

INTERNATIONAL AIRCRAFT SYSTEMS FIRE PROTECTION WORKING GROUP MEETING

Hosted by Airbus GmbH

May 14-15, 2014

MEETING AGENDA:

WEDNESDAY, MAY 14, 2014

9:00-9:15 AM	Welcome, Meeting Logistics, and Introductions
9:15-9:30 AM	Flight Deck Smoke Penetration Testing (D. Blake)
9:30-9:50 AM	Smoke Transport Code (D. Blake) Graphic
9:50-10:10 AM	Status of NexGen Burner for Powerplant Testing
10:10-10:20 AM	Airbus Welcome – Mr. Joerg Schuler
10:20-10:30 AM	<i>Break</i>
10:30-10:50 AM	Updated Experimental Investigation of the NexGen Burner (S. Jeng – U Cincinnati)
10:50-11:00 AM	Commercial Aviation Safety Team (D. Blake)
11:00-11:20 AM	SAE/ISO Standards on Fire Containment Covers and Fire Resistant Containers (D. Blake)
11:20-11:40 AM	Bulk Storage of iPads (R. Hill) Video
11:40-1:15 PM	<i>Lunch</i>
1:15-1:45 PM	Class E Cargo Compartment Fire Suppression Testing (D. Blake)
1:45-2:05 PM	Lithium Fire Scenario – Cargo MPS (D. Blake)
2:05-2:10 PM	FAA Advisory and Rulemaking Committee (ARC) (R. Hill)
2:10-2:25 PM	Industry Collaboration/Consortium (IC) Research Effort to Develop a Single, Industry-Wide Non-halon Fire Extinguishing Agent for Engine and Auxiliary Power Unit Fire Zones. A proposal of the IC's structure, statement of work, deliverables, and schedule will be discussed. (R. Bennett)
2:25-2:40 PM	International Coordinating Council Aerospace Industries Association Cargo Compartment Halon Replacement Working Group Overview (ICCAIA CCHRWG) (R. Bennett)
2:40-2:50 PM	<i>Break</i>
2:50-3:20 PM	The Behavior of Halon Replacement Agents When Tested at Sub-inerting Concentrations (A. Chattaway)
3:20-3:50 PM	Flammability Limits of Hydrogen at Altitude and Inerting Concentrations (R. Hill)
3:50-4:00 PM	Handheld Extinguisher Optimization

4:00-4:15 PM Handheld 2-BTP Update (M. Madden/B. Colton)
4:15-4:20 PM Engine MPS Status/Future Plans
Status of FAA Engine Nacelle Reports
4:20-4:45 PM Additional Discussion

THURSDAY, MAY 15, 2014

9:00-9:40 AM Full-scale Lithium Battery Testing – Class C
9:40-9:50 AM Passive Fire Protection for Lithium Battery Shipments
9:50-10:20 AM Battery Chemistry and Size Comparative Testing
10:20-10:35 AM *Break*
10:35-10:45 AM Update on Status of RTCA Document – Batteries
10:45-10:55 AM ICAO Transport of Lithium Batteries (R. Hill)
10:55-11:10 AM Transport Canada Lithium Battery Working Group Status – Miranda Labbé
11:10-11:40 AM UPS Update (B. Brown)
11:40-12:00 PM Airbus – Status Lithium Battery in Aircraft Applications (P. Rohrbach)
12:00-1:15 PM *Lunch*
1:15-1:45 PM Proposed Study on Smoke, Fire, Fume Events (R. Hill)
1:45-2:15 PM Energy Release of Lithium Ion Batteries at Different States of Charge
2:15-2:25 PM EASA Rulemaking Activity Regarding Halon (T. Loevenich)
2:25-2:40 PM Working Group Member Presentations
Shipment of Lithium Ion Batteries Work at Akro Fireguard (J. Green)
2:40-3:00 PM Additional Discussion/Closing

MEETING MINUTES:

WEDNESDAY, MAY 14, 2014

Flight Deck Smoke Penetration Testing (D. Blake for R. Morrison)

