INTERNATIONAL AIRCRAFT MATERIALS FIRE TEST WORKING GROUP MEETING

Hosted By Magnesium Elektron, Manchester, United Kingdom

June 19-20, 2013

Meeting Agenda:

WEDNESDAY, JUNE 19, 2013

8:30-8:45 AM	Welcome and Introductions
8:45-9:05 AM	Cargo Liner: Test Results // Round Robin – T. Marker
9:05-10:00 AM	Cargo AC: Components of AC Presentations – R. Hill/W. Eidsmore
10:00-10:30 AM	Magnesium Alloy Test – T. Marker
10:30-10:45 AM	*Break*
10:45-11:00 AM	Burnthrough/NexGen Burner – R. Ochs
11:00-11:30 AM	Composite In-Flight Flammability Test – R. Ochs
11:30-11:50 AM	Heat Flux Gauge Calibration Standard Conformity – Y. Agyei
11:50-12:10 PM	OSU Standardization Effort – Y. Agyei
12:10-12:30 PM	HR2/OSU Airflow/Plenum Pressure Data – M. Spencer
12:30-1:35 PM	Lunch
1:35-1:45 PM	Radiant Panel for Insulation – R. Hill
1:45-1:55 PM	Wiring Test – R. Hill
1:55-2:05 PM	Evacuation Slide Test – T. Marker
2:05-2:25 PM	Seat Cushion Oil Burner – T. Marker
2:25-2:50 PM	Seat AC – R. Hill
2:50-3:00 PM	Break
3:00-4:30 PM	Task Group Meetings I Magnesium Alloy – Marker Composite In-Flight Flammability Test - Ochs OSU – Y. Agyei AC for Cargo Liner-Cargo Liner Task Group - Hill

THURSDAY, JUNE 20, 2013

8:30-9:30 AM	Task Group Meetings I (Continued as needed) Magnesium Alloy – Marker Composite In-Flight Flammability Test - Ochs OSU – Y. Agyei AC for Cargo Liner-Cargo Liner Task Group - Hill
9:30-10:30 AM	Task Group Meetings II

Seat Cushion Oil Burner – Marker
Wiring Flammability - Hill
Burnthrough - Ochs
Heat Flux – Y. Agyei
Radiant Panel - Hill

10:30-10:45 AM	Break
10:45-11:30 AM	Task Group Reports
11:30-11:45 AM	Maintenance Video – R. Hill
11:45 AM-12:15 PM	Contamination of Thermal Acoustic Insulation Study Update – L. Wallace
12:15-1:45 PM	Lunch
1:45-2:30 PM	AircraftFire Presentation – J-M. Most/G. Luedtke

Additional Items on June 20, 2013:

Enzo Canari gave update on some EASA items.
Dick Hill gave information on the Seventh Triennial International Aircraft Fire and Cabin Safety Research Conference.

Meeting Minutes:

WEDNESDAY, JUNE 19, 2013

Task Group Session on Revised Cargo Liner Test – T. Marker for Tim Salter

Review of items presented during March 2013 Materials meeting. Flame retention head (FRH): replaces stator and turbulator, parts can be purchased from a local heating supply store. Tim described how the FRH works. Comparison photos were shown of the FRH in use vs. the stator and turbulator in use. Ignition wires: Tim Salter has come up with a standardized igniter position – this was reviewed. The draft tube assembly was reviewed. Cargo liner burner settings were reviewed. Results of tests conducted using FRH were presented. 2013 Round Robin is currently underway – 5 labs participating. FAATC has supplied a package with some of the parts (such as modified draft tube, etc.) and test materials to 2013 RR participating labs. Objectives of the 2013 RR were reviewed. Soot removal from burner: burner cones should be cleaned of soot between each calibration and/or sample test. It is important to periodically inspect and remove any buildup of soot from within the bottom of the burner tube. Planned activities: finalized FRH settings, conduct testing and various cargo design feature to support development of advisory material, continue with 2013 RR, and test burner using heat sink on thermocouples. J. Dave: Nozzles: we've got some Delevan – is W nozzle preferred for 2-gallon for hour tests? Marker: is we can do it, wed like to try to standardize the nozzle for all of the 2-gallon per hour tests, so we don't need a number of different configurations. Danker: We have several tests that all use the same 'looking' burner. Marker: I put together a spreadsheet recently because we have several different configurations for the different tests. We are trying to standardize the 2-gallon per hour tests as much as possible. I think that is the focus of Tim Salter's effort. Danker: Will it be more useful to maybe call them by 2-gallon per hour instead of what they are testing? Marker: That would be ideal, but we'll have to see, because the burner is set-up vertical in the cargo test. Erb: Do you see any difference in timing in Pan cloth? Marker: Yes. S. Campbell: The configuration for the seat vs. the cargo – are you going to try to make it so it's the same burner for both configurations? Marker: I don't want it to sound like that's the primary thing where it's the same burner configuration for these tests. We want to try to make it as close as possible. We want to replicate the Park burner. Now, we

