INTERNATIONAL AIRCRAFT MATERIALS FIRE TEST WORKING GROUP MINUTES

Hosted by Magnesium Elektron, Naples, Florida

MARCH 4-5, 2009

WEDNESDAY, MARCH 4, 2009

Burnthrough Update – Rob Ochs

What is NexGen Burner? – the next generation (NexGen) burner was designed by the FAA Technical Center to be used as an equivalent burner to the Park DPL 3400 which is no longer in production. This uses compressed air and fuel to supply the burner, whereas the Park DPL 3400 uses an electric motor to spin a blower fan and mechanical pump. Major advantages: construct inhouse with easily obtainable materials, more precise metering. The drawings are available at http://www.fire.tc.faa.gov. Igniters can be obtained Westwood Products www.westwoodproducts.com. Heat exchanger is a McMaster Carr part number 43865K78. The FAA cannot accept payment for a NexGen burner. That is why the drawings were made available on the FAATC Fire Safety website. Data from the May 2008 mini-Euro round robin and January 2009 mini-USA round robin was presented. Question: are you aware of any companies that have made the NexGen burner? I am aware of companies that are planning to build the NexGen burner. Other uses for NexGen burner: seats, cargo liners, powerplant hose assembly and fire penetration tests. The parts for the Park oil burner are still available, however, the shell is no longer available. The NexGen is an equivalent replacement for the Park oil burner for these tests as well as the seat tests. FAATC will be running seat tests comparisons with Park burner and NexGen burner in the near future.

Labs that currently have NexGen burners set-up:
Boeing Commercial Airplanes, Seattle, WA
The Mexmil Company, Santa Ana, CA
Airbus, Bremen, Germany
Jehier-Hutchinson, Chemile, France
CEAT, Toulouse, France

Analysis and Design

Methodology: Utilize flow measurement techniques to study the operation of the burner and assess each component and parameter. Technique selected: hot wire anemometry.

Particle Image Velocimetry (PIV) for Fire Safety: burners are driven by fluid thermal processes, test results are completely dependent upon these processes, insight into the fundamental burner parameters will lead to optimization of the parameters. Explanation of how 3D PIV works. Explanation of Interferometric Particle Imaging (IPI) – FAATC has not gotten into IPI yet but has the capability to do this.

Recently acquired PIV data: images of PIV exit air flow from draft tube (turbulator removed). Analysis: the effect of the stator is apparent in the measured flow field. Stator vanes appear to accelerate the flow.

Exit air flow from Turbulator: mean image (False Color), vector plot (range 0-1.5 m/s), vorticity plot, vorticity and streamlines.

Comparison of each: vector fields, vorticity and streamlines.

Analysis: The effect of the turbulator is apparent in the flow field, the center of the flow field retains the counterclockwise swirl imparted by the stator, each turbulator vane is seen to create a pair of counter-rotating vortices at the edges of the stator-induced swirling flow, the magnitude of the velocity on the periphery of the flow field is significantly reduced by the action of the turbulator, these counter-rotating vortices are intended to enhance mixing of the air and fuel spray.

Exit Flow from Burner Cone: measurement plane was 3" from and parallel to burner cone exit plane. Images: vector field (airflow), vector field (air and fuel spray), vector field (cone flipped 180 degrees), vector field (cone removed). Analysis: the flow field exiting the cone was similar for the case of air only and air and fuel spray, the counterclockwise swirling motion is still evident after the flow traveled through the length of the cone, although the swirl seems to "break up".

Spray Nozzle Visualization: water is substituted for fuel 3 different nozzles were compared (old and new nozzles were used).

Preliminary Flame Measurements: initial measurements were made on the burner flame approximately 3 inches from burner cone plane, narrow band filters were necessary to block all wavelengths except for 532 nm laser light, flame is extremely luminous, soot emission at 532 is much stronger than seed particle emission, an external electro-optic shutter is necessary to avoid over-lightening of the second flame.

Will you use this tool for varying air and fuel temperature? Yes, in the future I will have a set-up that allows me to do that. I do not have that set-up at this point.

<u>RTCA Update</u> – Pat Cahill

Background: new advisory circular (AC21-16F) identifies RTCA document number (RTCA/DO-160F) as an acceptable means of environmental qualifications for showing compliance with airworthiness requirements. The AC excludes Section 26, "Fire and Flammability" as it is not as stringent as FAA accepted methods. The AC will be issued this summer.

