

INTERNATIONAL AIRCRAFT SYSTEMS FIRE PROTECTION WORKING GROUP MEETING

July 17-18, 2001

Hosted by Kidde Aerospace, Wilson, North Carolina

TUESDAY, JULY 17, 2001

Systems Fire Protection Presentations/Discussion

Full-Scale Ground-Based Inerting Testing with B747 SP – B. Cavage

Bill reviewed the background of this program. The Research Plan and the Testing Safety Plan have been written. The Preliminary Testing schedule is set to begin in August 2001. The installation of the Testing Control Center and Instrumentation has begun. Bill provided an overview of the planned instrumentation. A diagram of the Gas Sample Locations was shown. The work pending was also reviewed.

Model Manifold Design – B. Cavage

Bill reviewed the background on the Scale Model Inerting Testing. A diagram of the Scale Model Bay Convention was shown. Bill discussed the preliminary balanced data. The conclusions and summary of these experiments were reviewed.

Aviation Rulemaking Advisory Committee (ARAC) on Flammability Reduction in Fuel Tanks – R. Hill

The draft report is currently under review and discussion with the FAA. The publication date has been delayed. The ARAC process is a method for harmonizing rulemaking with aviation authorities in the world.

Fuel Tank Ignition Experiments at Reduced Oxygen Concentrations – S. Summer

These tests were conducted to determine the Lower Oxygen Limit of Flammability at altitudes of 0-40kft. A diagram of the test apparatus was shown and described. Steve discussed the Methane Validation Test experiments conducted and the results of these experiments. The results of the JP-8 LOLF Tests were also reviewed. The Future Plans include improving the pressure measurement system.

Additional Related Discussion – R. Hill

Ivor Thomas (FAA Chief Scientist and Technical Advisor for Fuel Systems) has developed a spreadsheet to calculate the fuel/air mixture. This spreadsheet is available on the FAATC Fire Safety Section website (www.fire.tc.faa.gov). It is in an MS Excel spreadsheet.

One of the concerns brought up in the ARAC meetings was additional air pollution at airports created by ground-based nitrogen inerting. Hazard to personnel walking past the vent was also a concern. As a result of this concern, measurements were taken at several locations near the vent when the tank was being inerted. It was determined that the concentration measurements were not cause for concern.

OGBI Design – R. Hill

We attempted to obtain information (i.e.: power required, pressure from APU, etc.) from the aircraft manufacturers (with little success) for a few years in order to design systems. We have contracted four companies (Medale, Parker Aerospace, FR High Temp, Shaw Aerospace) to design an on-board ground

based inerting system. Other advisors on this system include representatives from the NASA fire safety research program and the FAA Fuel Systems area. This group is currently researching on-board power sources, parts sources (off-the-shelf parts), on-board location of the system, and the system design. This group discussed various time requirements for inerting the fuel tanks and the cargo compartments in determining the specs/requirements for this system. This group took pressure, temperature, power, etc., measurements at the FAATC B747 SP in order to determine additional needs for the design of this system.

NASA Update on OBIGGS/OBOGS – C. Chang (NASA Glenn Research Center)

The NRA described during the March IASFPWG meeting has been put on hold for all but one element. NASA will fund a 6-month engineering study that will determine how feasible it is to develop an OBIGGS or OBOGS system. NASA has worked through Boeing in the past to obtain how much power, etc., is required to run one of these systems—this information is currently on the FAATC Fire Safety Section website in PDF Format (check the instructions on the website for viewing this document as it is an extremely large file).

WEDNESDAY, JULY 18, 2001

Lavatory Extinguishers – R. Hill

Dick recapped what has been accomplished in this area. The MPS has been slightly modified and that modification is now on the FAATC Fire Safety Section website.

Airbus has conducted several tests and has received CAA approval on use of lavatory extinguishers containing FE-36.

