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March 31, 2009

Mabel Echols
Office of Information and Regulatory Affairs, Records Management Center
Office of Management and Budget
10th Floor NEOB
725 17th Street, NW
Washington, DC 20503

RE: Office of Management and Budget (OMB), Request for public comments on how to improve the process and principles governing Federal regulatory review. (74 FR 8819, comment period extended by 74 FR 11383)

Dear Ms. Echols,

The Association of Flight Attendants-CWA, AFL-CIO (AFA-CWA) represents more than 50,000 flight attendants at 20 airlines. For over 60 years, our union has served proudly as the voice for flight attendants in the workplace, in the aviation industry, in the media and on Capitol Hill. Given the recent history of regulatory dysfunction throughout the Federal Government, we are pleased that the Director of OMB, at the direction of President Obama, is developing a set of recommendations for a new Executive Order on Federal regulatory review. We further applaud the Director's decision to seek the public's guidance in this matter.

In reviewing comments[1] submitted by various parties through March 25, 2009 in response to the OMB request, AFA-CWA finds that many of the substantive recommendations contained in a report[2] referred to by OMB Watch, the nonprofit research and advocacy organization, are particularly compelling. Specifically, the Executive Summary of the OMB Watch report lists six principles of good government that should be embraced in order to repair the broken regulatory system:

1. Regulatory decisions should be timely and responsive to public need.
2. The regulatory process must be transparent and improve public participation.
3. Regulatory decisions should be based on well informed, flexible decision making.
4. Authority to make decisions about regulations should reflect the statutory delegation granted by Congress.
5. Agencies must have the resources to meet their statutory obligations and organizational missions.
6. Government must do a better job of encouraging compliance with existing regulations and fairly enforce them.

[1] http://www.reginfo.gov/public/jsp/EO/fedRegReview/publicComments.jsp
[2] *ADVANCING THE PUBLIC INTEREST THROUGH REGULATORY REFORM: Recommendations for President-Elect Obama and the 111th Congress*, OMB Watch, November 2008. http://ombwatch.org/files/regulatoryreformrecs.pdf

These principles are relatively simple and non-controversial. Unfortunately, it has been our experience, from participation in numerous rulemaking efforts and through observing compliance and enforcement interactions between Federal agencies and the commercial transport aviation industry, that too often one or more of these principles are violated, leading to margins of safety, health and security that fall short of those expected and demanded by the public. Below we discuss five case studies involving rulemaking issues that affect flight attendants to illustrate by example the adverse impacts of failing to heed one or more of the six principles listed above. These case studies include occupational safety and health protections for flight attendants; design standards to protect against rapid decompression caused by uncontained engine failure; the need for full-scale emergency evacuation tests; crew fatigue during ultra-long range operations; and joint regulation of airplane potable water systems by the Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA).

Occupational Safety and Health Protections for Flight Attendants

Flight attendants encounter numerous occupational hazards working onboard commercial flights, including but not limited to turbulence, severe air pressure changes, unwieldy service carts, broken luggage bins, balky exit doors and door handles, exposure to toxic chemicals that are sometimes mixed with the air bled from the engines that enters the passenger cabin, unruly passengers, communicable diseases, threats of terrorism, and emergency evacuations. Over the past three decades, internal AFA-CWA analyses of survey data collected by our local union safety and health committees and the U.S. Bureau of Labor Statistics (BLS) have shown that these hazards contribute to flight attendant injury and illness rates far in excess of those experienced by workers in almost every other sector of private industry.

On July 10, 1975, the Federal Aviation Administration (FAA) published a statement in the Federal Register[3] asserting complete and exclusive jurisdiction over crewmember health and safety on "civil aircraft in operation … from the time it is first boarded by a crewmember, preparatory to a flight, to the time the last crewmember leaves the aircraft after completion of that flight..." By asserting jurisdiction over crewmember health and safety, the FAA used Section 4(b)(1) of the Occupational Safety and Health Act of 1970[4] to prevent the Occupational Safety and Health Administration (OSHA) from extending its protections to flight attendants working onboard commercial airplanes. For flight attendants, the 1975 FAA claim has led to significant regulatory neglect in areas traditionally covered by OSHA standards, including, but not limited to, exposures to blood borne pathogens; workplace noise and hearing conservation; workplace sanitation; hazard communications; and access to employee exposure and medical records.

