

Intermediate Scale Flammability Testing of Wiring and Ducting Using a Vertical Fuselage Section

Robert Ochs, PhD

In July of 2013, Asiana Airlines flight 214 touched down early on approach to SFO, resulting in a crash landing with rupture of the fuselage and a small oil fire on a detached engine directly adjacent to an environmental control system (ECS) riser bay. Although the fuselage was found to have not burned through, a very large cabin interior fire resulted confined to the inaccessible areas behind cabin sidewalls, stowbins, and ceiling. The post-crash investigation determined the most probable cause of the fire was the ECS riser ducts being heated by the fire through the skin, and propagating a significant fire into the overhead area.

Testing was performed to determine the ability of vertically oriented riser ducts to propagate flames along the surface when confined to a simulated environmental control system (ECS) riser bay lined with thermal acoustic insulation and a sidewall panel that meets the low heat release requirements of FAR 25.853. A standard fire source for inaccessible areas was used to initially ignite the ducts. Wire bundles were also tested in a vertical orientation to determine the level of flame propagation in the same scenario. The test results will be used to determine the pass/fail criteria for the new lab-scale Vertical Flame Propagation (VFP) test being implemented for extensively used inaccessible area materials other than thermal acoustic insulation.