Handheld/Lavatory Extinguishers – R. Hill

FAA management and the U.S. EPA (Associate Administrator) have drafted a letter to strongly encourage airframe manufacturers and air carriers to use alternative agents in lavatory and handheld extinguishers since there are now alternative agents that have been approved. Underwriters' Laboratories will be setting up the test apparatus for approving handheld extinguishers with alternative agents for aviation use (a sticker to indicate 'approved for aviation use' will be placed on those that pass). Nothing similar is being done in Europe at this time.

Engine Nacelle – R. Hill

There have been continual problems with the current halonyzer. Doug plans to be ready to run initial tests on at least one alternative agent sometime in August 2001 and have results of these tests available during the October 2001 conference. If the Halonyzer II is not up and running by mid-August, a company will be contracted to provide operational halonyzer equipment. Dick reviewed some of the problems Doug has incurred and solved since the spring 2001 meeting. The guidance material is available on the FAATC Fire Safety Section website (www.fire.tc.faa.gov).

Fire Detection Work – D. Blake

Aircraft Cargo Compartment Fire Detection – D. Blake

FAATC is working on defining specifically what should be detected. Dave briefly reviewed the background of this project and the work that has been done to date. He reviewed and discussed the results of a number of the tests he has conducted in order to determine what signals occur that could be measurable for detection. A

schematic of the DC-10 Test Article set-up for these tests was presented indicating the areas where the flaming resin block scenario was set-up. Fire detection in several different sized cargo compartments with various ventilation rates is being studied in this project. Dave discussed diagrams of the alarm times for the flaming resin tests and the smoldering resin tests he conducted in the 3500 cubic foot volume compartment. He explained the planned future work in this project (alcohol soaked rags, suitcases, and shredded newspaper scenarios will be tested).

Sandia Math Model – J. Suo-Anttila

Modeling Smoke Transport in Aircraft Cargo Compartments: Goals: improved certification process including specify sensor alarm levels and reduce the number of flight tests. In addition, validation using FAA full-scale experiments. Jill presented and explained the results of an earlier CFD Simulation and demonstrated the fire model. She briefly reviewed theoretical modeling of cluttered spaces such as aircraft engine nacelles.

Water Mist System (MPS for Cargo Compartment Test Results) – J. Reinhardt

John reviewed the four MPS Test Protocols (bulk load fire, containerized fires, flammable liquids, and aerosol can explosion simulation). He also presented schematics and explained the MPS Test Protocol for the various tests. A new test scenario combining the aerosol can simulator with 58 cardboard boxes was presented and described. Several tests were also conducted using a water mist and nitrogen suppression system. John presented and described the specs of the water mist system (water mist only) he used in this test program. He also described the specs of the water mist system with nitrogen (N₂). He presented the results of one bulk load, two containerized tests, and a number of surface burning tests conducted using the water mist with nitrogen suppression system. This test work was done in conjunction with finalizing the development of the cargo compartment Minimum Performance Standard. The MPS should be finalized within the next month if the Task Group is in agreement.

Environmental Issues – T. Cortina

At the current time the Bush administration does not intend to become a party to the Kyoto Protocol. Individual countries continue to make changes, etc., on their own. The European climate change document was finalized last month.

Working Group Member Presentations

Progress Report on BF Goodrich 244 Fire Suppressant – D. Olander

A copy of his presentation is available on the FAATC Fire Safety Section website.

Aircraft Fires in Inaccessible Areas – R. Hill

There are two approaches to this problem. We are currently investigating how to detect and suppress fires in inaccessible areas of the aircraft. The system used or the approach taken to extinguish such fires may depend on the specific inaccessible area. There have been numerous accidents over the years where fires in inaccessible areas have caused loss of life or loss of aircraft due to these fires getting out of control. There are some proposals out to change flammability standards in these areas. This is a very complicated issue. There is a new Task Group that has been formed within the Systems Working Group to investigate this issue. FAA management is committed to improve the fire threats, detection, and suppression in inaccessible areas.