Continued Airworthiness - E. Dawson

The Task Group consists of fireblocking material manufacturers They will be writing a list of recommended inspection alternatives. These will be put into a sample CMM proposing guidance on the content and format on the information manufacturers should supply to the end users

We will check Repair Station, Inspection Procedure Manuals for Continued Airworthiness Information and sources of that information.

Certification Issues of Renovated Material Systems - T Marker

See attachment. See attached information on "substantially complete replacement" provided by Frank Tiangsing.

OSU Quality Assurance - M. O'Bryant

Materials for next round robin will be distributed for Fall 1997 and the results will be presented at the Winter 1998 meeting.

Thermal Acoustic Insulation - R. Hill

Discussed information from round robins. From the data produced, the Task Group was comfortable with the Perkowski test being more of an indicator of the flammability of the film in a composite formulation (the blanket as a composite) to spread fire than the bunsen burner was. This Task Group will put together a technical report and present it to the FAA Regulatory Authorities as a recommendation to use this test in place of the bunsen burner test to show flame spread on the individual composite film.

P. Cahill - There is still a problem with burn length versus shrinkage - what was burn length and what was shrinkage?

There was further discussion on burn length, char, shrinkage when testing the films.

R. Hill - We are trying to come up with a test to replicate the hazards in an aircraft and what the biggest ignition source is that you want to protect against?

Formation of New Task Groups - R. Hill

C. Lewis - Quality Assurance of Panels, how do manufacturers assure compliance to certain values? What is the variability, etc? A Task Group on this was established at one time but it was dissolved. The issue was never fully addressed. Will a Task Group be re-formed on this

issue? R. Hill - Part of the problem was that we did not have the right people to participate in this Task Group. There are a couple of main questions: 1). How does a quality control program work? 2). What exactly should companies who make panels be required to do for minimum requirements for heat release and smoke for quality control? We basically need people who manufacture and use panels to be involved in this Task Group. R. Hill - Anyone who thinks they can contribute to develop what minimum you should do to continue assured quality please contact April Horner. These names will be provided to Claude Lewis.

M. O'Bryant - We (Boeing) run process control charts every month on every construction or on new materials.

H. Betz - Standardized form for testing?

R Hill - Industry could form a group to put together a standardized form to show: What industry would recommend to be a standardized form to be used for the various test methods. Anyone interested in being involved in this project, contact H Betz. This group would be chaired by industry and have industry participants.

Discussion on Current Test Method Problems/Development of New Test Methods - R. Hill

G. Danker - On the vertical burn, should the world standardize on the diffusion flame for the vertical bunsen burner test? Do any labs use the non-diffusion flame for vertical bunsen burner testing? J. Peterson - If you use methane you get enough air to get a clean flame. The write up in the Handbook is a little ambiguous, it should be made a little more clear. ACTION: R. Hill, we can make it a little clearer in the Handbook.

Fire Containment Cover - Are little flames acceptable on the back of the fire containment cover during testing? ACTION: This should be clarified.

S. Giri - The testing of OSU samples that are 1 3/4" thick is not clearly defined. ACTION: R. Hill - This issue was addressed, I will try to get an answer for you when I return to the office. There may have been something written and included in the new draft of the Handbook-I will check into this.

A. Allerton - per *Section 5.4.1* of the Handbook states: Use a thickness a maximum of 1.75 inches to test panels thicker than 1.75 inches.

P. Cahill - Question on carpeting with Velcro strips. See attached information provided by Frank Tiangsing.

Next Meeting - A. Horner

The dates of the next meeting will be ***Tuesday and Wednesday, June 10-11, 1997***. (*Note*: This is a date change). The meeting will be hosted by Mankiewicz at the Hotel Frantour Paris Suffren, 20 Rue Jean Rey, 75015 Paris, France. The telephone number for reservations is 33 1 45 78 53 41. A block of rooms has been held for the nights of June 9, 10, 11, 1997. If you would prefer to fax your reservation request, a new reservation form will be available soon. Please contact me via fax (609-646-5229) for a copy of this form.

INTERNATIONAL AIRCRAFT MATERIALS FIRE TEST WORKING GROUP

A Message From The Coordinator's Office

IMPORTANT NOTICE

DATE CHANGE FOR JUNE 1997 MEETING

Dear International Aircraft Materials Fire Test Working Group Members:

Please note that the dates of the June 1997 International Aircraft Materials Fire Test Working Group meeting have been changed to Tuesday and Wednesday, June 10-11, 1997. The meeting will run from approximately 9:00AM-5:00PM on June 10, and 9:00AM-12:00Noon on June 11.

The meeting will be held at the Hotel Frantour Paris Suffren, 20 Rue Jean Rey, 75015 Paris, France. A block of rooms has been held at this hotel for the nights of June 9, 10, 11, and 12, 1997. A reservation form is attached which may be faxed to the hotel. If you would prefer to call in your reservations, the hotel reservation telephone number is 33 1 45 78 53 41.

I hope that this date change will accommodate your schedules much better, and I look forward to seeing you in June.

Sincerely yours,

April Horner

Attachment

Sponsored by:
Federal Aviation
Administration
Technical Center

MANKIEWICZ
FAA WORKING GROUP
STAY FROM 9th to12th JUNE 1997

Hotel FRANTOUR Paris Suffren
20, Rue Jean Rey
75015 PARIS

HOTEL FORM

PLEASE FILL IN THIS FORM AND RETURN IT AS SOON AS POSSIBLE TO :

*HOTEL FRANTOUR PARIS SUFFREN****
20, RUE JEAN REY
75737 PARIS CEDEX 15
Telephone : (33).1.45.78.53.42 / 53.40 - Fax : (33).1.45.78.91.42 - Telex : 204 459 F

SURNAME _____ *FIRST NAME :* _____

ADDRESS ✉ : _____

CITY / ZIP : _____ *POST CODEE :* _____

PHONE ☎ : _____ *FAX 🖷 :* _____

❶ *ARRIVAL DATE* :____/____/____ *AT ◷* ____ *O'CLOCK.*

❷ *DEPARTURE DATE* :____/____/____.

TOTAL OF ROOMS RESERVATION
AMERICAN BREAKFAST BUFFET AND CITY TAX ARE INCLUDED

__ *Room(s) SINGLE(S)*	*FFR 820*	:	_____ *Name*
__ *Room(s) DOUBLE(S)*	*FFR 900*	:	_____ *Name.*
__ *Room(s) TWIN*	*FFR 900*	:	_____ *Name.*

→ *Instead of FFR 970 and FFR 1100 VAT included, our Public Rates.*

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- Minimum One Night Deposit to be forwarded : FRF. _____ *X number of rooms = FRF.* _____.

- You are allowed to charge on the following credit card :

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(only) an amount of : FRF. _____.

CREDIT CARD NUMBER : — — — — — — — — — — — — — — — —.

VALID UNTIL :— — / — — / — —.

Date : ...../...../.....

SIGNATURE

The attached 7 pages (including this page) were provided by Frank Tiangsing of the FAA Transport Airplane Directorate in response to questions raised at the February 25-26, 1997, meeting concerning: velcro type material attached to carpets and the discussion in the Certification Issues of Renovated Material Systems Task Group meeting on "substantially complete replacement" .

