AIR LINE PILOTS ASSOCIATION, INTERNATIONAL

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January 17, 2001

U.S. Department of Transportation Dockets
Docket No. FAA-2000-7909
400 Seventh Street SW, Room Plaza 401
Washington, DC 20590

Re: Notice of Proposed Rulemaking (NPRM) 00-09; Improved Flammability Standards for Thermal/Acoustic Insulation Materials Used in Transport Category Airplanes

SUPPORT WITH COMMENTS

Dear Sir or Madam:

On behalf of more than 59,000 pilots flying at 49 airlines, the Air Line Pilots Association (ALPA) submits comments in support of this proposed rule, NPRM 00-09, Improved Flammability Standards for Thermal/Acoustic Insulation Materials Used in Transport Category Airplanes. The changes proposed in this NPRM are not broad enough in scope. The proposed rule signifies an opportunity to improve safety, however it is inadequate as proposed. The proposed exclusion of aircraft seating 19 passengers or less, and to only insulate the lower half of the fuselage will significantly degrade the effectiveness of this safety proposal. This new standard for delaying burnthrough should be applied to all aircraft used in air carrier service and throughout the cabin. We submit the following comments for your consideration in finalizing this rule change.

Costs of the Proposed Rule

The NPRM states that "the FAA has determined that some materials that would meet the proposed test requirements cost and weigh no more than materials currently being installed in newly-produced airplanes." We understand this to mean that these materials are comparable in price and weight to the commonly used fiberglass insulation. Certainly there will be costs regarding design, administration and implementation, however, we find the proposed values for costs to be far above what would be expected for this change in design.

The costs for engineering work would appear to be in vast majority of an administrative nature, consisting of changing specifications and plans. There is no analytic task in making the change as outlined. The change described in the NPRM requires changing from 3 inches of fiberglass batting with a vapor barrier to be 2 inches of fiberglass with 1 inch of Curlon (or whatever other brand qualifies) with a new vapor barrier. Thus, working through the cost analysis, it appears that the engineering costs are exaggerated. The FAA estimates that the cost for redesign of six narrow-body twin-engine airplanes, 6 wide-body twin-engine airplanes, and 3 wide-body airplanes with 4 engines would cost

$13.8 million.[1] This distributes evenly among these types to be $920,000 per aircraft type. The loaded labor rate is assumed to be $130/hour. This results in a value of 7,076 hours of labor per design, or 3 ½ man years. We find this estimate exceedingly high, and consider a labor amount of at most 1,000 hours per design to be more in line with the state-of-the-art. Using this figure to work out the engineering costs results in a cost per airplane type of $130,000, and a net cost to implement in all aircraft of less than $2 million ($1,950,000).

Considering the minimal costs to change to a vastly better thermal insulation that can significantly delay post-crash fire burnthrough leads us to conclude that the proposed standard should be required wherever insulation is installed, regardless of aircraft seating capacity or insulation location.

Applicability

The traveling public expects all aircraft in commercial passenger service to be equally safe. However, the proposed rule makes two limitations in applicability that may cause safety to vary with aircraft types to which we must strongly object. First, the proposed exclusion of aircraft with less than 20 seats in the passenger cabin is unconscionable, clearly in conflict with the FAA's established pattern of to provide one level of safety. Second, the proportion of the fuselage that is protected must be increased over the presently proposed lower half because crashes are not predictable enough to only provide the ideal protection.

Improved Insulation Should Be Required For All Transport Airplanes

We acknowledge that other rules have been written with a standard that is dependent on the number of passengers. The NPRM notes that the regulation for interior material flammability and the aisle width are two examples. Other examples are the crash ax requirement and the emergency evacuation demonstration. However, the FAA has deemed to establish a "One Level of Safety" policy that is intended to provide uniform standards for the traveling public, regardless of the size of the airplane. In the preamble to Amendment 121-151, the rule on "Commuter Operations and General Certification and Operations Requirements", the FAA stated, "as the commuter market grows, the disparity between the two sets of requirements is of more concern. There is no longer any justification for maintaining two sets of standards for scheduled operations in airplanes with a passenger-seating configuration of 10 or more seats. When a passenger pays for a ticket on an FAA certificated commuter operation, that passenger must be assured of the highest possible level of safety." This proposed rule must keep in line with this intent, that all aircraft seating 10 or more passengers are protected to the same standard from a post-crash fire.