Following 15 years of FAA refusals to pursue occupational safety and health rulemaking requested by flight attendants, on May 8, 1990, the Association of Flight Attendants filed

[3] 40 FR 29114, 1975, http://www.faa.gov/safety/programs_initiatives/health/ashp/media/1975-notice.pdf

[4] Section 4(b)(1) of the OSH Act (1970) states that "Nothing in this Act shall apply to working conditions of employees with respect to which other Federal agencies … exercise statutory authority to prescribe or enforce standards or regulations affecting occupational safety or health."

a petition for rulemaking with the FAA that asked the agency to adopt selected OSHA safety regulations and apply them to the crewmembers working in the airline industry. In submitting this petition, flight attendants were attempting to fill the void created when the FAA asserted jurisdiction over crewmember health and safety without actually exercising that authority. Almost seven years after this petition for rulemaking was filed, the FAA finally responded in a terse, one-page letter dated June 6, 1997, in which it stated in part:

> The FAA has determined that the issues identified in your petition may have merit but do not address an immediate safety concern. Because of budgetary constraints, and the need to meet the demands of a changing aviation industry and a complex air transportation system, the FAA finds that it must dedicate its rulemaking resources to the most pressing problems and issue associated with safety. For these reasons, we are unable to consider your petition for Rulemaking; therefore it is denied.

On August 7, 2000, pressure from flight attendants and others led the FAA and OSHA to enter into an historic Memorandum of Understanding (MOU)[5] that established a joint team to identify whether certain OSHA requirements could be applied to working conditions in airplane cabins without compromising aviation safety. A December 2000 first report[6] from the FAA/OSHA Aviation Safety and Health Team concluded that many of the OSHA regulations under consideration could be implemented without implicating aviation safety concerns. Although the December 2000 report recommended that this Joint Team continue to meet to resolve various issues, it did not meet again until January, 2002, at which time no agreement on a timeline for implementation of relevant OSHA regulatory standards could be reached.

In September 2001, the Office of the Inspector General (OIG) for the Department of Transportation (DOT) issued a scathing report,[7] concluding that in the 26 years since the FAA asserted statutory authority for prescribing and enforcing occupational safety and health standards for aircraft crewmembers onboard aircraft,

> [The FAA] has not issued industry standards to address employee safety and health issues associated with working conditions onboard aircraft in operation. Instead, FAA focused its resources on providing and enforcing industry standards for aircraft design and operational problems affecting safety.

Furthermore, the OIG Report concluded that "unless FAA and OSHA resume working together, we have no confidence that industry standards will be issued in the near future to address occupational hazards." Perhaps directly as a result of this letter, the FAA/OSHA Aviation Safety and Health Team did meet again on several occasions through early 2003. However, in that time the FAA and OSHA took no concrete steps to implement the recommendations of the OIG Report, or in any other way regulate the

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[5] MOU between FAA and OSHA, signed August 7, 2000, http://www.faa.gov/safety/programs_initiatives/health/ashp/media/faa-osha-mou.pdf

[6] Aviation Safety and Health Team First Report, *Application of OSHA's Requirements to Employees on Aircraft in Operation*, December 2000, http://www.faa.gov/safety/programs_initiatives/health/ashp/media/faa-osha-report.pdf

[7] *Further Delays in Implementing Occupational Safety and Health Standards for Flight Attendants Are Likely*, DOT Office of Inspector General report AV-2001-102, September 26, 2001, http://www.oig.dot.gov/item.jsp?id=583

workplace health and safety conditions of flight attendants. On March 4, 2003, the FAA announced that it was creating an "Aviation Safety and Health Partnership Program"[8] to provide "empirical data concerning injury and illness hazards on aircraft in operation" to allow air carriers to "voluntarily" provide "selective" safety and health protections for "employees not covered by OSHA." The voluntary (rather than mandatory) nature of this initiative caused flight attendant unions to decline participation in a program seen as just one more way for the FAA to maintain its claim of exclusive jurisdiction over workplace safety and health onboard commercial airplanes. Given the difficult economics of the commercial airline industry, it is hardly surprising that this program has shown no results since its inception,[9] and that flight attendants continue to experience injury rates substantially greater than employees in most other private industries.

In reviewing the above events against the six principles recommended in the OMB Watch report, it is apparent that the FAA has failed at least twice with respect to Principle 1 (Regulatory decisions should be timely and responsive to public need,) once in 1997 with its one page letter that summarily dismissed the flight attendant rulemaking petition and later, following creation of the ill-considered ASHP. In its 1997 decision to dismiss the flight attendant rulemaking petition, the FAA also failed to see the need for requesting or assigning sufficient resources to fulfill their claimed statutory authority to enforce safety and health standards for flight attendants, thus violating Principle 5 (Agencies must have the resources to meet their statutory obligations and organizational missions.)