Goals of RTCA Task Group: draft a new Section 26, Fire and Flammability that will be accepted by the FAA, evaluate currently used accepted methods (such as FAR 25.853, ATIS Standard, etc.) when testing products that use RTCA/DO-160 as a guideline, specifically, enclosures housing small electrical components, discuss the benefit in testing the "box" as installed in the aircraft. Pat showed example photos of the types of enclosure units involved (RTCA covers cockpit displays, landing gear, electronics). RTCA worked with MIL 810 committee in the past. The standard is broken into two halves. It has no guideline as far as power consumption. Alan Thompson: the objective is to incorporate what is already accepted into Section 26. Dick Hill: This is meant to stay within the constraints of the existing rules.

<u>Update on Flammability Testing of Magnesium Alloy Components</u> – Tim Marker

Magnesium Alloy Use in Commercial Aircraft: industry question: why can't we use Magnesium-alloy in the construction of an aircraft seat frame? This is what initiated the current Magnesium-alloy research/test program at the FAATC. How should a full scale seat test be conducted?

Proposed Mag-Alloy Testing at FAATC:

Conduct 4 full scale tests, postcrash fire scenario:

Baseline, poor performing mag alloy in primary structural components, and good performing mag alloy in primary structural components. Schematic of FAATC full scale test apparatus and test configuration. Video of first baseline test conducted in October 2008. Seat backs were consumed by the fire during the baseline test. There was minimal melting of primary seat structure.

Baseline 2 test configuration: Accufleet donated former Continental Airlines seats for Baseline 2 testing. Video of baseline 2 test conducted on December 18, 2008.

A number of comparisons were done of the Baseline 1 and Baseline 2 tests – graphs of these comparisons were presented and explained. Dan Slaton asked for Tim to include notes from the explanation he is providing with the comparison graphs on the graphs. Tim said he would include them in the report. Graph of seat frame temperatures. Photos of baseline 2 test results.

Baseline 1: Air Canada seats/cushions, airflow drawing external fire into cabin, 3 minutes.
Baseline 2: Continental Airlines seats/cushions, no airflow drawing external fire into cabin, 5 minutes.

Future Considerations

Next Steps: continue with assembly of seats using mag-alloy components, finalize additional test parameters (test duration, use of water), prepare for using WE43 mag-alloy components, if good-performing mag-alloy results in elevated hazard level – do we consider terminating?, if no elevated hazard level, we proceed with next test in series.

<u>Lab-Scale Testing of Seat Cushions Used in Full-Scale Test</u> – Tim Marker

Testing of Seat Cushions Used in Full-scale Mag-Alloy Study: heightened interest in determining performance of seat cushion materials used in two full-scale baseline tests. Photos of cushions involved and photo of lab-scale configuration.

Vertical Bunsen Burner Testing of Seatback Material (Pat Cahill tested the seat back materials on the Vertical Bunsen Burner test.

Contribution from Non-cushion seat back?

Next Steps: conduct oil burner test on OEM Continental samples, compare results to Air Canada results, determine if either material suitable for full-scale evaluation. If neither material is deemed suitable, it will be necessary to acquire more 990 seat frames and re-run baseline test again with alternate cushion material, consider “lab-made” FB seat back cushions for full-scale evaluation.

<u>Development of a Lab-Scale Flame Propagation Test for Composite Fuselages</u> – Rob Ochs

Reason: increased use of non-traditional materials for modern aerospace applications.

Evaluation of Flame Propagation Risk

Development of a Lab-scale test: use the results from previous intermediate scale test as a baseline for a test.

Sketch of configuration 1, 2, 3, 4, 5, and 6

Summary of Initial Testing

Recent Work – Heat Transfer Measurements: Photo of sample used in these radiant panel tests (2 samples thicknesses).

Analysis of Results: heat transfer observations – heat is going through surface

Status: gather samples of different composite materials for intermediate and lab scale tests – FAATC has only been working with one material, so suggestions for additional composite materials for these tests are needed from industry.

Composite Fuselage Firefighting Issues – Doug DIerdorf, Ph.D (Applied Research Associates, Inc.)