are trying to establish a nozzle and FRH to become more standardized. Bennett: I was under the impression the elbow was working. Marker: The elbow is working. Slaton: Is there any idea to put in place a calibration of the nozzles - To double-check to see if your rig is within some tolerance band? Marker: We can investigate this. Slaton: Dimensional tolerances – FRH and static plate – did Tim S. create the static plate: are you going to define the dimensional tolerance maybe in a drawing? Marker: We could. Slaton: I would recommend that we do that as an industry, so we have good configuration control so we can be consistent as we can.

Sonic Cargo Burner Final Settings for AC Material – R. Hill

This is for the cargo liner test as it is currently applied. A schematic of the burner set-up was presented. These drawings will be included in the AC. Dick reviewed the burner setting recommendations. What we have will go into the AC for how to replace the Park burner with a sonic burner for the current test method. Does everybody understand that this is for the current test method? This AC has nothing to do with the new Workbook. It is for how to comply with the current/present rule not new requirements for new aircraft. Bennett: The AC will cover horizontal, vertical, and corners? Hill: The AC will cover use of sonic burner to replace Park burner.

AC-25.855(c) – W. Eidsmore

Will reviewed the purpose of the AC. Goals: finish working open issues with final draft of AC in July 2013. What does this AC cover: horizontal, vertical, and corner testing and pinning of clamping of specimens. AC Topics: boundary conditions (joint geometry) test methodologies; substitutions (metals, finishes, and fastening systems) – define substitutions with no appreciable effect; abstraction of a design to a simple test; feature test guidance; test exclusion areas – define common non-critical design features; liner repairs – presented separately by Akro Fireguard.

Development of a New Flammability Test for Magnesium-Alloy Seat Structure – T. Marker

This test effort began in spring 2007. Various configurations were tested since we began this effort. Vertical cylinder vs. horizontal bar comparison summary was presented. .25-inch thick bar is the preferred test configuration. Since March 2013 Materials meeting: ran 99 additional tests; draft test method completed; Round Robin II completed. Tim reviewed the items left to be done. Results from RR II using WE-43 were presented. Results of RR II using E-43 were presented. RR II statistics were presented. The comparison of findings from RR I and RR II was presented. Planned activities: refine the method for determining when the sample begins to burn; refine the method of determining when the sample self-extinguishes. S. Campbell: Materials such as WE-43 will be authorized to be used in certain applications? Marker: Fairly certain. Grogan: I would assume this test method would be fore bare alloy, not including decorative finishes? Marker: The bar with the finish would have to pass the test to make sure the pain or anodizing didn't have a negative effect. This is something that we will have to work on and address. Bennett: is there any question about the surface roughness on the burn time? Marker: We've looked into this, and haven't notice any impact. Slaton: Finishes concern expressed interest in standard paints and finishes be addressed. Danker: Are you happy with your catch pan materials? There are other types of materials that can be used for catch pan materials. Marker: We want to try to develop some specifications for the dry talc or other materials. Gwynne: the talc can also be used to extinguish fires when testing the worse-performing alloys. Member Question: have you checked alloy consistency from the vendor? Gwynne: It is all controlled very carefully. Marker: It may be an issue from one vendor to another, but for the purposes of the RR all alloys were manufactured by the same vendor.

NexGen Burner Comparative Testing for Burnthrough Test Method – R. Ochs

Rob reviewed the objectives of this work. Fuel comparison: 3 fuels found to provide similar measured flame temperature. NexGen Burner Round Robin: comparative test series will be a two-part test series. For RR participants: FAATC will create video that shows how they run test. Task Group: make comments/suggestions on current 25.856-2A AC and get them back to Rob Ochs. Eidsmore: how do the velocity profiles compare to post-crash fire fuel fed fire? Ochs: I have not done any work on this, but there has been work done on this previously that can be looked at. Hill: It's such a big range, that it is in it. The velocity of the air coming through the door is mostly dependent on wind velocities and openings in the airplane. There is no one velocity, one temperature or one heat flux.

