Burnthrough Task Group Summary

Discussion of Round Robin IV Results. A discussion of the work performed by K. Tran revealed some interesting information regarding the proposed burnthrough test. Analysis of the heat flux and temperature correlation of the burner flame, intake velocity and temperature, as well as the impact of the test cell temperature were reviewed. K. Tran's presentation is posted on the Fire Safety Section's website for everyone's inspection.

Air Velocity Measurement. Testing and research conducted by J. Davis indicates that the existing air velocity sensor (Omega HH30) may quickly fall out of calibration if used continuously. The sensor was intended for brief duty periods only.
Action Item: All labs should send their air velocity sensors to Omega for recalibration prior to conducting further tests.
The environment in which this sensor is used (burner intake) may also be too harsh, as the temperature routinely exceeds 100^{o}F in this area during testing. The normal temperature operating range of the sensor must be determined to see if it is suitable for this application. Humidity may also impact the life of the instrument, as this can cause corrosion to form on the shaft/bearing interface, which can impair the accuracy of the sensor.
Action Item: J. Davis will contact Omega to determine the operating limits of this device, to determine if it is suitable for this application.

J. Davis also conducted a head-to-head comparison of 2 air velocity sensors, which revealed slight differences even after recent calibrations. In addition, by reversing the flow direction, different results were obtained, even though the manufacturer claims the flow direction will not impact results. The location of the air velocity sensor also plays a big role in the measurements. It is possible that mounting the sensor close to the burner (i.e., using an airbox) may not yield accurate results due to the formation of a vortex from the blower to the air velocity meter. It was recommended that a straight section of pipe be used several feet upstream of the blower to allow stabilization of the air flow for the most accurate measurement.
Action Item: Develop a standardized method for ducting air into the burner, and develop suitable language for conducting the intake air velocity/flowrate measurements (J. Davis & T. Marker)

Other alternatives were discussed to better measure the amount of air entering the intake section of the burner. By using a mass air flow sensor, the effects of temperature and altitude could be eliminated. Some mass flow sensors are quite expensive, so the consensus was to first attempt to continue using the HH30. All labs agreed to send their sensors back to Omega for recalibration prior to running further round robin tests. Other options were also discussed, including the use of a bell-mouth device that would rely on pressure differential for determination of air flow.
Action Item: All task group members were asked to investigate various air flow sensing instruments (mass flow and others) to determine if a relatively inexpensive and accurate replacement could be made for the existing Omega HH30.

Heat Flux Transducer Accuracy. The accuracy of the heat flux transducers was also discussed.
Action Item: In order to obtain the most accurate calibration and test results, all round robin participants agreed to send their heat flux transducers back to the FAATC for recalibration. Please send the unit to:
FAA William J. Hughes Technical Center
Atlantic City Int'l Airport, NJ 08405
Attn: Tim Marker, bldg 275

Round Robin V. The current level of interlab data scatter was discussed. Although the latest round robin results indicated the data scatter has continually declined over the course of the 4 round robin test series, the consensus was that it still could be better. While the participants agreed that it would be virtually impossible for the results of all the labs to be identical, there are still a few minor problems that could be addressed with the test method to make it more consistent. Several task group members felt that producing the correct burner heat flux level was the most important parameter in obtaining accurate interlab test results. An analysis of the past round robin results indicates that many labs are still as much as 10% lower than the recommended heat flux output (16.0) for conducting the test. Others argued that while heat flux was important, the correct air flow through the burner, and hence, air force impacting the sample, was equally important. Many of the materials tested in the round robins are very thin with low mass per area, which makes them susceptible to differences in the resultant air force from the burner. In light of this, the task group members agreed that a one- or two-material round robin should be performed with 20-30 samples. Half of the samples could be run after calibrating the burner to obtain a heat flux reading of 15.2 Btu/ft^2 sec, regardless of the intake air velocity. The remaining half of the samples could be run after using the existing calibration method whereby the air velocity is set at 2150 ft/min, and the heat flux is recorded only (i.e., test may be run if heat flux level is not within prescribed 16.0 +/- 0.8 Btu/ft^2 sec). This comparison should allow a determination of the critical factor in obtaining the most accurate interlab test results (heat flux or air velocity).
Action Item: once the heat flux transducers and air velocity sensors are recalibrated, the FAA will arrange for a round robin test series as described above. Tim Marker will contact the appropriate members to obtain the necessary materials, and will send complete instructions to participating labs.

Standardization of Other Test Parameters. The measurement of other test parameters such as the test cell temperature, test cell air velocity, and duration between tests must be described in greater detail. The current language allows for a variety of sampling methods, locations, etc, which could increase the level of scatter in the test results.
Action Item: The Tech Center will develop more descriptive language for these parameters, and include it in the advisory material for the next round robin test series.

Next Task Group Meeting. The task group also agreed that a 1-2 hour meeting should take place at some point during the upcoming Cabin Safety Conference at Atlantic City in October. Details of the next meeting time and place will be given as the information becomes available.