B-2 Mishap – Guam: 2 stage fire, jet fuel fire (1st stage), burning composite fire (2nd stage). Observation: tendency to form deep-seated fires (burning coal or pile of tires) with burning well into the composite (slow charring, and re-ignition features). Some unusual phenomenon have been observed. The composite fuselage cannot be entered with any of the existing equipment available for fire fighting.

Objective: determine the best method and agents to quickly and efficiently extinguish a variety of aircraft composites.

Approach: evaluate existing agents and applications techniques to identify the most effective method to extinguish fires involving large amounts of composites, use standardized composite samples of carbon/epoxy carbon BMI composites, use standard sized fire, orient the composites in both horizontal and vertical configurations, evaluating the effects of wicking fuel into delaminated composite layers. These are composite systems.

Define a Test Fire:

Reproducible, cost effective, realistic
"Robust Fire" – difficult to suppress, susceptible to re-ignition, test of agents and application technologies, this is not a test of material.

Pre-Burn: defined by response time (how soon will first fire truck be on scene and fighting fires) – regulations state three to five minutes.
Composite Burn: before fire fighters arrive, survivable crashes, rescue crews must be able to enter safely.
Composite Extinguished: assess damage to composite, residual strength.
Initial Sample Concept: custom fabricated sample, simulate aircraft component, cost estimate $6,000 to $7,000 each for 100 units.

Low Cost Components:

Sheets, rods, tubes, and gussets, fabricate structures, control loading, control shape, effect of adhesive? Four-point bend loading and built-up stringer

Preliminary Concept Drawing: component based design – 2'x3'x1/8" carbon/epoxy sheet – pressure bars for four point bending load.

Doug is looking for comments, suggestions, input from Materials Working Group members and starting a Task Group to work on development of methods to evaluate these issues. There is also a research program on the FAA Airports side concerning new, large aircraft including the A380 and new 747 aircraft with composite components/parts/materials. Dan Slaton suggested that Doug speak to Larry Ilcewicz of the FAA (Structural Composites) larry.ilcewicz@faa.gov.

Restraint of Leather Seat Cushions During Testing – Pat Cahill

Recap of the presentation Tim Marker gave at the October 2008 Materials Working Group meeting in Atlantic City, New Jersey.

Pat presented a photograph of cushions tested by the CAAC in China. CAAC used 3 wires around the vertical cushion and 3 wires around the horizontal cushion over 15% weight loss. The next test 4 wires were used on each cushion and it passed.

Chapter 7 Supplement (7.3.5) discusses the use of one wire in securing the vertical seat cushion to the specimen frame. The survey of labs above shows that multiple wires are being used not only on the vertical cushion, but the horizontal cushion as well. Full-scale testing of both restrained and unrestrained leathers seats is being considered at the FAATC.

Aircraft Seat Task Group:

Discussion of K-Type Thermocouples
Any problems?

<u>Oil Burner Seat Test – Restraining Leather Seats</u> – Karl Fimmel (Vauth & Sohn, Germany)

How can you test leather if it always wants to run away?

On an aircraft seat – cushions are usually attached to seat frame with hook and loop (photo of actual leather aircraft seat). The hook and loop attachments worked.

Wiring:

Tests were conducted using a number of thin wires spaced evenly.

This is just the beginning of Karl's test program.

<u>Discussion of Full-Scale Seat Test Using Leather Cushions</u> – Tim Marker

Tim reviewed the language currently in Chapter 7 of the *Aircraft Materials Fire Test Handbook*.

Questions that still need to be addressed regarding use of wire:

Does the use of wire in the lab for restraining cushions create a more severe condition than an actual cabin fire? Creating an "artificial restraint".

Does the use of wire in the lab for restraining cushions create a less severe condition that an actual cabin fire?

Does it vary for various types of leather?

What is the most appropriate method for conducting the lab-scale test? Could we conduct a full-scale test to determine this?

Proposed Full-Scale Testing of Leather Seats – conduct 3 full-scale tests, postcrash fire scenario:

Baseline using (OEM or mock-up) seats with FB leather seat cushions
Repeat baseline test, seat cushions restrained with wire configuration 1
Repeat baseline test, seat cushions restrained with wire configuration 2

Next Steps:

Finalize full-scale test parameters, such as:

OEM or mock-up seats?
Full interior panels or not?
How many different types of restraining methods?
What is the basis for evaluation?