Composite Flame Propagation Update – R. Ochs

Rob explained the objective: initially intended for composites in hidden areas. Later possibly for primary fuselage structure and ducts, wires. Rob reviewed points from March 2013 meeting. A photo of the test apparatus developed at the FAATC was shown. Burn length results (also shown during March 2013 Materials meeting presentation) were shown. What's New: determine repeatability of material flammability properties: cone calorimeter and microscale calorimeter; change pilot flame to premixed; vary pilot impingement time, determine effect on repeatability and severity; find standard material; construct and test additional apparatuses. Microscale and cone calorimeters tests were conducted. Rob presented the Microscale and cone calorimeter test results/data. Pilot impingement: several tests were conducted. Rob presented the results of these tests. Pilot exposure time was varied and results recorded. A video of the 50 second flame impingement test was shown. Drawings of the test apparatus are being created. A complete parts list will also be available. The drawings and parts list will be available on the FAA Fire Safety website when completed. FAATC has built three of these units for their test facility. We plan to study apparatus reproducibility: test an array of materials on each machine; next move the machines to another lab at FAATC and run the same tests; and ship machines to a lab outside the FAATC and run the same tests for comparison. Repeatable composite materials are being sought. Richardson: Is there any more guidance yet on what specific parts and structures will be tested in this apparatus? Ochs: Hopefully, Jeff Gardlin will sit in on our Task Group meeting and have some more information on this. Erb: Are there other tests you can consider when designing this test (ie: a test I witnessed at a customer recently for composite cargo liners)? Ochs: Our testing for the development of this test started in the radiant panel. Hill: ARAC intent: basically, for in-flight fire everything in the inaccessible area everything should be able to withstand a fire the size of a block of foam test. We haven't defined exactly where the cut-off for this test is yet. Everything is going to have to show that it is not a hazard. This is the direction we are going. We still have to determine the cut-off on the materials that have to meet this test. HP Busch: how about some of the items (ie: sample holder) from the NBS chamber? Ochs: We have considered some of these in the development of this test. Slaton: We really need some better guidance on the application of this new regulation, so we can benchmark materials and designs for hidden areas. Hill: you have to remember that there is a rulemaking project, so we cannot discuss anything that would be part of the rule other than the test methods themselves.

Heat Flux Gauge Calibration Standard Conformity – Y. Agyei for M. Burns

Propsed Project Plan for HFG Standard: Phase I is complete. Phase II equipment capability assessment. Phase III: Round Robin. Facility Acceptance Checklist was described. Next step: Heat Flux Task Group discussion: final decision on NIST calibration; identify participants; and create timeline for proposed plan. Hill: The idea is that this new calibration would be used for the new rule where we can put it in with the requirements (ie: use "X" gauge and calibrate this way). A 10-point

calibration does not make it more accurate for the point you want. You may find that a 2 or 3-point calibration could work for a particular test method.

Boeing Proposal for OSU Round Robin – Y. Agyei

Recommendation: conduct focused Round Robin with controlled parameters: start with small focus group. Proposed Plan for OSU Improvement Task was presented. Participants must follow unit preparation instructions. Details of this proposed OSU Round Robin were presented.

HR2 and OSU Airflow and Pressure Data – M. Spencer for M. Burns

Mike Burns has been doing some work on the plenum pressure. Martin reviewed Mike's findings from this work. Hill: Mike saw big differences in the calibration coefficient in the HR2 where the airflow could be adjusted. This can be used as a method to see if your machine is splitting the air in the way it should be. This is more to see if there are problems out there. Martin reviewed the next steps including development of an international Round Robin and continue OSU Standardization Effort (current machines). Canari: Calibration factor range is between 10 and 13. If 13 is acceptable, why does chart say greater than or equal to 12? Spencer: I questioned Mike on that as well. It should be between 10 and 13.

Radiant Panel Test for Thermal Acoustic Insulation – R. Hill for P. Cahill

Pat created a General Check Sheet for Radiant Panel Operators. A copy will be distributed to Radiant Panel Task Group members at today's meeting. Dick highlighted the items for discussion during today's Task Group meeting including review of the Check Sheet. Send any comments on it to Pat. Pat is planning a damping materials Round Robin. Contact Pat if your lab would like to participate in this Round Robin. .

Aircraft Wiring – R. Hill for P. Cahill

Dick presented the items currently under investigation including: radiant panel oriented vertically in small chamber. Awaiting "GoGo" cable from American Airlines for evaluation in radiant panel test chamber.

Evacuation Slide Test – T. Marker for P. Cahill

Heat Resistant Evacuation Slides: Problem: fuel fire radiant heat may damage slides. Tim showed a schematic of the evacuation slide test apparatus. The Test Parameters were reviewed. Recent Activities: a meeting was held February 27, 2013, with two of the evacuation slide manufacturers. The results from the Round Robin tests were discussed, and the new evacuation slide test method was reviewed. The lab that failed the RR II samples will re-run the test. A new Round Robin will begin in fall 2013. Hill: There is a report on our website of a study we had conducted on evacuation times. It was prepared by Ray Cherry.