Updates since December 2013 Conference Presentation: test article reconstruction is still underway. Objective: to determine if current flight deck smoke penetration certification testing is adequate. Interim smoke penetration testing on the FAA Fire Safety's 727 freighter is being finished up. Results from interim 727 smoke data will be used to configure the main deck for both forward and aft cargo compartments in the 747 test article. Dave reviewed the test configuration in the 727 test article and the 727 interim test results. A retest is required due to the failed recording of the reduction of light transmissibility parameter on the 70/30 Helium/Air mix test. Before the retest could be accomplished, the final lithium primary battery test was run and resulted in an explosion in the Class C cargo/ECS compartment which blew out a 20'x10' section of the floor and ruptured all under floor ECS ducting. Current status: 727 test article is

being refurbished, and is nearly ready to go again. Questions: Ferguson: data on temps in main deck during lithium battery test – have you had a chance to correlate these temps to Helium-Air mixtures in these tests? Blake: it's more of a theoretical interpretation. It's not directly comparable. We were trying to get some smoke penetration in these tests. Freiling: will there be an update to the AC for smoke test penetration testing? Blake: it's premature to say that now. We will submit results to the FAA Transport Directorate for review and decision on updates to the AC, etc.

Smoke Transport Code (D. Blake for E. Oztekin)

FAA AC 120-80, In-Flight Fires, published in 2004. Ezgi is working on smoke transport code for hidden fires in the aircraft (lavatories, behind sidewall panels, overhead areas, and cheek areas). Objective: to improve understanding of hidden in-flight fires with the help of analytical tools, and to build analytical capabilities that will complement the existing experimental work for other fire scenarios. Dave reviewed the results of Test Case 1. Ezgi plans to build a CAD model for the overhead area of the 747SP test article; set up boundary and initial conditions for the CFD model; and plan for full-scale tests.

Next Generation Fire Test Burner for Powerplant Fire Testing Applications (D. Blake for S. Summer)

Numerous Regulations mandate fire protection in aircraft powerplant fire zones. The burners listed in these regulations are no longer commercially available. The *Aircraft Materials Fire Test Handbook* also lists these burners. Steve has created a Roadmap to NexGen Burner Implementation for Powerplant Testing – Dave reviewed this Roadmap (see Presentation for Roadmap). Dave reviewed the updates to burner configuration (flame retention head [FRH], etc.). Status: The second Round Robin is currently being initiated.

Current Status – AC 20-135: A sub-group has been formed with the goal of developing proposed rewording of AC 20-135 in parallel with the effort on the NexGen burner for powerplants. Question: How many labs are participating in the Round Robin? Blake: 4 or 5 labs at this time. If your lab would like to participate, contact Steve Summer.

Airbus Welcome – Dr. Joerg Schuler (Head of Cabin and Cargo CoC – [EC])

Updated Experimental Investigation of the NexGen Burner (S. Jeng-University of Cincinnati)

Objective: develop the operating settings for NexGen burner for Powerplant fire tests. Current Approach: study of proposed burner configuration with FRH and Delavan fuel nozzles. Five different models of FRH were tested. Fuel Spray: Objective: to study the fuel spray of the Delavan nozzles using the updated burner configuration with FRHs. Study differences between FRHs and fuel nozzles. Different combinations of the five FRHs and Delavan nozzles were tested. Conclusions & Recommendations: the bigger FRHs provide better burner performance as the fuel spray and flame occupies most of the cone exit area. Hariram: are you planning to update the FAA report on how to update and use the NexGen burner? Jeng: there are a few more steps to revise the configuration. Hariram: what is the timeline, because we are looking into using it for certain applications? Jeng: We will be making recommendations to the FAA. Blake: We will ultimately be updating the *Aircraft Materials Fire Test Handbook* and the AC. I do not know the timeline on it. Hill: The NexGen burner is used for a number of tests. Most of them are Materials tests, so you have to be careful. This work is being used for adapting and

using the NexGen burner for powerplant tests. The general burner is the same for both Materials (cargo liner tests, etc.) and powerplant tests, but their configurations are different. I think the report you have was produced by Rob Ochs for the NexGen burner being used for Materials tests.

Commercial Aviation Safety Team (CAST) Cargo Fire Protection (D. Blake)

Safety Enhancement (SE) 126: Cargo - Mitigations for Hazardous Material Fires. Current work is being conducted for SE 126 towards Output 1. The CAST process is very structured. Safety Enhancement 127: Cargo Fire Containment – reduces the cargo fires through new or revised standards for the construction of standardized and improved cargo containers that include fire-suppression or fire-containment systems.