Future Considerations:

All full-scale test results would help define an appropriate method or methods of restraining the leather-wrapped samples, which is the primary goal of the research. Although post crash full-scale test results will help in determining the most appropriate restraining methodology, other scenarios and testing may be used. If a more appropriate restraining method is developed, it would be incorporated into the *Aircraft Materials Fire Test Handbook*.

Jim Davis noted that the PIV research is confirming that there are inconsistencies with the oil burner flames. It is possible that the results we see with some of the leather seat cushion tests may be due to non-uniform flame from the oil burner and non-uniform seat frame configuration.

Are there enough variations in how the leather seats are restrained at labs to warrant this research? There seems to be enough of variation out there from lab to lab to warrant standardizing how the leather seats are restrained.

Ethel Dawson of Accufleet is the contact for this Task Group. Her email is ethel.dawson@accufleet.com. Tim suggested running a number of configurations to see what the outcomes are. This Task Group met on March 4, 2009, after the main part of the meeting was over for the day.

<u>Development of a New Flammability Test for Aircraft Ducting</u> – John Reinhardt

Project Update – Round Robin Exercise: calibrated calorimeters of five participating labs, started to receive ducting material samples for testing, and did not meet the 6-month time period to conduct Round Robin exercise. Hopefully, by the June 2009 meeting, there will be round robin data to present.

Development of an Improved Fire Test Method for Aircraft Wiring – John Reinhardt

Objectives: develop a fire test method for aircraft electrical wiring that could adequately discriminate between poorly performing wire insulation materials and fire worthy ones when exposed to a realistic fire scenario.

Scope: this project will focus on the flammability characteristics of aircraft wiring insulation only, it will consider the Radiant Heat Panel for this test.

Select/Modify Selected Test Method:

Description of Selected Test Method: combination of 60-degree test and radiant heat panel test – now a 30-degree test to work in radiant heat panel apparatus.

Peter Busch: is it possible to change the angle of the heater? Pat Cahill: it depends on how easy it is to change your radiant panel. Pat suggested investigating this further, and Steve Winn indicated he could make a bracket.

Address Task Group Member Questions:

Run 30-degree radiant panel test without the radiant heat, but with only the intense pilot flame: samples to include the BMS-13-60, MS81044/6, and Mil-17/28-RG58 wires and cable. Response: tests conducted, but results did not correlate to ISF test data. All of the samples passed (computer cable, CAT5e cable, Neoprene, M17/28-RG-58, MS5086/1, Silicone 200). This indicated that the radiant heat was needed.

Film the wire with a FLIR camera to see if there is an effect due to weight. Response: John showed the video taken with FLIR camera.

Test a bundle of wire wrapped with heat shrink. Response: I received the cable samples last week and started testing (M230 53/5-307-0 and NTFR-1/4-0-SP).

Send wire/cable samples to a few members for round robin to re-do some of the 60-degree flammability tests, especially the ones that passed the test, but failed the ISF test. Response: Not ran. Some of these poorly performing samples, see Request #1, passed when impinged with the radiant heat panel pilot without the radiant heat.

Members would like to see the length of the wire sample reduced from 30 inches to something less. Response: This request is plausible since during the short wire test no change in flammability performance was observed on the tested wires.

Members would like to clamp ends of wires/cable instead of using weight. Response: Difficult to clamp, weight works without breaking for this short test.

Continue using the average burn length and average after flame extinguishing time as in original test. Response: results data shows that the average burn length and average flame extinguishing time can be used because aviation wires tend to have very small standard deviations. The burn length and flame extinguishing time standard deviations for the group were 0.16 cm and 2.2 seconds, respectively.

Members requested the testing of the same 3 wires on a horizontal position and perpendicular to the pilot flame. Response: A few tests, using the marginal cable samples, were conducted by installing the wire horizontally; unfortunately, not all of the cables behaved as they needed to correlate with the ISF test (see photos, data, movie).

Re-invite members to join online group forum. Response: Participating task group members were re-invited in October 2008.