Seat Cushion Oil Burner – T. Marker for T. Salter

This work is for the new Appendix F. Initial testing showed need for improved test repeatability. Flame retention head (FRH) used in this test, also. FRH and static plate – FRH is F31. Standardization of ignition wires as with cargo liner test. Draft tube assembly and seat burner settings were reviewed. Tim reviewed the results of the initial testing. April 2012 RR considered complete at this time. Planned 2013 Round Robin using FRH – Tim Salter is looking for participants for this RR. Contact him if your

lab would like to participate. Future activities: finalize leather seat cushion restraints and continue testing for methods of limiting inaccurate ratings due to thermocouple heat cycling (thermocouple degradation). Slaton: Will the same approach be used with the seat AC as with the cargo liner AC? Hill: We are a little further behind with the seat AC than we are on the cargo liner AC.

Seat AC – R. Hill

When we are done with the cargo liner, we are going to start addressing the seat and update the seat AC. We asked for comments on the present AC and what needs to be addressed. One person responded. Dick gave his summation of the comments he received from that one person: 1) clarify when things such as buttons, hook and loop, or tags should be included on the test sample; 2) headrests and footrests and other foam components of the seat: clarify how these are tested; 3) clarify the inclusion of metal such as a bottom pan in the seat; 4) clarify similarity of dress covers especially when talking about leathers; 5) clarify when closeouts such as hook and loop should be facing the flame; 6) clarify when I can use similarity for the fire-hardened foam testing; 7) clarify outer fabric orientation when more than one fabric is used; and, 8) various comments about burner cone, and clarify cleaning of the burner cone. Does anyone else plan to send more comments or can we use this? Member Question: when do you need them by? Hill: By spring 2014 Materials meeting.

THURSDAY, JUNE 20, 2013

Task Group Reports

Mag-Alloy Task Group Minutes – Provided by Tim Marker

Magnesium Alloy Seat Structure Flammability Task Group Minutes June 19-20, 2013

General Meeting June 19 to all participants. The FAATC gave a status of the recent findings in the development of a laboratory-scale test for magnesium alloys. A brief history and evolution was given, which described the comparison work between the vertical cylinders and the horizontal bar sample configurations. The horizontal bar proved to be more repeatable than the hollow cylinder configuration, and the bar samples are much easier to produce. Work continued on the refinement of the testing apparatus, with improvements being made to the sample holder and catch pan. One of the most difficult aspects of the test had been the measurement of when the molten residue self-extinguished. This measurement relied heavily on the interpretation of the tester, and introduced a significant amount of error. The FAATC determined that measuring the sample weight loss was a much more accurate measurement of the amount of sample burning, so the proposed test method was updated to include this measurement. The latest proposed test method parameters were discussed, which included a minimum time for the sample to ignite (2 minutes), a test flame duration of 4 minutes, a maximum amount of time for the sample to self-extinguish (3 minutes after flame removal; total test time 7 minutes), and a maximum weight loss of 6% to 10% (this was still up for debate).

The FAATC went on to describe the systematic approach involved in the development of the latest test method, and what items were left to be finalized. These included a

requirement for the ventilation inside the testing chamber, which appeared to have an impact on the test results. Round Robin II test results were shown, with 7 individual labs supplying test data. A series of slides detailing the methodology to measure sample weight loss were also shown, since the Round Robin II test data indicated a high degree of scatter. A slide detailing the planned activities going forward was shown, which included a bullet indicating the proposed test method will be inserted into the current Fire Test Handbook. A video of a magnesium flammability test was also shown. The purpose of the video was to convey the FAATC's interpretation of when a sample begins to burn and when it self-extinguishes.

During the Task Group session, a discussion more specific to the proposed magnesium-alloy seat structure flammability test itself evolved, including:

Video Describing Time When Sample is on Fire; When Sample Self Extinguishes. The FAATC produced a video documenting 3 flammability tests using Elektron-43. The purpose of the video was to clearly show the FAA's interpretation of when a magnesium alloy test sample is actually on fire, and similarly when the sample self-extinguishes. The FAATC handed out 5 copies of the videos to interested participants, and offered additional copies to anyone else interested. Task Group participants asked if this video could simply be downloaded from the Fire Safety Branch website.

ACTION ITEM: FAATC will determine if the video will be available for viewing through the Fire Safety Branch's website.

Additional Language for Proposed Magnesium Alloy Flammability Test. Paul Lyons and Bruce Gwynne of Magnesium Elektron had agreed to provide some additional guidance language that could be used in the proposed standard to clarify 2 topics:
1. A specification on the use of dry talc in the test apparatus catch pan, and
2. a specification on the appropriate level of mechanically finishing the samples prior to test.
Both of these areas will benefit from additional detail to ensure the test method is being administered in a consistent fashion, regardless of laboratory or location.