DESK MEMO

From: Frank Tiangsing
Regulations Branch, ANM-114
Transport Airplane Directorate
Aircraft Certification Service
206-227-2121

Date 28 February 1997

To: Dick Hill, ACD-240

Subject: Testing of Velcro Affixed to Carpet

I was unable to find a letter specifically addressing the flammability testing of velcro type material affixed to carpet. However, I have attached a letter which addresses the aspect of whether or not the velcro type material should be considered part of the floor covering material, i.e., yes it should.

Additionally, I did find a memo discussing velcro type material and seat cushions It says, in pertinent part, "velcro type material should be tested with the velcro material attached to its backing material but not hook to pile."

Combining the content of these two documents leads to the conclusion that when carpeting is held in place with velcro type material, the flammability testing of the carpet should include the velcro type material which is attached to the carpet.

I am also enclosing the letter I mentioned which discusses the intent of the phrase "substantially complete replacement."

Frank

24 APR 1987

Emmett Salzberg
Senior Product Manager
Tuck Industires, Inc.
Lefevre Lane
New Rochelle, NY 10801

Dear Mr. Salzberg:

With respect to your inquiry to Chief Counsel E. Tazewell Ellett, dated February 24, 1987, it is our position that the means by which carpet or other material is bonded to the aircraft floor would be included as "floor covering" within the meaning of Federal Aviation Regulation §25.853(b).

We hope this answers your inquiry.

Sincerely,

Original Signed by
John H. Cassady, III

John H. Cassady
Assistant Chief Counsel
Regulations and Enforcement Division

APR 11 1990

Mr. J. B. Maydew, Airframe Design Technology Group
British Aerospace (Commercial Aircraft) Limited
Airlines Division
Comet Way
Hatfield, Hertfordshire AL10 9TL
England

Dear Mr. Maydew:

This is in regard to your letter of March 6, 1990, concerning the flammability of interior materials used in the cabins of transport category airplanes. Before attempting to answer your specific questions, I will provide some insight on the basic intent of the rulemaking. Perhaps that will help put the issues in context.

Development of the rulemaking concerning flammability of interior materials was based on the fire testing conducted by our Technical Center at Atlantic City, New Jersey. These tests showed that the lives of considerably more passengers could be saved in a post-crash, fuel-fed fire situation if there were more time to evacuate the occupants before flashover occurred in the cabin. The testing further showed that a significant delay in flashover would be realized if less flammable materials were used for the large-surface area components of the cabin. In conjunction with these tests, the Technical Center developed a method for assessing the flammability of these components using the radiant rate of heat release apparatus developed by Ohio State University (OSU).

Unlike most of our previous fire protection standards, the primary concern is the overall flammability of an area rather than the point with the least resistance to flame penetration. The capability of the components to resist flame penetration is, therefore, not significant. For this reason, it was not deemed necessary to require relatively small components to meet the proposed standards for flammability. Furthermore, it is, in many instances, impractical to fabricate them from materials that will meet the new standards. It was not necessary to include seat cushions because new flammability standards using a different test method had just been adopted for them. Other fabric components, such as curtains, were not included because it is not considered feasible to test such components using the radiant rate of heat release test apparatus.

The proposed rulemaking was aimed primarily at future transport category airplanes; however, consideration was given to those already in U.S. air carrier service. The benefits that would have been realized from a

retrofit program would not have been commensurate with the extremely high cost involved. We, therefore, did not propose a mandatory retrofit requirement. We did, however, feel that it would be entirely feasible for operators to install cabin components that meet the new flammability standards if the entire cabin interior were being replaced for any other reason. We did not propose that components meeting the new standards would be required when there is less than a complete replacement of the cabin. The primary reason for taking that approach was that the use of individual components meeting the new standards would not significantly affect the overall flammability of the cabin. In addition, there might be compatability problems if original components were replaced, on a component by component basis, with those meeting the new standards.

One commenter noted that an operator could circumvent the intent of the proposed rule by leaving some minor, inconsequential part of the original cabin. In order to preclude that possibility, the final rule was qualified to state that components meeting the new standards had to be used if there was a "substantially complete replacement" of the interior. Nevertheless, the intent is still that the components meeting the new standards must be used only if there is, for all practical purposes, a complete replacement of the cabin interior.

We also clarified in the final rule that "complete replacement of the cabin interior" refers only to complete replacement of the components that are subject to the new flammability standards. Whether other components, such as seat cushions or flooring, are replaced at the same time is immaterial.

It must be noted that the rulemaking discussed above applies only to U.S. air carriers. The airworthiness authorities of other countries may have adopted different criteria for determining whether replacement components must meet the new flammability standards.

In regard to your specific questions:

1. "For aircraft certified prior to 20th August 1988 can we:
   "(a) Replace all sidewall panels with 'flame only' compliant panels?
   "(b) Replace all overhead bins with 'flame only' compliant panels?
   "(c) Replace all ceiling panels with 'flame only' compliant panels?
   "(d) Replace all stowages with 'flame only' compliant panels?
   "(e) Replace all galleys with 'flame only' compliant panels?
   "(f) Replace all door trim panels and surrounds with 'flame only' compliant panels?"

If, by 'flame only' compliant panels, you are referring to components that meet the applicable flammability standards in effect prior to Amendment 25-61, the answer is yes. Since replacement of any one of the above types of components would not represent a "substantially complete" replacement of the interior, the components would not have to meet the new flammability standards.

2. "Which combinations of the above are allowed?"

Any combination of the above provided there is not a "substantially complete replacement" of the interior. As noted above, "substantially complete replacement" means replacement of all of the components subject to the new flammability standards, except for the possible retention of a few minor components.

3. "(a) How do manufacturers decide what a 'large area part' is and equally what a 'small part' is?

"(b) We understand that one definition of single small parts is an item having an area of less than one square foot. Taking a passenger service unit as an example of a number of small parts. Is there a limitation on the number of small parts forming a large surface? And, following on from that, if you have say an attendant's panel with an area of less than one square foot and in total you have four of these around the cabin, how is this resultant larger area viewed?"

The distinction between parts with large surface areas, which must meet the new standards, and those with smaller surface areas is very difficult because of the size of the cabin and other factors that may vary from one airplane to another. For example, a specific component might be insignificant when installed in a large wide-body airplane because it would make a minor contribution to the overall flammability of the area of the cabin in which it is installed. On the other hand, it might represent a major contribution when installed in a smaller transport category airplane. The proximity of the component to a potential source of fire, such as an exit, lavatory or galley, would also be a consideration. As you noted, a component with an area of one square foot or less was cited in one specific application as a component that did not have to meet the new standards. The built-in passenger serving trays have also been cited as examples of components that did not have to meet the new standards. Although it is not possible to cite a specific size that will apply in all installations, we can provide the following guidance. As a general rule, components with surface areas of one square foot or less may be considered small enough that they do not have to meet the new flammability standards. Components with surface areas greater than two square feet may be considered large enough that they do have to meet the new standards. Those with surface areas greater than one square foot, but less than two square feet, would have to be considered in conjunction with the areas of the cabin in which they are installed before a determination could be made.