The NPRM uses the logic that the smaller airplanes can be evacuated more quickly than larger airplanes. We find the logic flawed in this case, since achieving a rapid evacuation before the cabin becomes unsurvivable cannot be guaranteed. While small aircraft (seating 19 or less) do usually achieve a faster time to evacuate the cabin, there may be

[1] No costs are assumed for implementing this change in design, since it will be implemented in new type certification, new construction, and in aircraft scheduled to have insulation replaced.

times when this is not the case, and where extending the time for survivability can save lives. Clearly, it would have been beneficial in the Quincy accident involving the Beech 1900D where all the exits could not be opened.[2] In the Quincy accident, there were witnesses who reported running to the accident site from the FBO office and arriving at the scene, hearing people asking for help. They reported the cabin was full of dark smoke, and dark smoke poured out of the left aft cargo door when that was opened as rescuers attempted to gain entry to the airplane. It appears clear that providing improved insulation that would have delayed fire penetration which might have helped provide more survival time for the trapped occupants. While it is not a subject of the current NPRM, it would also have been beneficial to provide the crew with a crash ax. If both of these had been provided, it is our view that the number of fatalities would have been far less.

An accident involving a very hard landing involving a Beech King Air operating in cargo delivery at Sea-Tac on 8/13/97 had the pilot trapped in the fuselage while a fire erupted outside the airplane due to the impact. The pilot survived thanks to the rapid emergency response of the airport. Better insulation on this airplane would have delayed burnthrough and extended his time for survival, increasing the time available for rescuers to act.

Smaller airplanes in the commuter and normal categories generally have thinner aluminum skin panels than larger transport airplanes. While these panels are not robust in exposures to post-crash fires, the thicker fuselage skin panels do take longer to burn through. Thus it is contradictory to exclude these airplanes from the requirement for improved burnthrough protection. The smaller airplanes need better insulation, regardless of the time demonstrated in carefully contrived tests to show the airplane's theoretical evacuation capability. This insulation will help in the practical evacuation where complicating factors such as non-functional doors can make the difference between life and death.

Airplanes seating less than 20 passengers should also be required to have the insulation meet the fire standards proposed in this NPRM. There would be benefit for passengers and crew in the event of a post-crash fire when evacuation is impeded. Delaying burnthrough should be an elementary design standard for all airplane designs. It would be irresponsible to not use the better performing materials, especially considering the fact that they can substituted on an equal basis for weight and cost.

Improved Insulation Should be Installed Around Entire Fuselage

The NPRM proposes to require that only the lower half of the fuselage be protected by the insulation meeting the new standards. The existing insulation is only tested to comply with FARs 25.853 or 25.855, depending on whether the insulation is adjacent to the passenger compartment or the cargo compartment, respectively. These standards reference Part I of Appendix F of Part 25, a Bunsen burner test with flame contact for only 12 seconds. Thus the proposed rule would allow that the insulation on the top half of the fuselage only have to withstand a Bunsen burner for 12 seconds, while the lower half of the fuselage must withstand a 6.0 gallon per hour oil burner for 4 minutes. When

[2] Great Lakes Aviation Beech 1900 collision with a Beech KingAir at Baldwin Field, Quincy, IL, 11/19/96

it is considered that the new material (for the lower half of the fuselage) will be comparable in cost and weight, it seems irrational to not require the improved material anywhere that thermal/acoustic insulation is used.

The NPRM states that the "FAA has considered whether to make the burnthrough requirement applicable to only certain areas of the fuselage". The NPRM further states that the "lower portion of the fuselage is the most susceptible to burnthrough from an external fuel fire because flames from such a fire would typically impinge on the fuselage from below." Then it is concluded that the "lower portion [of the fuselage] would derive the most benefit from enhanced burnthrough protection." We acknowledge that the radiant energy is most severe on the lower portion of the fuselage, but this is subject to variables such as wind and whether the airplane is on its gear or the gear is collapsed. In the report "Full-Scale Test Evaluation of Aircraft Fuel Fire Burnthrough Resistance Improvements", it is stated that "an aircraft with its gear extended is more vulnerable to burnthrough from a ground-level pool fire than an aircraft resting on its, belly, mainly because of the increased temperatures sustained at the upper flame area of the fire." This suggests that the effect of flames on an airplane with collapsed gear would be experienced higher on the fuselage. Our data on accidents shows that gear collapse occurs in more than 12% of serious accidents. Clearly, this makes a gear collapse a likely scenario that should be included in the range of test conditions. This is based on analysis of 1,262 accidents worldwide which were not catastrophic events. In 24 of the accidents, the fuselage wreckage was inverted (partial tabulation attached). In such a case the insulation being on only the lower half would fail to have the intended effect. Before adopting the rule for only the lower fuselage meeting the improved standard, the FAA should ensure that their research shows that fuselage burnthrough can be delayed equally as long as the test requires when the lower half of the fuselage is protected with the insulation meeting the improved standard while the upper fuselage is protected to the existing minimal standards.