ACTION ITEM: Magnesium Elektron to provide FAATC with additional guidance language on the use of talc and the appropriate level of sample surface machining.

Analysis of Round Robin II Data. The results of Round Robin II were made available only shortly before the June meeting. A more in-depth analysis of the results can now be made, to determine the correlation (if any) between the burner calibration temperature and the melt time, time to ignition, burn duration, etc. Normal standard deviations and percent standard deviations will be calculated based on the results from the 7 participating labs.

ACTION ITEM: FAATC will analyze Round Robin data and provide an update at the next meeting.

Impact of Flame Bias on Test Results. At least 2 laboratories participating in the Round Robin series reported that the current, FAATC-recommended burner set-up (stator and turbulator components) had resulted in a slightly biased flame (i.e., a majority of fire comes out on either the left or right side of the cone, instead of the desired, evenly-distributed flame). When this bias occurs, the result is often an uneven melting of the horizontal test sample. In many cases the sample will melt left or right of the center, and upon breaking, the near-molten center section of the sample will "swing" to one side before completely detaching. As a result of this phenomenon, additional melting drips from the bar sample can be deposited on the residue that collects in the catch pan. In at least one test, this has resulted in significant, additional after-burning of the residue, causing a higher-than-expected weight loss. It is imperative that the FAATC finalize the burner setting using the Flame Retention Head (FRH) now under examination. It is anticipated that this component will result in a more evenly distributed flame, and eliminate the occurrence of the above.

ACTION ITEM: FAATC will investigate/develop the FRH in an effort to establish a more evenly-distributed flame.

Weight Scale Specification. One laboratory participating in the Round Robin discussed the need for scale accuracy for measuring sample pre- and post- weights. The typical weight loss experienced during these tests is in the 1% to 4% range, so an accurate measurement is critical. While accuracy is key, the measuring device must not be cost-prohibitive. The current proposed test method calls for a scale with an accuracy of +/- 0.02 lbs. (it was pointed out that 0.02 lbs. is 4% of 0.5 lbs., the typical initial weight of the sample); an investigation should be conducted to determine if this level of accuracy is sufficient.

ACTION ITEM: Jim Davis of Accufleet agreed to perform some research on the available scales, their accuracies, and their price ranges in order to develop an appropriate scale specification.

Weight Loss Measurement. While discussing the FAATC's interpretation of the measurement of the post-test sample weight, it was discovered that several laboratories participating in the Round Robins had conducted their measurements differently. The primary areas of discrepancy involve the amount of time the molten sample is permitted to cool prior to blowing it off with compressed air, as well as the use of other mechanical means (wire brush) for removing the oxidation and/or talc from the sample prior to recording a final weight. In order to determine the impact of each, and to develop appropriate guidance, the Task Group members agreed on a simple hierarchy of the severity of several techniques used to remove the oxidation prior to weighing.

ACTION ITEM: FAATC and Magnesium Elektron will conduct a minimum of 5 tests using WE-43 samples according to the proposed standard. The molten/resolidified material retrieved from the catch pan will be subjected to a series of preparations prior to recording the weight. The preparations will be conducted as follows:
1. Let resolidified material set for 1 hour, blow off with compressed air, weigh.

2. Let resolidified material set for 4 hours, blow off with compressed air, weigh.
3. Let resolidified material set for 24 hours, blow off with compressed air, weigh.
4. Conduct the above, then brush residue with a wire brush or similar, weigh.
5. Conduct the above, then strike residue with 5 lb. steel sledgehammer, weigh.

From the above activity, determine the most appropriate method for preparing the retrieved sample from the catch pan prior to weight measurement. Accurately describe the method and include this in the proposed test standard.

Coated vs. Non-Coated. The group had previously discussed the need to run some limited tests on samples that are painted or coated. It is possible that a coated sample may produce results different from a non-coated sample. The FAATC has indicated that the basic magnesium material will be required to meet the new test standard, without modification. Additionally, any coating or anodization process that will be used in service on the magnesium component must also be tested on a sample to ensure no negative effects will result.

ACTION ITEM: FAATC will work with Magnesium Elektron to produce and test coated samples to determine the impact of a variety of anticipated finish coatings.

Possible Process for Certifying the Use of Magnesium in Seat Frame Construction (i.e., Application for Special Conditions). Jeff Gardlin of the FAA's Standards Staff joined the Magnesium Task Group specifically to provide guidance on the route to certification of magnesium in aircraft seats. Enzo Canari was also present representing the European Aviation Safety Agency (EASA). Jeff indicated that in order to obtain certification for magnesium the use of Special Condition provisions would be necessary. Special Conditions are used for situations when a novel or unusual design feature is proposed to be used on an aircraft for which there is no current Rule for certification. Those requesting Special Condition consideration must demonstrate that the novel or unusual design feature does not compromise safety levels. Special Condition requirements are written by the FAA (or other governing authority for other countries) and are posted in the Federal Register for public comment. If satisfied, the Final Special Condition becomes the Rule.