Since the primary consideration is the flammability of a local cabin area, there is no limitation on the number of small parts that can be used if they are not concentrated in one specific area. If, however, such parts are adjacent to each other and they collectively form a single component, the need for compliance with the new standards would be based on the size of that component rather than the sizes of the individual parts. In your example, the four attendant's panels would not have to meet the new standards because each is less than one square foot in area and, since they are located around the cabin, they do not collectively comprise a single component that is four square feet in area.

4. "(a) Similar questions to 1.(a) - 1.(f) but substituting 'recovering' or 'painting' for replacing with the proviso that in recovering the materials used had similar or improved flammability characteristics.

"(b) Variation on the above but for part of the cabin, when for example a two or three class layout is installed, the airline/manufacturer wishes to refurbish ~~and~~ existing items for first class as the tooling for new manufacture no longer exists."

Recovering or repainting is considered refurbishment rather than replacement. If the components are reinstalled in the same airplane, they have not been ~~'installed'~~ 'replaced' and there is no requirement to meet the new standards. Similarly there would be no requirement to meet the new standards if they were removed for other purposes, such as access to hidden areas of the airplane, and then reinstalled.

It should be noted, however, that the original components would be 'replaced' if components from another airplane were installed regardless of whether the latter components were refurbished. If the components were 'replaced,' the next question would be whether there was a 'substantially complete replacement.' In your example of replacing only the first class cabin components, none of the components would have to meet the new flammability standards because there would not be a 'substantially complete replacement.'

5. "Will derogations be allowed for the 65/65/200 compliance after 20th August 1990? If so will they include heat release and smoke, and for what time period?"

Deviations from the definitive 65/65/200 standards may be granted for airplanes manufactured on or after August 20, 1990, but not later than August 19, 1991. Such deviations may also be granted for airplanes in which there is a substantially complete replacement during that time period. The criteria for granting such deviations are the same as those for granting deviations earlier from the interim 100/100 standards. It must be emphasized that these provisions for deviations are applicable only to U.S. air carrier operators. Foreign airworthiness authorities may or may not choose to grant similar relief for the operators under their cognizance.

6. "Are there any items which are considered to be exempt, i.e. light covers, windows (direct view), projections screens, head impact pads?"

As discussed above, many components are not required to meet the new standards because of their small size. In addition, lighting lenses, windows and transparent panels needed to enhance cabin safety are not required to meet the new standards regardless of their size. 'Transparent panels needed to enhance cabin safety' include panels inserted in cabin partitions to provide seated flight attendants with a clear, unobstructed view of the cabin or to provide passengers a view of an exit as an aid to emergency evacuation.

Projection screens would have to meet the new flammability standards unless they were small enough in surface area that they did not have to comply for that reason. Head impact pads would generally be small enough that they would not have to meet the new flammability standards.

Please advise if you have any further questions in this regard.

~~Yours~~ Sincerely,

Original Signed by
Leroy A. Keith

Leroy A. Keith
Manager, Transport Airplane Directorate,
Aircraft Certification Service

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[illegible]	[illegible]	[illegible]	PHONE: [illegible] FAX: [illegible]
LEE LIPSCOMB	SOUTHERN MILLS	6501 MALL BLVD. P.O. 289 UNION CITY, GA 30291	PHONE: 770-969-1000 FAX: 770-969-6846
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LIST OF ATTENDEES
INTERNATIONAL AIRCRAFT MATERIALS FIRE TEST
WORKING GROUP MEETING
Hosted by Schneller, Inc.
February 25-26, 1997

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Subgroup on Material Systems Renovation & Repair

Presentation/Review. In 1994, the Transport Airplane Directorate (Seattle) tasked the International Materials Fire Test Working Group to investigate several areas as part of harmonization work with the Joint Airworthiness Authorities (JAA) and Transport Canada. The major areas of study were: continued airworthiness of existing cabin materials, minor changes to previously qualified materials, quality control, and repair/renovation of cabin material systems (Subgroup 4). The primary objective of Subgroup 4 was to first determine the problem areas involving repair/renovation. Subsequent to this, test methods were developed for the materials most commonly repaired/renovated. A revised test method and pass/fail criteria was later developed for qualifying repaired cargo liners and filler-repaired interior panels. In terms of renovation, it was discovered that painting and re-laminating of existing interior surfaces was becoming very common. Once this type of procedure takes place, it is necessary to demonstrate that the refinished material still meets the requirements of the original type-certification of the aircraft. A major problem with this lies in the difficulty in obtaining the appropriate substrate to run a compliance test. As a result, the Subgroup members suggested that substitute materials, or "surrogates" could be used to conduct these tests. Surrogate panel substrates would have the same generic construction (i.e., core type, thickness, type & number of pre-preg plies, etc.) as the original material. A method for using surrogate materials to qualify renovated interior materials was developed by the Subgroup. Additionally, other alternate testing options were theorized and discussed, such as the possibility of using a "critical" panel, for example. Although all methods deserved consideration, the fact remained that the only way to ensure compliance of a renovated material system was to perform a test using identical, original materials. This was particularly true for the surrogate case, since most current resins used in panel construction are much more fire resistant than similar types used 6 to 8 years ago. Because of this, there is the likelihood that a surrogate panel could yield erroneously low numbers compared to the actual in-service panel.

Irrespective of this and other concerns, the Subgroup's goals were clear: to develop and perfect an alternate method for conducting compliance tests on renovated cabin materials, then implement this simplified procedure into the Fire Test Handbook for everyone's benefit. Although this seemed like a reasonable task, a more in-depth review by the Transport Airplane Directorate revealed that none of the "alternate" methods could be implemented due to legal discontinuities. These methods were found to be in conflict with various sections of Part 121 Airline Operating Rules, and Part 25 Airplane Requirements. In order to clarify the legal ramifications, a representative from the Transport Airplane Directorate participated in the Subgroup's break-out session.

Certification Issues Discussed During Breakout Session. Several specific cases citing the difficulty involved with certification (after interior cosmetic changes had taken place) were discussed. Questions ranged from the use of cut-out material to the degree of testing required when a similar film type of different color is used. A Transport Airplane Directorate representative explained the Directorate's position on the subject matter very clearly. In essence, the Transport Directorate representative and the Subgroup leader concluded that there were simply too many different materials and possible combinations involved in the totality of aircraft interior renovations (and the attendant unknown synergistic effects) to allow for a single method of compliance (using only similar materials). At the present time, it is not possible to assume that any single method would effectively guarantee that a renovated material system would remain in compliance once a standardized set of procedures were followed. In light of this, the Subgroup was reaffirmed that the only method currently acceptable for qualifying renovated interior systems was a method in which exact replacement or pre-existing flat dummy panels are used for the tests (panel cut-outs

would also be acceptable). However, exemptions might be allowed on a case by case basis if there is conclusive evidence to support a finding of equivalency. The obvious question is then raised as to the degree of data/testing required to be considered "conclusive". This again would be a function of the specific case being considered. For example, consider an operator renovation involving the re-painting of a particular interior sidewall panel which was originally certified at heat release rates of between 35/35 and 40/40. If the operator had data showing the results of this paint over 4 widely different types of substrates and the largest increase was only 5 units, then a reasonable conclusion would be that this combination would not surpass 65/65. On the other hand, if the base material was between 55/55 and 60/60 and the paint typically caused a heat release increase of about 6 units then it is unlikely that it can be conclusively demonstrated that the untested combination will not surpass 65/65.