SAE/ISO Fire Containment Covers (FCCs) and Fire Resistant Containers (FRCs) Standards Development (D. Blake)

FCCs: SAE and ISO have both finalized their standards (SAE AS6453 and ISO 14186:2013 “Fire Containment Covers- Design, Performance, and Testing Requirements”- published. These standards are identical. FAA intends to issue a new TSO that will reference the new SAE AS6453 standard. Hughson: The FAA TSO C203 should go out for public comment this week. Fire Resistant Containers ISO/CD 19281 and SAE AS6278 “Fire Resistant Containers – Design, Performance, and Testing Requirements” are under development. The last meeting was April 1-2, 2014, in Köln, Germany. FAA intends to revise TSO C90 to include FRCs and will reference the new SAE standard. Dave reviewed a number of unresolved issues including lithium batteries and delayed smoke detection from a fire originating in either an FCC covered pallet or inside an FRC. FAATC Fire Safety Branch will conduct tests in the DC-10 main deck test article. Question: will this be addressed?: creating of allowance for space on interior sidewalls for expansion of intumescent coating. Blake: you are right, that needs to be addressed.

E-Tablet Fire Tests (R. Hill for T. Maloney)

CAAS (Civil Aviation Authority of Singapore) was concerned by a request from a carrier to use iPad/tablet devices for passenger entertainment (supplied and stored on aircraft). Lithium-ion batteries are known to undergo “thermal runaway” and propagate “thermal runaway” to additional adjacent batteries. Related tests: FAA: the effect of iPad battery overheating was observed under various conditions. Objective: perform experiments to understand the fire hazard of storage of large quantities of e-tablets. Three (3) types of e-tablets were used in tests. A test video was also shown.

Class E Cargo Compartment Fire Suppression Testing (D. Blake for D. Dadia)

Recent Tests: 5,000 Lithium-ion Batteries and a test with 4,800 Lithium Metal Batteries both using Fire Containment Cover. Dave described set-up of each test. A comparison video of both tests was shown. Next, 5,000 lithium-ion batteries were tested in FRC equipped with a smoke detector. There was a fuel-air explosion. This was the first time we saw a reaction like this with the lithium-ion batteries. This led us to a lot of questions. Dhaval will write a Technical Note with the results of all of these tests. The planned test of the lithium metal batteries in the FRC has been postponed for now. Hill: The batteries were charged to around 40-50% charge, because we have been told that this is how they are shipped.

Lithium Battery Fire Scenario for Cargo Compartment Halon Replacement Minimum Performance Standards (MPS) – (D. Blake)

Should a lithium battery fire scenario be part of these requirements? There are a lot of questions. Dave is considering how to proceed with this. If anyone has any thoughts on this, please contact Dave.

FAA Halon Replacement Advisory Rulemaking Committee (ARC) – (R. Hill)

The final report findings & recommendations are due to the FAA in July 2014. Dick reviewed the objectives of this group. The ARC has 10 Tasks – Dick explained these Tasks. Question: Is there a date for cargo compartment halon replacement? Hill: It is difficult to come up with a date when you do not have a replacement for halon yet.

Industry Collaboration/Consortium (IC) Research Effort to Develop a Single, Industry-Wide Non-halon Fire Extinguishing Agent for Engine and Auxiliary Power Unit Fire Zones. (R. Bennett for A. Macias)

Industry is leading a broad stakeholder approach to: define a common non-halon fire extinguishing solution for use in engine/APU fire zones; engage stakeholders; and execute a plan. A focal point will be appointed (Managing Entity) – a third party not one of the stakeholders. The IC is progressing: July 2013 kick-off telecon. A copy of this presentation is available at www.fire.tc.faa.gov.

International Coordinating Council Aerospace Industries Association Cargo Compartment Halon Replacement Working Group Overview (ICCAIA CCHRWG) – (R. Bennett)

Task: ICCAIA will establish a working group tasked to work on Halon replacement issues related to cargo compartments. Rolf explained the ICCAIA consists of six associations. The work plan is progressing: 5 stakeholder working group teleconferences have been held, 3 face-to-face meetings (May 2013, December 2013, and May 2014). Next step: transpose requirements into a timeline. The timeline will lead to an Action Plan: develop Action Plan with schedule (ECD Dec 2014); obtain commitment to support Action Plan from relevant stakeholders; and continue ongoing stakeholder outreach and engagement.

Halon Alternatives for Aviation – Behaviour of Fluorinated Compounds at Sub-inert Concentrations in Explosion Suppression – (J. Gatsonides)

Josephine reviewed the test procedure, information wanted from the agents (performance); how to achieve this; considerations in selecting scale of experiment. She reviewed the Test Matrix – over 100 tests were conducted. A copy of Josephine's presentation is available at www.fire.tc.faa.gov. Ferguson: are you planning on doing some more work -looking at agents? Chattaway: we are open to agent manufacturers bringing agents to test. Colton: are you going to go back and try it with Novec? Chattaway: the original schedule did not permit it, but we may be able to look at that if/when we run other tests.