The report "Full-Scale Test Evaluation of Aircraft Fuel Fire Burnthrough Resistance Improvements" indicated that a "thermogauge radiometer with a 136° angle of incidence (radiative heat flux only) reached approximately 12 Btu/ft^2-second" in comparison to the "maximum heat flux of between 14 and 16 Btu/ft^2-second." It seems prudent to provide the lesser-heated section of the fuselage with insulation much more robust than the current standard, if not something meeting the new standard.

Further, the implementation of this proposal would be subject to human error and introduce a risk of fire entry due to improper installation. It would be far better to have one variety of insulation than to have two different types depending on the location in the fuselage. This may be more of an issue for the initial design of where to stop the insulation, however, there are numerous accidents involving incorrectly arranged parts that were not realized during the course of assembly that resulted in an accident complication.

Tests Standards – Flame Propagation

We cannot comment in detail on the intended test methods, however, we have some operational experience we are compelled to pass on to ensure the tests are effective in providing protection for realistic operations. Our comment is simply that the insulation and its vapor barrier should be tested in a less than pristine condition, so that it is proven to be effective when arranged as it will be in service. It is possible that the environmental pollutants of aircraft cargo compartments will degrade the effectiveness of the insulation. It is common to have some oiliness on the interiors, and this should be evaluated to ensure it does not degrade the insulation. Similarly, it must be ensured that repeated saturation with moisture does not degrade the fire barrier feature of the insulation. We are concerned that dirty insulation could enable fire to propagate on the vapor barrier to a much greater extent than when the vapor barrier is in pristine condition. We suggest that the FAA examine insulation actually in service to determine the worst-case level of contamination and use that for the tests. As a corollary, establishing such a standard would also serve to benefit maintenance inspectors (airline and FAA personnel) for determining when insulation should be replaced due to contamination.

Conclusion

In conclusion, we urge the FAA to apply the standards for burnthrough protection to all new aircraft and to all scheduled air carrier aircraft insulation replacements that occur after two years from the effective date of this regulation. There should be one standard for insulation. The FAA has done a great job of developing a rigorous test and it should be swiftly implemented across the board to improve safety for all passengers on commercial air carriers.

We suggest that the FAA consider revising the burnthrough penetration portion of this rule. First, it should be made to apply to all air carrier aircraft. Secondly, we recommend that the regulation should be rewritten to be a performance standard that applies to the delay of fire penetration into the airplane cabin, to be approved by demonstration, engineering analysis or a combination thereof. The goal should be to show that the fuselage is thermally insulated to prevent fire penetration into the cabin and flight deck for 4 minutes exposure to the fire defined in the tests. This is the real goal of the rule, and should be defined as the standard regulation that must be met.

Thank you for the opportunity to comment. We welcome discussing this further in detail. Please arrange to meet with us by contacting Staff Engineer Pierre Huggins, at 703-689-4211, or via email at hugginsp@alpa.org. Thank you.

Sincerely,

Tom Phillips

Captain Thomas J. Phillips
Acting Chairman
ALPA Accident Analysis Group

Attachment – Tabulation of complications experienced in non-catastrophic accidents worldwide

1,129 accidents examined (accidents which were not catastrophic (e.g. loss of control crash from high altitude, hitting mountain, etc. were excluded) and evaluated for complications to fire fighting that were experienced

Data span: 03/17/1940 - earliest date, 04/19/1997 – latest date

DARKNESS	178
COLLAPSED NOSE GEAR	166
RAIN	145
COLLAPSED ONE MAIN GEAR	125
OFF RUNWAY	94
WATER	87
DITCH	86
COLLAPSED ALL GEAR	77
SOFT GROUND	74
TREES	73
FOG	70
POOR VISIBILITY	70
GEAR UP	61
FUSELAGE BROKEN	60
STRONG WINDS	50
POOR WEATHER	50
HIT A BUILDING	49
STRUCK ANOTHER AIRPLANE	46
HIGH ENERGY IMPACT	46
WING BROKE OFF	33
SNOW	32
DOWN SLOPE	32
EVACUATION	32
ENGINE BROKE OFF	30
COLLAPSED ONE MAIN AND NOSE GEAR	29
FUEL LEAK FROM WING	27
COLLAPSED BOTH MAIN GEAR	26
CROSSED ROAD	24
AIRPLANE INVERTED	24