Development of Method I Document. Although it was concluded that the only acceptable method for conducting compliance tests on renovated systems involves the use of exact replicate materials (Method I), a formalized document which discussed the test specifics has yet to be developed. A renovation test document included in the Fire Test Handbook would be helpful to operators and refurbishment facilities that routinely perform these operations. Procedural information and guidelines designed to further standardize renovation testing would likely be included. This document will be developed by the Subgroup with Transport Directorate guidance.

Limited Surrogate Tests. Although the conclusion of the discussion was that the only acceptable method (as of this writing) for conducting compliance tests on renovated systems involves the use of exact replicate materials, several Subgroup participants agreed that limited testing of various surrogate applications should continue. For example, are there significant differences in surrogate panels supplied by different manufacturers, assuming that the design/specification is identical? Exactly how much difference is there when a singular type of renovation (e.g., paint) is used in conjunction with surrogate panels produced by different manufacturers? To accommodate these questions, several panel manufacturers will be asked to supply samples to the FAA Tech Center where they will be catalogued according to construction. The samples will be baseline tested at the FAA, then sent to various decor shops where they will be painted or re-filmed, then re-tested at the Tech Center; results will be studied for normal/known distribution and combinability (this exercise was attempted in the past, but not completed due to lack of interest by the panel manufacturers).

Additional Comments. There was still confusion over the phrase "substantially complete replacement" as it applies to renovation. If an operator wants to change the appearance of the interior cabin and does so by refurbishing or renovating the large surface area panels of the cabin and reinstalls them in the same airplane, then the operator is only required to maintain compliance according to the type certification basis of the airplane. If, however, all or almost all of the large surface area panels of the cabin are removed and replaced with other panels (including ones which were removed from a similar airplane and refurbished/renovated) then the cabin has undergone a substantially complete replacement of the interior surfaces, and the material constructions must then meet current FAR's (i.e., 65/65 heat release and 200 D_s). A letter from the Transport Airplane Directorate discussing the subject of substantially complete replacement will be included in the meeting minutes.

Future Areas of Research. A limited study to investigate the variety of panel constructions used in the major surface areas (e.g. sidewall, stowage bin, ceiling) of current 65/65 aircraft should be performed. This would serve as a catalogue for all future subgroup research, including surrogate production, differences between new and old resins, etc.

SUBGROUP ON MATERIAL SYSTEMS RENOVATION & REPAIR

OBJECTIVES

1994 Determine Problem Areas Regarding Renovation & Repair Of Interior Material Systems

1995 Develop Representative Test Methods In Key Areas:

Cargo Liner Repairs (Adhesion & Shingling Tests)

Interior Panel Repair (Filler-Only Test)

Interior Panel Renovations (Surrogate Use?)

1996 Develop Test Data & Test Methodologies To Simplify & Standardize The Certification Procedure For Renovated Interior Panels

1997 Reccomendations To Transport Directorate Agreement On Proper Document Structure & Language

1998 Implement Standardized Procedures Into Fire Test Handbook?

SUBGROUP ON MATERIAL SYSTEMS RENOVATION & REPAIR

Types Of Interior Panel Renovatons

Re-Decorating (removal of old laminate, install new)

Re-Painting (lightly sanding old surface)

Re-Surfacing Using Filler & New Decorative

Re-Surfacing Using Filler & New Paint

Piggybacking (new laminate directly over old)

...any and all changes to interior surfaces must maintain compliance according to original type certification!!

In Most Cases, Need To Retest Final System

SUBGROUP ON MATERIAL SYSTEMS RENOVATION & REPAIR

Testing Options

Option 1: Actual

Spares or Flat Dummy Panels Supplied With Original A/C

Actual Replicate Flat Test Panels Produced By Manufacturer

Cut-Out of Existing Interior Panel

Advantages: Accuracy

Disadvantages: Cost (Cut-Out necessitates replacement panel)

Cost (production of replicate flat panels)

Option 2: Surrogate Panel

Same Generic Construction as OEM Panel

Same Core Type, Thickness, Same Number & Type of Pre-preg

Similar Type of Resins

Advantages: Easy to Produce

Disadvantages: Accuracy (use of 'similar' resins)

SUBGROUP ON MATERIAL SYSTEMS RENOVATION & REPAIR

Testing Options (con't)

Option 3: Standardized Surrogates

Use Existing Standard Panels or Develop New Ones for All Possible Applications

Development of a Panel Data Base

Advantages: Certification Process Simplified (once the panel data base is established)

Disadvantages: Initial Effort High (need to determine various panels in use, develop new panels, then conduct similarity tests with various renovations to develop data base)

Option 4: Critical Panel

Same Generic Construction as OEM Panel

Consistent, High Heat Release Numbers

Advantages: Easy to Produce

Disadvantages: Accuracy (synergistic effects not accounted for)

SUBGROUP ON MATERIAL SYSTEMS RENOVATION & REPAIR

CONCLUSIONS

IDEAL OUTCOME: Choose & Perfect One Alternate Certification Test Procedure, Implement This Method Into The Handbook

PROBLEM: Legal Ramifications To Most Of The Proposed Methods,
Part 121 Airline Operating Rules
Part 25 Airplane Requirements
(Need Clarification From Transport Directorate)

INTERIM SOLUTION I: Use Method I Exclusively Until One Of The Alternate Methods Become Available, OR

INTERIM SOLUTION II: Prove Compliance Using One Of The Alternate Methods On A Case By Case Basis

SUBGROUP DISCUSSION ITEMS

Transport Directorate Update

Legal "Ex" involved in implementing alternate certification process

Probability of implementing alternate certification method into Handbook

Additional testing required

Update on Case study #3 (F/G panel/Mankiewicz paint)

Review of paint thickness measurement technique

Additional Testing/Development of Alternate Method II, Surrogate

Additional tests using one type panel produced by various manufacturers

Development of list of potential panel manufacturers

Impact of newer more fire resistant resins in surrogate production

Formulation of new task groups:

surrogate production

current panel construction

surrogate testing

CONTINUED AIRWORTHINESS FOR SEATING

BACKGROUND

The most recent TSO's for seating (e.g.TSO127) specify that information on continued airworthiness must be supplied to each end user of a seat. This group was formed to propose guidance on the content and format on the information manufacturers should supply to the end users

DATA GATHERING

The group gathered component maintenance manuals (CMM) from several sources These included the CMM for the Webber 830500, PTC 850-03, and the Sicma 5049 All manuals reviewed used identical formats (See Figure 1) Working within this format should minimize the impact on the seat manufacturers.