Flammability Limits of Hydrogen at Sub-Atmospheric Pressures and Reduced Oxygen Concentrations – (R. Hill for S. Rehn)

Hydrogen has very wide flammability limits (~5-75% at sea level), very low ignition energy needed (<0.1mJ), in a closed container, explosion pressure rises up to 8 times initial pressure in as little as 10ms, Adiabatic flame temperature of 4010°F (2210°C). Objectives of this project were reviewed. A diagram of the Experimental Setup and test apparatus was shown. Conclusion and Future Work: H₂ flammability limits widen at high altitude. H₂ requires less O₂ to ignite at high altitudes, so more N₂ is required to inert it. Higher spark energy needed near upper flammability limits at high altitude.

Handheld Fire Extinguisher Optimization Final Update – (D. Blake for R. Morrison)

Dave reviewed the background for this work. ADA Technologies was awarded a Phase III SBIR to develop an extinguisher with a 5 B-C rating. Tests were conducted at Aberdeen Test Center in March 2013 using 3B and 5B pans and 2 propellants. FAATC: 18 tests were conducted at the FAATC in August 2013, using 5B pans and 3 propellants. Phase III contract completed – no further work planned at this time. Madden: what was weight and size of extinguisher? Blake: it appears to be similar in size to a halon extinguisher but larger in diameter. The actual size and weight are not included in this presentation. Contact Rob Morrison for more information/details: robert.morrison@faa.gov.

Halon Replacement for Airplane Portable Fire Extinguishers – Status Update (M. Madden)

Mike gave a quick review of the Steps to Commercialization and presented the BTP timeline. BTP has been REACH registered (recently). Applied for SNAP approval for BTP in December 2013 – should hear something in May 2014. Future: Boeing will proceed with implementation planning of BTP fire extinguishers. American Pacific will be drafting the proposed ASTM standard for BTP. Hill: Has American Pacific committed to building a factory to produce this in quantities needed for the aircraft industry? Madden: yes, there is a commitment to produce the quantities needed or Boeing would not be spending the money for this.

Halon Replacement Work For Engines and APUs – Update (D. Blake for D. Ingerson)

Report on aircraft powerplant halon replacement approximately 30% completed, temporarily paused for other work. New halon replacement test project identified: in planning phase, testing expected summer 2014. KSA/solid aerosol activity continues.

THURSDAY, MAY 15, 2014

Full-Scale Battery Tests – Class C – Large Format Cells (D. Blake for H. Webster)

Objective: document the characteristics of large battery fires in a realist aircraft environment. Dave reviewed the test plan. Baseline tests were conducted outside. Baseline tests were also conducted inside the test article aircraft. Dave described Class C mixed cell test and presented results. The lithium-ion cells test results were presented. A video of the lithium metal Class C test was shown. Dave showed results of test series and photos of damage to test aircraft interior.

Comparison Video 5,000 Lithium Ion Batteries and 4,800 Lithium Metal Batteries in FCC from Class E Cargo Compartment Fire Suppression Testing presentation given May 14, 2014, was shown. The 5,000 lithium-ion batteries in FRC test video was shown.

Passive Fire Protection for Lithium Battery Shipments (D. Blake for T. Maloney)

Concept 1: vary the separation distance between each cell within the package. Previous Tests conducted: a) variation of state-of-charge of Li-ion cells affected thermal runaway propagation; b) variation in cell divider materials; c) a packet of water above the cells stopped propagation; d) explosions of cells stopped propagation. Different exterior packaging material was also tried. Larger separation distances were not very effective at reducing cell temperatures. Separation distance did, however, have a significant impact on the rate of propagation. At the time these tests were conducted, the new ICAO packaging requirement was not in effect. Rogers: there are three general segments under which lithium batteries are shipped and number of lithium batteries you can ship varies by which segment they fit (based on specific parameters). Blake: it is not uniform as Mark pointed out.