30-Degree Radiant Heat Panel Test for Electric Wire:

To be recommended as replacement test to Chapter 4 in the *Aircraft Materials Fire Test Handbook* and 14 CFR Part 25 Appendix F, Part 1 (1v) and (3).

A round robin will be conducted to verify procedures.

<u>Developing Fire Safety Assessments: Future Considerations</u> – Dan Slaton (Boeing)

Keys to full-scale to lab-scale test correlation:

    Establish equivalent fire scenarios

Full-scale configuration representative of actual compartment and its combustion environment: heat flux and fire temperatures, airflow/ventilation, volumetric/mass ratios

Understand fundamental material properties and their response to dynamic fire conditions.

Toxicity testing of insulation (DOT/FAA/AR-TN07/15): a straightforward correlation has not resulted when comparing toxicity results from the “box” and full-scale test configurations. Steel “box” test method is complex and difficult/costly to run.

Future Proposal for Research:

Consider alternate lab-scale test methods to gain knowledge of material properties for composite materials.

Refer to Dan’s presentation for reference to Fire Science Journal, Feb. 27, report.

Railway Smoke and Toxicity Test Method Overview:

EU has been working since the 1990's to standardize railway fire requirements. Test apparatus is similar in size to NBS chamber with horizontal specimen orientation.

Evaluate a variety of configurations at various fire conditions.

Task Group Meetings: Magnesium Alloy Flammability/Full-Scale Testing, RTCA, In-Flight Composite Flammability Test, Ducting and Wiring, Fire Fighting Composites, Leather Seat.

THURSDAY, MARCH 5, 2009

Task Group Reports:

Mag-Alloy Task Group – T. Marker

A third baseline test with a different/better performing seat back cushion will be conducted. These cushions will be made at the FAATC lab. Length of test will be decided as test progresses. Visual feedback of flaming of seat in doorway will be done by placing a camera on the opposite side of the fuselage. Additional thermocouples will be used on all seats.

RTCA Task Group – P. Cahill

First meeting of RTCA Task Group held Wednesday. Airbus has done some related work and will send some tech notes from some of this work. We need to define what needs to be tested. Alan Thompson will break down two boxes and drawings will be produced and distributed to all Task Group members. We will attempt to define the small electronic components after we define the product. Our focus is looking at 25.853 initially. We have one year to get this into a document for internal review.

Ducting Task Group – J. Reinhardt

1. The FAA should be receiving more ducting samples by the end of next week. Once the FAA receives all of the ducting samples, it will package them and ship to the labs that will be participating in the Round-Robin exercises (RRE).
2. The task group members agreed to complete the RRE by the last week of April. The results will then be submitted to the FAA for further analysis.
3. Before starting this RRE, a questionnaire will be created to help the labs document the tests and results. An initial list of activities to record will be posted, but if you have any additional activity that you would like to include, go ahead and post it. We will add them to the questionnaire.
4. The RRE test procedure will be posted so that all of the labs are on the same page.
5. The labs participating in the RRE shall use the FAA calibrated calorimeters.

Wiring Task Group – J. Reinhardt

John will send special condition document will be sent to members who requested it. Three members will send John samples of protective sleeve to test. John will try the test set-up as Peter Busch suggested and report to Task Group on outcome.

Composite Flammability Test Task Group – R. Ochs/D. Dierdorf

Cytec will build some composite samples with thermocouples embedded for this test program. The test program will be initiated once the samples are received.

Restraint of Leather Seats Task Group – J. Davis

Burn tests will be conducted with three different configurations: one minimally restrained, one extensively restrained with minimal impact to cushions, and one with very restrictive restraints. Dana Eberly and Susanne Busch will provide materials. Gary Palmer will provide foam set. A group has been set up on Yahoo Groups to exchange information, coordinate program, and post results.

OSU and NBS Updates – Dick Hill (for Mike Burns)

NBS: Photometric round robin, experimental furnace, NIST release sale of standard material for NBS

NBS Photometric System Round Robin: FAA is currently conducting a round robin check of NBS Photometric System using neutral density light filters. These filters provide a linearity check of five data points. No furnace heat or pilot burner required. 17 labs have participated to date – data should be analyzed by June 2009 Materials WG meeting. Filters are currently available for international lab testing. Contact Mike if your lab is interested in participating.