PROPOSED FORMAT

Information in manuals can be divided broadly into three categories Continued Airworthiness, Other Safety Data, and Utility and Appearance Data The order of the information set forth in the manuals stems from the natural flow of disassembly inspection and assembly In order to identify continued airworthiness requirements we propose a format that will not impact the order of the information presented but highlight the crucial continued airworthiness and other safety items

It is proposed that the continued airworthiness items be shaded, and use a larger bold type Other safety items can use the larger bold type Utility and cosmetic items would be written about in the standard manual type. The introductory page in the manual would be modified as seen in Figure 2. Pages from a typical manual using this format is found in Figure 3

EXAMPLES FOR EACH SECTION

The group is developing sample language for each section in the standard CMM. We should have these examples finalized by the next meeting. At this time we will have the proposed guidance available for the entire group to review

FIGURE 1

Data Format

AIRCRAFT SEATS
COMPONENT MAINTENANCE MANUAL
PART NUMBERS: ABC, DEF, GHI, JKL, MNO, AND PQR

TABLE OF CONTENTS

FIGURE 2

AIRCRAFT SEATS
COMPONENT MAINTENANCE MANUAL
PART NUMBERS: ABC, DEF, GHI, JKL, MNO, AND PQR

INTRODUCTION

1. Scope of This Component Maintenance Manual

This component maintenance manual provides instructions for off aircraft maintenance of passenger seats.

Information on Continued Airworthiness, other safety information, and utility and appearance information are displayed with different formats:

Airworthiness information is large, bold and shadowed.

Other safety related information is bold, large type.

Utility and appearance information is regular type.

A summary of the instructions contained in this manual is as follows:

A Description and Operation

This section provides a description, leading particulars and operation procedures for the passenger seats. Nomenclature used for parts in the description and on the illustrations is consistent with that used throughout this manual including the ILLUSTRATED PARTS LIST.

B. Testing and Troubleshooting

This section details testing and troubleshooting a completely assembled passenger seat.

C. Disassembly

This section details the disassembly procedure for parts that need to be removed to allow visual inspection of the passenger seats and for parts that can be removed.

Figure 3

AIRCRAFT SEATS
COMPONENT MAINTENANCE MANUAL
PART NUMBERS: ABC, DEF, GHI, JKL, MNO, AND PQR

CHECK

1. General

NOTE: Establish requirements of any service bulletins applicable to this equipment. During check, determine which service bulletins, if any, are to be incorporated.

Replace, with a serviceable part, any part that fails to meet the requirements of check. If defective part is repairable, note defect and assign part for repair.

2. Check

NOTE: Conduct checks under a bright light. Use a poer 5X to 7X magnifying glass to detect surface flaws.

A. Visually check that all parts are clean and free of cracks, corrosion, deterioration, and obvious signs of damage.

B Check security of all clamps and straps securing leads and all other parts not removed during disassembly.

C. Visually check all threaded parts for crossed or damaged threads. Reject part if thread damage exceeds 50% of one thread.

NOTE: If damage to any one thread is 50% or less, note defect and assign part for repair.

D. Check sewn seams for fraying or separation and fabric for fraying, scuffing and rips.

E. Check fire blocking layer for rips, tears or seam separation

F. Check attaching bolts, nuts, screws and pins for tightness and floor attaching studs for wear or deformation.

G. Check helicoil inserts for damage and security of installation.

H. Check structural parts including clips, brackets and machined parts for damage, cracks and sharp nicks.

NOTE. Burrs, nicks and scratches are defined as material raised above the normal surface, which if not removed would prevent complete and proper mating of parts and sealing surfaces Where nicks or scratches allow bare metal to show through a protective finish, note defect and assign part for repair. Dents or other damage must not impair finish or functional operation of any part.

I. Check paint and finishes for chipping and worn spots, and note condition of bonding on parts and assemblies.

J. Check nameplate and placards for legibility and secure attachment.

K. Check food table top shroud for nicks, cracks, stains or burns.

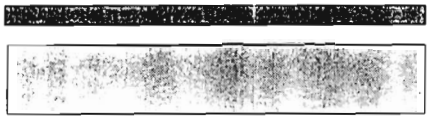
Reason for Similarity Tests

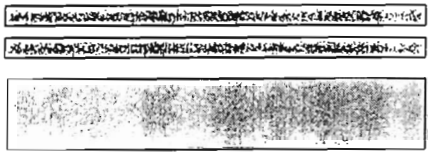
- Exchange of Suppliers
- Different Manufacturers use different Decor Suppliers
- Reduction of Partnumbers in the Store
- Certification Tests at Suppliers are similar