Aircraft Installed Lithium Battery Hazard Analysis (D. Blake for S. Summer/T. Maloney)

Work requested by FAA Transport Airplane Directorate. Dave reviewed the battery matrix for batteries to be tested. Tests are conducted in a 10 m³ pressure chamber. The testing details were described. Test Progress: 150 tests have been conducted so far. Testing is nearly complete, and results are planned to be presented at the next Systems Meeting (fall 2014). Some additional tests were conducted with two types of lithium-metal batteries (D-cell lithium manganese dioxide and D-cell lithium thionyl chloride). Question: did they perform the tests in a ELT-like environment? Blake: we did some in the open, and some in a different set up. A propagation test, Li/MnO₂ was conducted next – test video was shown. Future Tests: FAA recently acquired a Accelerating Rate Calorimeter (ARC) that is planned to be used for additional characterization of various chemistries. It will measure temp, pressure, heat release, etc. Gas analysis will also be done.

RTCA SC-225: Rechargeable Lithium Batteries and Batteries Systems – (D. Blake for S. Summer)

Members of SC-225 include representatives from both government and industry organizations. Dave quickly reviewed the previous RTCA documents for rechargeable lithium battery systems. Committee is currently working on RTCA/DO-311A – and will integrate coverage for all sizes of batteries into this. Ferguson: do you know if the work you are doing on propagation will find its way into those documents? Hill: yes, the one major change to the standard is, in the past you had to do some testing and show that your battery couldn't go into thermal runaway – now, you have to force it into runaway and show that you can contain it Blake: Steve Summer or Harry Webster can give you more details.

Update from ICAO DGP on Lithium Batteries – (R. Hill)

ICAO organized The International Multidisciplinary Lithium Battery Transport Coordination Meeting in February 2014. The meeting was held at the FAA Technical Center. Dick reviewed the Recommendations that came out of this meeting and were submitted to the ICAO DGP and ICAO Airworthiness. 1. further restrictions on the carriage of lithium metal batteries in commercial passenger carrying operations; 2. performance based approach; 3. cargo aircraft; 4. multidisciplinary approach to cargo safety. Comment: battery manufacturers should be included in the multidisciplinary group. Hill: they were included in this multidisciplinary group that ICAO organized.

Dangerous Goods Panel (DGP) Working Group on Lithium Batteries met April 7-11, 2014, in Montreal, Canada. This panel voted in favor on the ban of the shipment of lithium metal cells in passenger airplanes with the provision for approvals (this does not include lithium metal cells shipped with equipment). They began Development for Guidance Material for approvals to ship small quantities of button cells. This ban needs additional ICAO approvals. Recommended Date of implementation January 1, 2015, was discussed??? It still has to go through the ANC and the Council. There is some discussion of another Multidisciplinary meeting prior to the late October-early November 2014 DGP meeting. It is the intent of the group to take up the transport of lithium metal cells in cargo aircraft at that meeting.

Transport Canada Lithium Battery Working Group Status (M. Labbé – Transport Canada)

Mandate: to consolidate Transport Canada's knowledge base on this topic and identify, discuss, and analyze issues relating to transport and handling of lithium batteries. The WG may make recommendations to the TDG Director General. Transport Canada Lithium Batteries WG was established in 2012. This WG developed cost-effective awareness material in 2012 and 2013: TDG website material to target shippers and general travelers. WG comprised of 4 areas: compliance; awareness; regulations; and research, data collection, and risk analysis. It is a multi-modal WG.

Hill: the FAA and the CAA are putting together Training Videos. One of them was shown at the DGP by Geoff Leach. They are for cargo handlers, shippers, etc. We have coordinated this through our international Cabin Safety Research Technical Group, but the TCCA member has retired. You may want to have someone from your group participate in this group. It is an authorities only group.

Freighter Fire Protection During Smoke/Fire/Fume Events – (B. Brown – UPS)

Bob is a member of the UPS/IPA Safety Task Force. The UPS air business model has changed significantly in the last 20 years primarily because the transportation of battery and energy is growing. Lithium-ion market was \$11.7 billion and is supposed to double by 2016. Ferguson: there has been a lot of discussion about a continuous smoke source, as a comment for those who are not familiar with certification, there is a continuous smoke source requirement as part of certification. Brown: I can't speak to the regulation, I can only speak to the real world. The GAO did a report last year that dealt with smoke in the cockpit. We actually commented on that report and found more than the eight the GAO included in the report. Hill: there are two different problems with smoke, one is certification of smoke getting into a cockpit; and smoke evacuation. Most people look at smoke removal from the cockpit or other places in the airplane takes place after the source is mitigated. There are no real smoke control procedures that have been identified. There was a program years ago, and you might want to look into that again.