Rapid Decompression Caused by Uncontained Engine Failure

In 1996, the FAA concluded a rulemaking that was published as Amendment No. 25-87[10] to the Federal Aviation Regulations. The new rules specified certain design standards for subsonic transport airplanes operated up to an altitude of 51,000 feet above sea level. Amendment 25-87, based on so-called "special conditions" that had been used for certification of airplane designs for many years, resulted from a thorough, nearly seven year rulemaking process that involved the FAA, international regulators, and U.S. and foreign industry representatives. Subsequently, several manufacturers of large transport airplanes objected to the new design rules, which they claimed (for various technical reasons) made it impossible to achieve certification of large transport airplanes with wing mounted engines for flight at altitudes beyond 40,000 feet above sea level. Many previous large transport airplane types had already been certified for flight above 40,000 feet using the pre-Amendment 25-87 regulations, and flight to ever higher cruising altitudes allows greater fuel economy (obviously, an important consideration). Following the industry protests, the FAA formed a Mechanical Systems Harmonization Working

[8] 68 FR 10145, 2003

[9] Evidence for this conclusion is contained in the website of the FAA Aviation Safety & Health Program (ASHP, http://www.faa.gov/safety/programs_initiatives/health/ashp/, as accessed on March 30, 2009, last updated 4:30 pm ET February 18, 2009). At this writing, the site included only a link to the Federal Register document that first created the program, a link to the OSHA website, and links to three precursor documents: the 1975 notice claiming exclusive jurisdiction, the 2000 MOU and the December 2000 Joint Team first report. No documents showing any progress, significant or otherwise, are cited, displayed or linked.

[10] 61 FR 28684, 1996

Group (MSHWG) under the auspices of the Aviation Rulemaking Advisory Committee (ARAC) Transport Airplane and Engine Issues Group (TAEIG), to study the problem and make recommendations to the FAA for rulemaking that would provide a consensus path forward.

The engineering problem considered by the MSHWG and relevant to this discussion involved the potential for "uncontained" engine rotor burst failure. In this scenario, there is some small probability that large fragments of the failed engine will tear through engine containment shielding and cause fuselage damage, which could in turn subject cabin occupants to extreme hypoxic conditions at altitudes greater than 40,000 feet above sea level. Attachment 1, a letter sent by the Association of Flight Attendants to the FAA, dated August 7, 2003, and titled *AFA Dissenting Opinion on the MSHWG Final Report on FAR/JAR 25.841 (a)(2,3)* summarizes many of the technical issues. While the engineering issues are complex, the regulatory conflict is relatively straightforward.

The Association of Flight Attendants played an active role in the MSHWG, along with various stakeholders representing the FAA, international regulators, and several of the major airframe manufacturers. There were strong disagreements over technical issues among the parties, but eventually consensus solutions were achieved for most outstanding items. However, one proposed rule change – to allow cabin pressure altitude to exceed 40,000 feet for brief periods of time following a rapid decompression caused by engine rotor burst – proved impossible to adopt on a consensus basis. Eventually, this change was approved through a seldom-used voting procedure, but with aviation industry representatives outnumbering other participants, the vote's outcome was a foregone conclusion. Another issue that defied consensus was a recommendation from the industry representatives that the FAA adopt an "interim" policy to allow immediate use of the proposed rule changes, *before* notice and comment public rulemaking could be conducted to modify the regulations put in place by Amendment 25-87.

In the Attachment 1 letter, we registered our disapproval for the industry-supported recommendations, citing three areas where we believed the proposal failed to protect adequately the health and safety of airplane occupants following a rapid decompression event: 1) The 40,000-foot cabin altitude limit has generally been accepted as a necessary limit to protect the health and safety of unprotected airplane occupants following rapid decompression failures; 2) pending appropriate testing, validation and peer review, the quasi-analytical methodology proposed as a means of compliance lacked sufficient theoretical support and empirical evidence; and 3) the proposed "interim" policy would allow manufacturers to circumvent existing regulations and could diminish the motivation to conduct new research and obtain data necessary to validate a compliance methodology.

In spite of our strong objections, the FAA eventually adopted the interim policy (in March 2006)[11] and has used it to certify several new large transport airplane models with wing-mounted engines for flight at altitudes in excess of 40,000 feet, including the Airbus A380 and the Boeing 787. Today, more than five years after the MSHWG report

[11] *Interim Policy on High Altitude Cabin Decompression (Reference Amendment 25-87),* FAA Interim Policy PS-ANM-03-112-16, issued March 24, 2006.

was finalized[12], the fears expressed in our Attachment 1 letter have been confirmed, as the FAA has yet to even begin conducting the animal and human physiology testing deemed necessary by the MSHWG, and has yet to publish a notice for proposed rulemaking. Through use of the "interim" policy construct, the FAA (at the behest of an aggrieved industry) has managed to circumvent the formal rulemaking process.