NBS Furnace:

Furnace upgrade: longer service life of heating element
Experimental furnace endurance testing progress: Incoloy vs. Inconel, approximately 1094 hours of operation, 59 cycles, 42 samples

NIST NBS Reference Material: NIST released sale of NBS Standard Reference Material (P/N 1006/1007 (B)). Material was withheld by NIST to study potential problems with material. None were found.

Heat Flux Gauge Calibration Study: during a recent visit to Vatell it was noted that the FAA had collected calibration data while heating a graphite plate. Mike did a study using the FAATC system and noticed that the slope was higher when calibrating while ramping heat up. Slope values were typically 0.7% higher on average when calibrating upward. Test repeatability does not seem to be a factor.

Visit to Medtherm Corporation: discussions included: calibration method – calibrates “standard” gauge using 3 different methods to validate calibration accuracy, neither of the 3 methods are the same as the NIST heat flux calibration method.

New FAATC Equipment: FAATC has recently purchased a new OSU and a new NBS chamber. The NBS chamber is currently installed and operational. Original equipment will remain available for special testing and occasional training.

Maintenance Tips and Reminders: OSU: Clean upper thermocouple beads after each set of 3 test samples as a minimum. NBS: ensure furnace rim is 1 1/2” away from sample face (left, right, top and bottom), monitor supply voltage for any fluctuations observed throughout the day while in use.

Next Steps:

International labs who would like to participate in NBS photometric system round robin please contact Mike Burns at the FAATC. Continue to work heat flux gauge calibration discrepancy issue. FAATC remains in the process of updating Chapter 6 (NBS) of the *Aircraft Materials Fire Test Handbook*. Dan Slaton asked if there are any plans to review Chapter 5 of the Handbook. Dick indicated that Chapter 5 would be reviewed after the Chapter 6 review is complete.

Discussion:

Heat Flux Gauge Calibration Methods used for calibrating the reference or “standard” gauge.

Dick described calibration discrepancies that Mike has been investigating as a result of a telephone call from Hank Lutz at Boeing. Vatell claims their transducer is traceable to NIST by a temperature standard. Medtherm calibrates their transducer differently but to within a half a percent of what the NIST numbers are. Vatell - the primary standard they use is about 17-18% different than what the FAA would consider acceptable. Any lab that has a Vatell transducer that has not been recalibrated by the FAA may have a transducer that is 17-18% off and may be passing materials that should fail.

FAA would like to initiate an industry Task Group to work on this issue. Dick stated that this issue should be resolved before further OSU and NBS round robins can be conducted.

Industry input/comments: Jim Davis: Will the FAATC make resources available to help industry recalibrate their gauges until the issue is resolved so that the labs can get back to their test schedules? Dick: We may be able to handle a limited number in the interim as we’ve done in the past prior to a round robin. We really need to find a resolution to this as soon as possible. Jim Davis: Is the FAA going to broaden up where labs can obtain the gauges? Dick: We may have to since Vatell is not going to change their procedure. Peter Busch: We can use one that has been calibrated by the FAA as the master to calibrate other gauges in our labs. Dan Slaton: It seems like something needs to be documented formally by the FAA to make this issue an “official issue”. Jeff Gardlin: We are looking at the amount of variation there and how bad could it be, and we have decided to take a methodical approach to it. I don’t think the first step is formalizing it and creating widespread panic. I think we need to do something collectively with industry first before we issue a letter. Dick: I believe this issue will affect tests in the NBS and OSU most significantly. There are a limited number of labs with radiant panels. Most labs that use radiant panels have participated in round robins and have had their transducers calibrated at the FAATC prior to the start of the round robin. Scott Campbell: There doesn’t seem to be an answer out there, since only the FAATC and Boeing are calibrating to NIST specs. We have ordered a transducer from a company in the Netherlands that has just started selling transducers. We (FAATC) are going to check it when it arrives. Maybe there is an industry lab that would consider adding heat flux transducer calibrations to their business services.

Scott Campbell suggested providing the Vatell contact information so all labs with Vatell transducers will send letters to Vatell insisting that their transducers be traceable to the NIST standard. Dan Slaton: I think FAA needs to provide some official guidance. A safety assessment should be done. FAATC needs materials in order to test to determine what materials are sensitive to this discrepancy.