In the case of magnesium, the laboratory scale test method being developed, when completed will be inserted in the current Aircraft Materials Fire Test Handbook. This does not make it Rule and to use magnesium in aircraft seats will still require Special Conditions being granted. The inclusion of the laboratory scale flammability test method for magnesium in the 'Handbook' will make the Special Conditions process go more smoothly. With the results of the Magnesium Full Scale Testing and the progress demonstrated in the development of the lab scale test method the FAA would now allow magnesium in aircraft seats, *providing the requirements and conditions as set out in the Special Conditions are satisfied.*

Completion of the Draft Test Method, and Generation of a Final Report on the Test Method Development. The FAATC described what the proposed test method will look

like, and what some of the requirements may be. Since it was agreed there was a degree of uncertainty when test-burning magnesium alloys, the FAATC indicated the test would provide a recovery process to allow for "rogue" failures. In this regard, only 80% of the test specimens would be required to pass (not 100%). The proposed test calls for the usual 3 test samples. All 3 must pass. If a failure of one occurs, 2 additional samples could be run, with both passing the test. This would result in 4 of the 5 samples passing, or 80%. This methodology is consistent with other flammability tests that are being refined and developed by the FAATC during its overhaul of Appendix F to Part 25.

The three primary factors in the test so far are:

1. time for the sample to begin burning,
2. time for the sample to self-extinguish
3. weight loss

Based on the test results obtained thus far, the proposed parameters will be:

1. the sample must not ignite prior to 2 minutes,
2. expose the test sample for 4 minutes,
3. the sample must self-extinguish within 3 minutes of burner removal
4. the weight loss must not exceed (still under review, likely 6% to 10%)

Action Item: The FAATC will finalize the draft Test Method and generate a final report on the development of the Test Method prior to the next IAMFTWG meeting.

Interim Meeting to Check Status. The FAATC agreed to do this. Since the next IAMFTWG meeting will not take place until late February/early March 2014, the FAATC will entertain the idea of hosting a small meeting at the Technical Center near the Fall of 2013, or alternatively a telecon to disseminate the latest information regarding the test development.

Seat Task Group Minutes – Provided by Tim Marker

Seat Cushion Flammability Task Group Minutes June 19-20, 2013

General Meeting June 19 to all participants. The FAATC gave a status of the recent developments with the seat cushion flammability test. A majority of the work being done at the FAA Technical Center involves the experimentation with a Flame Retention Head (FRH) burner component in an effort to make the burner apparatus more consistent. The FRH essentially replaces the turbulator component, which is located at the end of the draft tube. In addition to the FRH, a component referred to as a static disc will be used to replace the existing stator. When used together, these 2 components have the potential to make the flame more consistent over a wider range of test conditions. The parts can be purchased for less than $50. The FRH appears to induce a more consistent flame that burns in closer proximity to the draft tube end, which will increase the level of control. In order to accommodate the slightly different diameter of the FRH, a small modification to the draft tube is necessary to allow for a short section of tube and the FRH. Pictures of the modification and assembly were shown, along with the proposed settings and other

recommended parameters. A switch to the Delavan "W" style nozzle was also recommended in this updated burner configuration.

Numerous trials were run on 3 types of seat cushion materials (2 types of fire-hardened foam + 1 type of fire-blocked foam) to determine the impact of the new configuration on test results. Using the Delavan W nozzle and an air pressure setting of 45 psi, the test results correlated well with previous tests using the Park burner.

The status of the 2012 Round Robin was also given. The Round Robin involved 8 labs, but only 6 of the 8 labs had provided data to the FAATC, so the test series is considered complete at this point. The data showed a wide range of results between the labs, indicating other factors (ventilation?) may be playing a role. As a result of this somewhat unproductive effort, an additional series is currently being arranged. Round robin 2013 will involve the exclusive use of the FRH and associated componentry, which the FAATC will supply to participating labs. The FAATC requested interested labs to contact them to arrange for their participation.

During the Task Group session, a discussion more specific to the seat cushion flammability test itself evolved, including:

The Difficulties of Passing the Weight-Loss Criteria When Testing Inflatable Bladder-Type Cushions That are Marginally Heavier Than the 3 Pound Cut-Off for Being Considered a "Lightweight" Seat Assembly. E. Dawson from Accufleet initiated a discussion on this problem, which was corroborated by other participants of the Task Group. As described, the new bladder-style cushions are primarily air, but they typically weigh in the range of 3.5 to 4 pounds, excluding them from the lightweight acceptance criteria (if the test assembly is less than 3 pounds it qualifies for a different weight-loss and burn length acceptance criteria). As a result, during a typical flammability test, the inflatable components are largely consumed, even though the dress cover does not burn more than a typical fire-blocked cushion.