Test Samples

1. 
   Bare panel

2. 
   Decor A

3. 
   Decor B

4. 
   Decor A
   Decor A

5. 
   Decor B
   Decor A

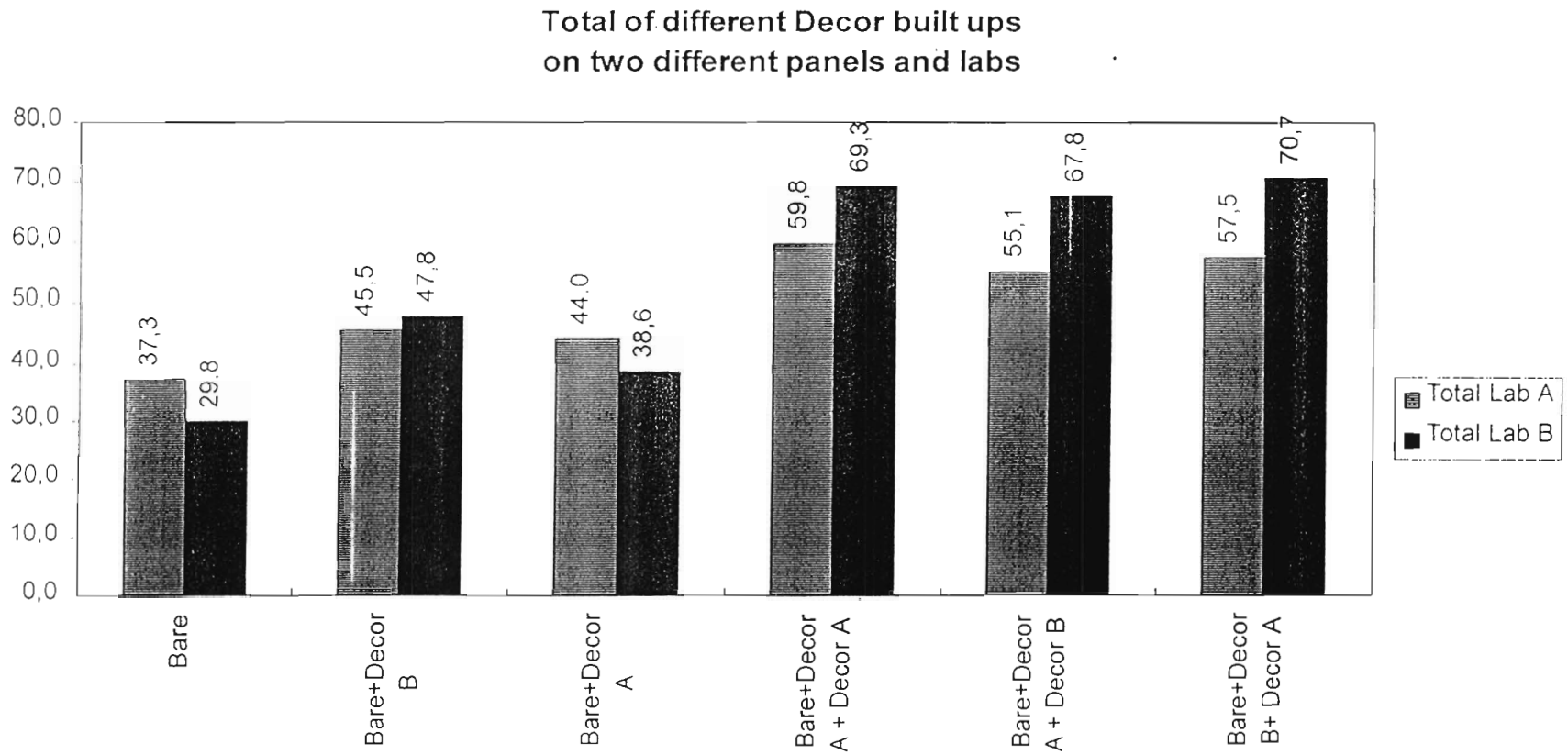
6. 
   Decor A
   Decor B

All Samples tested in 2 different Labs

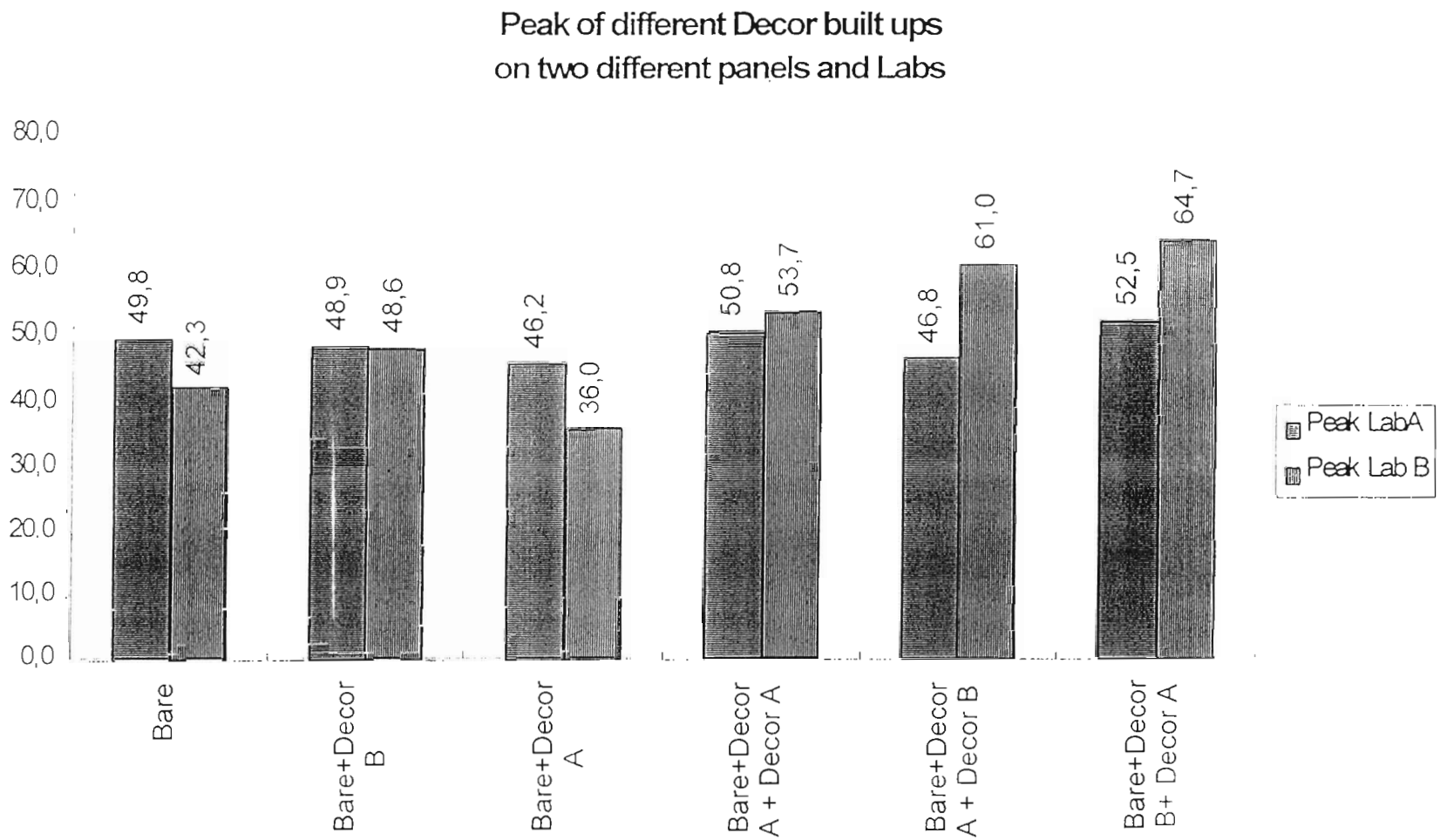
Comparison of two different decor foils

- Test Program
  - 2 Different Bare Panels
  - 2 Different Labs
  - Different Panel Built ups
    - each Decor Material installed on the Panel
    - Picky Backing or Painting with each Decor