Lithium Batteries in Aircraft Applications at Airbus – (P. Rohrbach)

4 zones: cabin, cockpit, design, cargo. Airbus has developed cabin procedures and cockpit procedures. Paul reviewed Airbus' activity regarding carriage of lithium batteries and its participation in international working groups and committees addressing this issue.

Research into Fire, Smoke, or Fumes Occurrences on Transport Airplanes – (R. Hill)

This study has been commissioned by the FAA and UK CAA. It involves collecting and analyzing data related to smoke, fire, and fume events on US-registered airplanes (both passenger and cargo airplanes). Data period is 2002 to 2011. Objectives: collect data relating to occurrences involving fire, smoke, fumes, odors and false fire/smoke warnings. Compile into Occurrence Database. Sources: FAA Aviation Safety Information Analysis and Sharing Systems (ASIAS), the NTSB Accident Database, and FAA Service Difficulty Reports (SDRs). The project is scheduled for completion by April 2015. Initial data analysis should be completed by January 2015. The Occurrence Database has been constructed, and data entry for 2002 and 2003 is now complete. The initial analysis has started. Freiling: initially you said the timespan will be ending at 2011. wouldn't it make sense to include up through 2013, because of new technology smoke detectors being used in aircraft starting around 2010 to get the data on false alarms? Hill: We would like to bring it up to data, but most of the funding to do this is the labor of going through the SDRs, ASIAS, and NTSB Accident Database. Someone who has knowledge of aviation needs to collect the data. You could use the same Occurrence Database for other projects/studies and/or even add fields to it later for other projects/studies. Madden: what is your database going to look like? Hill: it is an Excel database with approximately 40 fields. Chattaway: is it intended to be publicly available? Hill: I am not sure right now about the availability of the database. However, there will be a report publicly available.

Energy Release of Lithium Ion Batteries at Different States of Charge (D. Blake)

This work is primarily being done by the folks in the FAA Fire Safety Chemistry lab at the FAATC. The FAATC Chemistry lab provided data on the chemical composition of 18650 lithium-ion batteries. Studies were done using the cone calorimeter and the bomb calorimeter which measures chemical energy. The first series of tests used nichrome wire wrapped around the battery to trigger thermal runaway. Question: did you find any difference in your results compared to published results? Did you find something surprising from these results? Blake: I haven't seen any comparison of our chemists' work compared to others' results. Ferguson: Do you know what the levels of oxygen are measured in the cone calorimeter? Do they have any plans to do this? Blake: I don't know of any plans to go to that level of detail. Ferguson: is there good data to make the comparison of energy release from a standard chemistry lithium-ion and lithium-metal battery? Member comment: there is very little data for lithium metal batteries.

EASA Rulemaking Activity Regarding Halon (T. Loevenich)

RMT.0560, NPA 2014-XX in progress "Halon: Update of Part 26 to comply with ICAO Standards" This is for lavatory and handheld extinguishers only. Schedule: NPA draft: March 13, 2014. Commission Regulation: July 2016 CS26: July 2016.

RMT.0273, NPA 2011-14 closed: Removing Halon from Book1 of CS-23/-25/-29
RMT.0206 in progress: new ETSO-2C515 for halon-free portable fire extinguishers. It will be based on SAE AS6271. NPA: being drafted.

RMT.0368: planned: safety concerns for halon contamination to be addressed.

Thomas posed this question: How will built-in extinguishing systems in cabin crew rest compartments be handled? He has asked this question and has not received an answer yet. Ferguson: there are a few out there. I think the general thought is the cutoff date for cargo

compartment systems would apply to those crew rest compartments using the same kind of fire suppression method. I have an expectation that if it is a fixed fire suppression for a crew rest it is like a fixed fire suppression for a cargo compartment.

Working Group Member Presentations:

Shipment of Lithium Batteries Technology Concept, Development and Testing – Update
(J. Green – AkroFire)

This is a follow-up update to the presentation given at the December 2013, Seventh Triennial International Aircraft Fire and Cabin Safety Conference. We are not intending this method for bulk shipments of thousands of batteries. Rogers: Why not? Green: only because the volume of the packing chips/peanuts you would need would be such a large quantity. We are thinking this may be a good way for shipping companies to pack items like a few cell phones being returned to a manufacturer. Gatsonides: what are the gasses being released when the material is starting to fuse? Green: I will look into that.

Additional Discussion

There was no additional discussion. Meeting adjourned.