ACTION ITEM: Accufleet will send the FAATC information on the design and construction of these seats. The FAATC will discuss jointly with the Standards Staff of the Transport Airplane Directorate and determine if additional testing or research into the current requirement is valid for this novel application.

Additional Language for Acceptable Burn Length in the Revised Seat Cushion Flammability Test. The FAATC initiated a discussion on the topic of burn length measurement on the underside of the bottom cushion sample in the present test. The current description in the Handbook and FAR requires that a cushion not burn more than 17 inches across the 18-inch wide sample. This is not a problem for the top of the bottom cushion. However, on the sample frame is constructed of 1 inch by 1 inch steel angle members. This poses a problem when measuring burn length on the underside of the cushion. If the flame burns all the way to the edge of the angle member, it will have essentially burned 17 inches. Many labs have considered this as passing the test. But it is impossible to fail the test if this logic is applied. The FAATC clarified that a 17-inch

burn length on the underside of the sample is a fail. E. Dawson suggested that a 16.5-inch burn length requirement be imposed in the revised test method for the Workbook.

ACTION ITEM: FAATC to discuss possible solutions with the Standards Staff of the Transport Airplane Directorate and draft additional language on this topic for inclusion in the revised test method to be included in the new Workbook.

Other Items Requiring Additional Language for Clarification. Task Group participants suggested other areas of the current test requirement that would benefit from increased clarification. These include the concept of not fully encapsulating a test sample with fire blocking layer (on the underside) if the actual, in-service cushion does not contain a blocker on the underside. Also hook-and-loop fasteners, and a better description of the appropriate way to test these. Additional guidance was also suggested on the attachment of the back (upright) cushion to the test sample frame. Some labs use a clamp, while other use wire or other mechanical devices. Lastly, the FAATC recommends the translation of the sample, sample frame, and associated hardware (scale, catch pan, etc.) to the burner, while the burner is fixed to be stationary. This will prevent the movement of critical burner components (e.g. intake tubing), which could lead to error.

ACTION ITEM: FAATC will review these areas and introduce appropriate guidance language in the revised test that will be included in the Workbook.

The Use of Diesel Fuel. Several participants shared their experiences of using Diesel fuel in the NexGen burner, since they did not have access to Jet A fuel, which is recommended. These participants indicated that much higher flame temperatures resulted when using Diesel, and raised concerns over high sample failure rates when using this fuel. J. Gardlin of the FAA Standards Staff indicated that if in fact the temperatures were increasing as a result of Diesel use, this actually resulted in a more conservative situation, in that the flame is more severe. Although several participants suggested the use of Diesel be banned in the revised test method, the FAA felt it would be permitted, with some additional language indicating the possibility of increased temperatures when using this fuel.

ACTION ITEM: No action was necessary.

Discussion of Appropriate Methodology for Testing "Non-Traditional" Seat Cushions. Several participants inquired about the test requirements for non-traditional seat cushions that are not typical of traditional urethane foam encapsulated by a fire-blocking layer and dress cover. These would include stretched fabrics and similar materials. The FAATC acknowledges that it would be a hardship for an applicant to be required to construct a 4-inch thick test sample from stretched fabric, and that an alternate test method may be more suitable. One suggestion is to require that all non-traditional materials meet the current OSU rate-of-heat-release test, since this is now the

requirement for most cabin materials, including the sidewall, ceiling, and stowbin panels. Another suggestion is to construct a standardized "skeleton" framework of non-combustible (steel) that could serve as a scaffold to attach stretched fabric to. If the framework were close to the typical weight of a urethane foam sample, then the weight loss criteria could be maintained.

Action Item: The FAATC will discuss possible solutions with the Standards Staff of the Transport Airplane Directorate and draft additional language on this topic for inclusion in the revised test method to be included in the new Workbook.

Interim Meeting to Check Status. The FAATC agreed to do this. Since the next IAMFTWG meeting will not take place until late February/early March 2014, the FAATC will entertain the idea of hosting a small meeting at the Technical Center near the Fall of 2013, or alternatively a telecon to disseminate the latest information regarding the test development. The FAATC also reminded participants that if they are interested in participating in the 2013 Round Robin, to please contact Mr. Tim Salter at (609) 485-6952, or Timothy.Salter@faa.gov

AC on Cargo – R. Hill

We discussed what the AC has in it at present time. Some old ideas that were not resolved were discussed. Main discussion points: look at intent of rule and the use of the test method. Develop criteria that is already acceptable – possible some additional guidance on flames on backface. For Class E cargo compartment – should include wording that you do not need to test the 45-degree or vertical Bunsen burner test with these materials, because the oil burner test on these materials is much more severe. August 2013: Task Group deadline to circulate draft.