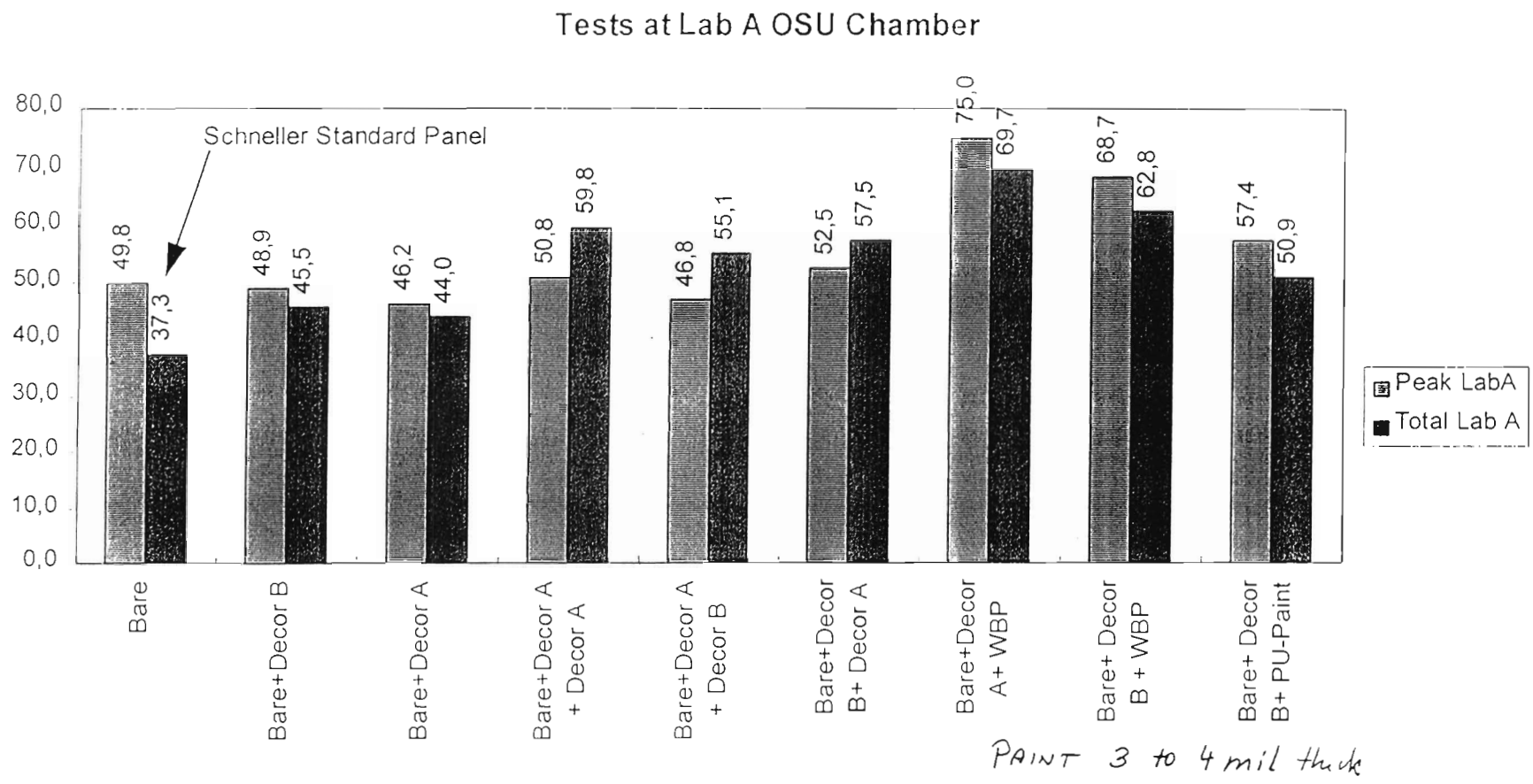
Comparison of two different decor foils



Comparison of two different decor foils

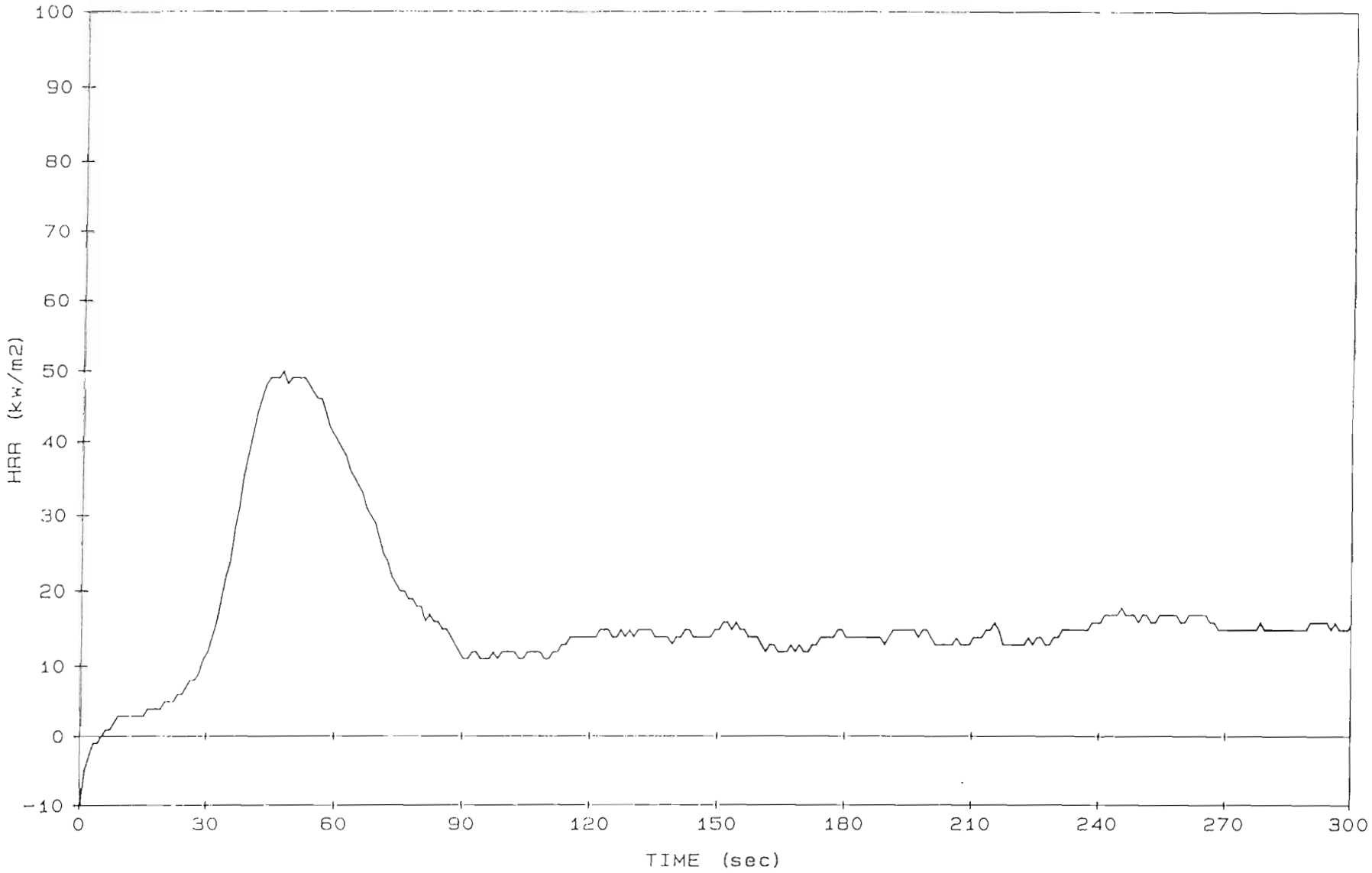


Heat Release from different Decor Built ups



Data File : HR6447.MDT Run 3 Material : LFP 3677 Test Date : 10-23-1996

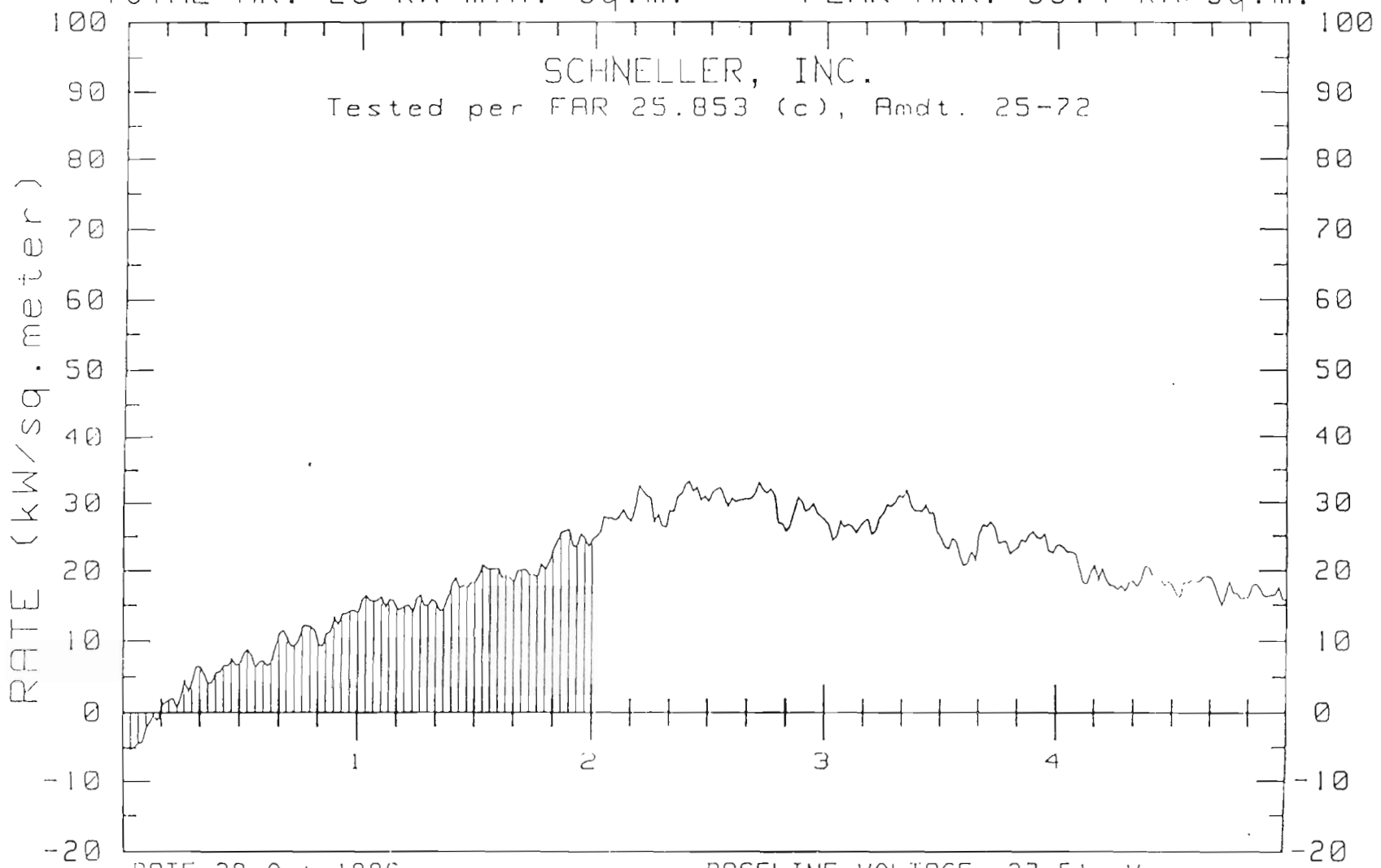
Peak HRR = 49.7087 kW/m2 Total HRR = 39.62496 KWxmin/m2



HEAT RELEASE RATE -vs- TIME

LOG # 14680 LOT # 96026 RUN # 2

TOTAL HR: 25 kW-min./sq.m. PEAK HRR: 33.4 kW/sq.m.



DATE:28 Oct 1996

TIME:15:52:46

HEAT FLUX DENSITY: 3.48 W/sq.cm.

BASELINE VOLTAGE: 27.51 mV

CALIBRATION FACTOR: .28041 kW/mV

TIME TO PEAK RATE: 145 sec.

HANDBOOK - CHAPTER 7 -EDITS

7.7.3 While the burner is rotated out of the test position, turn on the fuel and light the burner. Allow it to warm up for 2 minutes. Move the burner into the test position and adjust the air intake and oil burner components to achieve a heat flux of 10 BTU/(ft^2 second) (11.9 W/cm^2) or greater. Record the heat flux density measurements at least once per second averaged over a 30 second time period to ensure a steady state condition.

HANDBOOK - CHAPTER 7 - EDITS

7.7.5 Start the burner and allow it to warm up for 2 minutes. After warm-up, move the burner into position and record the temperature of each thermocouple at least once every second averaged over a 30 second time period. Of the seven thermocouples used, any two will be equal to or greater than 1750° F (954° C) while the remaining thermocouples will each be equal or greater than 1800° (982° C). The average of the 7 thermocouples must be equal to or greater than 1800° F. After the steady state condition has been achieved with the required temperatures mentioned above, turn off the burner.

HANDBOOK - CHAPTER 7 - EDITS

7.7 Calibration

7.7.1 Secure the calorimeter in the bracket and place it on the test frame assembly used to mount specimens. Position the burner so that the vertical plane of the burner cone exit is centered in front of the test frame assembly at a distance of 4 +/- 1/8 in (102 +/- 3 mm) from the calorimeter face. Ensure that the horizontal centerline of the calorimeter is offset 1 +/- 1/16 in (25.4 +/- 1.6 mm) above the horizontal centerline of the burner cone (see Figure 7-5).