Vatell Corporation
240 Jannelle Road
Christiansburg, VA 24073
Phone: 540-961-3576/Fax: 540-953-3010
Email: mkt@vatell.com
URL: http://www.vatell.com

Dick invited Working Group members to meet with him and Jeff at 1:15PM to discuss this issue further and discuss a way to proceed.

Heat Flux Transducer Task Group Minutes (this group had its first meeting March 5, 2009):

Outcomes of Task Group meeting:

1. Any lab wishing to do so may send one (1) transducer to Mike Burns at the FAATC for calibration.

2. Airframe manufacturers are going to select some materials to look at sensitivity to varying heat fluxes.
3. Two labs are looking into setting up an industry calibration lab.

Task Group members:

Susanne Busch	Lantal Textiles
Heinz-Peter Busch	Airbus
Scott Campbell	CD Zodiac
Antonio Chiesa	Bombardier
Anninos Chouliotis	Bombardier
Jim Davis	Accufleet
Raimund Fritzl	Isovolta AG
Jeff Gardlin	FAA
Bradlee Gustavesen	Chase-Facile
Dick Hill	FAATC
Jym Kauffman	KYDEX LLC
Francisco Landroni	EMBRAER
Claude Lewis	Transport Canada
Bernd Menken	Airbus
Thomas Ohnimus	EASA
Gary Palmer	Skandia Inc.
Randy Rundhaug	Boyd Corporation
Christopher Schofield	Transport Canada
Martin Spencer	Marlin Engineering, Inc.
Tatjana Stecenko	MTI Polyfab
Stephen Winn	The Govmark Organization, Inc.

<u>Cabin Component Design Features – Fire Properties of Corefiller, Adhesive, "Ditch and Pot"</u> – Ingo Weichert

FAR/CS 25.853 (a) Appendix F Part 1 Paragraph (a)(1)(i)

The core filler mechanically protects component edges. The adhesives support the shaping of edges (predetermined by molding tool). Core splicing adhesive. Metallic insert –serves as attachment point. Ditch and pot or cut and fold technology – milling or cutting a ditch inside to create an angled component. How should these configurations/items be tested? There are some discrepancies. FAA interpretation is different from the interpretation of some in industry. The *Aircraft Materials Fire Test Handbook* Section 1.4.1 was also consulted. Will test coupons of 13 mm/0.5 inches thickness qualify thinner or thicker panels? Do minor changes to qualified décor materials require new testing? There may be further questions. ICCAIA*/Airworthiness Committee/Cabin Safety WG: industry suggests the creation of a Task Group to develop guidance. *International Coordination Council of Aviation Industries Associations. Dan Slaton: We have had similar detailed discussions within Boeing on these types of issues. Martin Spencer: I believe that the original letter from the FAA was for the cut and fold structural adhesives. It is confusing. Ingo: As long as it is confusing, we need some guidelines/guidance. Peter Busch: Why is it now important to look into this? Jeff Gardlin: Small parts that will not contribute to a fire do not require a flammability test, but materials such as epoxy used in some of these applications cannot be considered small parts that will not contribute to a fire, so a flammability test is required. Tim indicated that a Task Group should be formed to discuss this further.

<u>Harmonizing the Application of Flammability Requirements</u> – Scott Campbell

What to test, which test and how to test it…

Pre 2008 – fairly common world – interpretation of CFR 25.853. Late 2008 major production disruptions due to new interpretative views. 2009- identify differences, generate interest, and restore order – come closer together on how we interpret these things. Examples: ditch and pot, panel edgefill, seat special conditions, insert potting compounds, tab and slot joints, numerous others (core edgefill, etc.). Level setting activities: networking and industry web-based survey, difference analysis, recommend guidelines/training, develop universal process for establishing similarity. Consideration: are new interpretations based on original intent? Are new interpretations based on strict law? Any interest in forming such a Task Group? There is some interest.

Formulation of New Task Groups: Heat Flux Transducer Task Groups, Restraint of Leather Cushions, Mag-Alloy, Wiring, Inflight Flammability Composites, Fire Fighting issues of Composites, Flammability Requirement Harmonization Task Group. Dan Slaton: what FAA personnel need to be involved in this last Task Group? Tim: I see it more as one for regulatory involvement.