Wiring – R. Hill

Same test as Rob is looking at for composites.

Radiant Panel – R. Hill

The Task Group reviewed and discussed Checklist: modified some of the statements, deleted some redundant wording, and clarified some information. The Checklist will be available on the FAA Fire Safety website with the Handbook.

Composites – R. Ochs

Dan Slaton provided the group with a project plan outlining all of the steps. Group came up with some additional items to take care of. We talked about various cross section materials. Group will investigate testing flat and round construction. We talked about in testing some of the duct materials (ie: glass epoxy material test). We talked about wire testing in the rig and got some information from test apparatus manufacturers. Thermoplastics testing was discussed – some different blends will be made up and tested. Conduct a thorough analysis of the apparatus. Burn length determination was discussed again. The test parameters were discussed.

Burnthrough – R. Ochs

We discussed burner, cones, fuel. The logistics for our Round Robin were discussed. The tolerance for the frame warping was discussed and will be investigated. Calibration methods were discussed – maybe a different method of assessing the flame severity for the future test method. Making Boeing version of calibration tools for FRH was discussed.

OSU – Y. Agyei

10 participants for Round Robin– looking at timeline of completion of RR in October in order to be able to share the data at the conference in December. We discussed what we have to do to get this done by October 2013. Please let me know if you would like more information.

Heat Flux – Y. Agyei

The new proposal is only for future regulations specifically the HR2. Concerns on variations of numbers from each lab. Round Robin participants – two labs right now. Range of calibration was discussed – this needs more discussion. We are considering having another Task Group meeting in the fall at the FAATC.

HR2 – M. Spencer

Further discussion on the presentation Martin made on Mike's findings. Mike has the only HR2 in existence. Marlin Engineering will help him build another unit for cross comparison of results between the two machines.

Maintenance Video – R. Hill

Graham Greene of the CAA wrote the script for this video. It will be made available to airlines for maintenance training. It is currently being incorporated into the FAA EWISS training. If you are in Europe, contact Graham Greene at the CAA for a copy of the video, or contact April Horner and she will put you in contact with Graham. If you are in the U.S. and would like a copy, contact April Horner and the FAA will send you a copy. The video was shown.

Contamination of Thermal Acoustic Insulation Study Update – C. Lewis/L. Wallace

Claude gave a brief background on this study. Dust and lint are the biggest causes of contamination. RGW Cherry & Associates were contracted to do a study on dust and lint contamination. The study consisted of two parts: airplane survey and conducting tests to determine flammability performance. The data has been collected and is in the process of being evaluated.

Lionel presented the details of the study. He reviewed the causes of contamination: dust, lint, corrosion inhibiting compounds, etc. RGW Cherry & Associates looked into where and how the dust and lint accumulated. Lionel discussed the areas in the aircraft where they took the samples: airlines removed cabin and cargo bay panels for sample collection. Hidden areas with the highest levels of dust and lint are behind the dado panels in the cabin just above the floor; in cheek just below the floor. Lionel presented a photo of heavily contaminated EWIS and TAI in cheek near air recirculator found on one of the airplanes sampled. He reviewed some of the other types of TAI contamination including food wrappers and moisture. Food wrappers were found behind the cargo bay liners in one aircraft.

Flammability testing was conducted on the Transport Canada Arc Test Rig on some of the samples collected from the aircraft. The test results were presented.

EASA Certification Memorandum on Flammability Testing of Interior Materials – E. Canari (EASA)

EASA has decided to issue a Certification Memorandum to design organizations to follow PS-ANM 25.853.01-R1 issued by the FAA.

2013 Conference – R. Hill

The 2013 conference will be December 2-5, 2013, at the Philadelphia Marriott Downtown. Subject areas include: fire safety, systems fire safety, materials fire safety, crash dynamics, evacuation, and fire research.

Tim Marker asked if anyone would like to present a paper on Test Method and Analysis or Material Development at the conference, please contact him ASAP with an abstract.

Aircraftfire Project – J-M. Most

Aircraftfire Project Objective: evaluate the fire threats and passenger survivability in new generation of aircrafts. Jean-Michel explained the aspects of the project and presented the findings so far. A copy of the presentation is available on the FAA Fire Safety website.

Next Meeting

There will be no Materials Working Group meeting in fall 2013, because it is a conference year. The next Materials Working Group meeting will be held in spring 2014. Information will be sent to Working Group members and posted to the FAA Fire Safety website when it is available.