AGENDA

INTERNATIONAL AIRCRAFT MATERIALS FIRE TEST WORKING GROUP MEETING

Hosted by Schneller, Inc.
at
Caribe Royale Resort Suites, Orlando, Florida

February 25-26, 1997

TUESDAY, FEBRUARY 25, 1997

9:00-9:15	Opening/Introduction
9:15-10:30	Presentations and Updates by Task Group Leaders
	Continued Airworthiness (J. Davis)
	Minor Changes to Qualified Materials (R. Hill)
	'OSU Test for Different Decor Foils-Similarity' - H. Betz
	Certification Issues of Renovated Material Systems (T. Marker)
	Similarity of Fabrics (S. Hasselbrack)
	Handbook on Materials (S. Hasselbrack)
	OSU Quality Assurance (M. O'Bryant)
	New Design Seats (P. Cahill)
	Thermal Acoustic Insulation (P. Cahill)
10:30-10:45	Break
10:45-11:30	Presentations and Updates by Task Group Leaders (Continued)
11:30-12:00	Heat Flux Transducer - Specification Discussion
12:00-1:30	Lunch
1:30-2:00	Oil Burner For Seats - Calibration Operation - Follow up to 10/31/96 Meeting (P. Cahill)
2:00-4:30	Separate Task Group Meetings
	Certification Issues of Renovated Material Systems (T. Marker)
	Thermal/Acoustic Insulation (P. Cahill)
	OSU Quality Assurance (M. O'Bryant)
	Continued Airworthiness (J. Davis)
	Similarity of Fabrics/Handbook Guidance Document on Fabrics (S. Hasselbrack)
	New Design Seats (P. Cahill)

(Ulrich Gierrbach of Hoechst Celanese Corp. will give a 30 minute presentation for anyone interested on "Trevira" immediately following the meeting today).

WEDNESDAY, FEBRUARY 26, 1997

9:00-9:30	Task Group Discussion/Reports/Assignments
9:30-9:45	Formation of New Task Groups
9:45-10:45	Discussion on Current Test Method Problems/Development of New Test Methods
10:45-11:00	Break
11:00-12:00	Fire Test Handbook Discussion
12:00-1:00	Presentations by Working Group Members
	Larry Eskind - "Pyroflex Intumescent Coating"
	Ulrich Gierrbach - Hoechst Celanese Corp. - "Trevira - A Flame Resistant Fiber for Aircraft Interiors"
1:00	Final Discussion/Next Meeting/Closing
1:15	Pat Cahill will hold a Blanket Meeting for anyone interested immediately following the conclusion of the meeting