The Minutes of the Harmonizing the Application of Flammability Requirements Task Group can be found on the last two pages of these minutes.

New ideas/suggestions: Peter Busch: Task Group meeting time is too short/limited. He suggests holding Task Group meetings one day prior to main meeting and possibly a half day on a day of the main meeting.

Next Meeting:

June 17-18, 2009
Cologne, Germany
Hosted by EASA
April will send meeting location and hotel information in the near future.

2010 Meetings:

We are currently seeking hosts for the 2010 international and U.S. meetings. Please contact April Horner if your organization(s) are interested in hosting one of these meetings (april.ctr.horner@faa.gov).

Harmonizing the Application of Flammability Requirements
Task Group Meeting Minutes
5 MAR 2009

Group presentations by Ingo Weichert and Scott Campbell initiated the task group formation. The Task Group met immediately following the Working Group Meeting- a definite fire under our chairs to begin work. A few members were not able to attend due to the sudden formation of the group, but either we or they expressed a desire to participate.

Ironically, In the few minutes we met, it was clear that there are several other differences between regional agency offices' interpretations of the rules or what was allowed by similarity.

The Task Group briefly outlined the following goals:

1. Establish an industry-wide accepted interpretation of the application of flammability requirements, document the proposed guidance and submit to regulatory agencies for acceptance.
2. Generate a guidance/ training tool based on the industry-wide accepted interpretation.
3. Propose implementation guidelines for future potential "non-conformances" not previously addressed.
4. Propose implementation guidelines for those who don't meet proposed industry standards.
5. Establish an approved process to develop similarity claims (Means of Compliance (MOC)).

The following list of activities are required to achieve our goals:

a. Baseline current industry practice and establish the common interpretation of the regulations. Create anonymous web-based survey for a representative of each participating company to complete. May want two sets of survey questions based on time frames March 08 and March 09 for comparison.
b. Prioritize industry practice and provide justifications based on the level of cabin safety being provided. (Align with information supported by incident, technical data, and engineering judgement/perspective. Justifications should include technical discussion about Fire Safety being defined by the "system." The "system" involves a broad range of requirements, including the flammability properties of materials, cabin configuration layouts, and cabin system fire safety aspects (evacuation and fire fighting aspects, etc...). Align with the specific fire scenario being addressed; in-flight fire or post crash fire.)
c. Coordinate these interpretations with the regulatory agencies for acceptance to establish agreement on the adequacy of the industry compliance approaches used over the last 2 - 3 decades.
d. If needed, identify areas/features that need additional research into the impact on cabin safety (material properties that have technical merit and evaluate configurations and risk level, foam block testing, intermediate scale, ...)

Thanks for everyone's input so far-

Scott

Harmonizing the Application of Flammability Requirements
Task Group
3/5/09

Name	Organization	Phone	E-Mail Address
Weichert, Ingo	Airbus	49-40-743-75 624	ingo.weichert@airbus.com
Carlo, Al	Boeing	425-293-3256	al.r.carlo.@boeing.com
Slaton, Dan	Boeing	206-544-1912	daniel.b.slaton@boeing.com
Chiesa, Antonio	Bombardier	514-855-5001	antonio.chiesa@aero.bombardier.com
Chouliotis, Anninos	Bombardier	514-855-5001 x88853	anninos.chouliotis@aero.bombardier.com
Campbell, Scott	C&D Zodiac	714-934-0002	scott.campbell@zodiacaerospace.com
Ohnimus, Thomas	EASA	0221899904098	thomas.ohnimus@easa.europa.eu
Landroni, Francisco	Embraer	55 12 3927 4155	landroni@embraer.com.br
Zambon, Gicela	Embraer	55 12 3927 4155	gicela.zambon@embraer.com.br
Gardlin, Jeff	FAA TAD	425-227-2136	jeff.gardlin@faa.gov
Spencer, Martin	Marlin Engineering	360-671-0155	mspencer@marlinengineer.com
Miler, Michael	Schneller	330-676-7131	mmiler@schneller.com
Wright, Tim	Senior Aerospace BWT	01625870700	twright@bwt.co.uk
Carter, Di	Senior Aerospace BWT	01625870720	dcarter@bwt.co.uk