Returning to the six principles specified in the OMB Watch report, it is our view that the process used by the FAA to essentially overturn the 40,000 feet cabin altitude limit violated at least one principle. The regulatory process was short-circuited through use of the opaque (to the general public), industry-driven and informal interim policy mechanism. Therefore, the FAA clearly violated Principle 2 (The regulatory process must be transparent and improve public participation.) We also believe that the FAA violated the spirit of Principle 6 (Government must do a better job of encouraging compliance with existing regulations and fairly enforce them.) To be fair, during the ARAC process the FAA did try to encourage the airplane manufacturers to develop designs that stayed within the performance criteria specified by the existing (and still current) regulations. However, the interim policy approach that was finally adopted is really a method that applicants can use to *circumvent* an existing regulation, in contrast to the approach taken in FAA Advisory Circulars, which are guidance documents that provide applicants one (but not the only possible) means to *show* compliance to regulations.

Need for Full-Scale Emergency Evacuation Tests

AFA-CWA strongly advocates requiring a full-scale evacuation demonstration for each new aircraft design or an increase in an existing design's seating capacity of more than five percent. Design standards, used in the design phase of a project, can be verified while the product, in this case an airplane, is still "on the drawing board," i.e., before the airplane is built. Performance standards, on the other hand, evaluate the performance of the product, often under the influence of factors that cannot be effectively integrated or evaluated during the design. Typically, a performance standard involves a test of the product after it is built. In the case of a full-scale evacuation demonstration (a performance standard) of an airplane, the factors that must be evaluated are the performance of the passengers and crew.

About ten years ago, the FAA proposed a policy change and drafted an advisory circular to allow new airplane designs or any increase in an existing design's capacity to be approved using analysis of data from past tests, rather than by conducting a full-scale evacuation test. However, at that time, and to this day, there are no analytical models capable of predicting failure of the crew and passengers to meet the performance standard, after the design standard has been met. At the time, there had been just such failures by crew and passengers during emergency evacuations; thus, we argued that no analytical methods could properly substitute for full-scale demonstrations, and therefore the FAA could not enforce its policy change. The unfortunate result of the policy change would be that the first full-scale evacuation of a new airplane will be performed by the

[12] *Mechanical Systems Harmonization Working Group (MSHWG) Final Report on FAR/JAR 25.841(a)*, dated July 31, 2003.

traveling public and improperly trained crewmembers, under emergency conditions, rather than by paid test subjects under the controlled test conditions of a demonstration. Thus, there could be no assurance that these "first" evacuations would be successful.

In a letter to the FAA dated May 7, 1999 (provided with these comments as Attachment 2), the Association of Flight Attendants reviewed the pertinent regulatory history, and recommended that the FAA rescind its policy of allowing the use of analysis in lieu of a full-scale demonstration, and not adopt its draft advisory circular. To this date, it is unclear to AFA-CWA whether this draft advisory circular has ever been converted to final form by the FAA. However, the FAA policy change allows airlines and airframe (aircraft) manufacturers to use analysis and sub-scale tests in lieu of full-scale evacuation demonstrations for certification purposes, when a full scale evacuation test would otherwise have been the norm. This policy makes the exception the rule and the rule an unenforceable exception.

The other serious deficiency in the process leading up to this FAA policy change was its refusal to require that all data related to full-scale evacuation demonstrations conducted by airlines or airframe manufacturers be provided to the FAA's Aviation Rulemaking Advisory Committee (ARAC) working group assigned to develop the draft advisory circular (AC) guidance on the conduct of such demonstrations. These data would have been valuable to the working group, but since the FAA would not require airlines and airframe manufacturers to release the information, the draft AC is neither a fully- nor well-informed document, and was biased by the very limited data selected for the group's review by an industry participant who wanted the requirement for full-scale evacuation demonstrations to be eliminated.

Therefore, with respect to the six OMB Watch principles, our view of the FAA's actions concerning emergency evacuation certification is that they are clearly violating Principles 2 (The regulatory process must be transparent and improve public participation), 3 (Regulatory decisions should be based on well informed, flexible decision making) and 6 (Government must do a better job of encouraging compliance with existing regulations and fairly enforce them.)

Crew Fatigue during Ultra-Long Range Operations

With the advent of aircraft able to fly halfway around the world without refueling, up to 20 hours or more in the air, the issue of flight attendant fatigue is more relevant now than ever. Some of the U.S. carriers are expanding their international operations to include longer flight segments that can have block times (the time between leaving, or blocking out of, the gate at the departure city, to blocking into the gate at the arrival city) exceeding 16 hours. Extensive research and appropriate regulations are required to determine appropriate fatigue mitigation strategies for all crew members, including flight attendants, and ensure that these so-called Ultra Long Range (ULR) operations are as safe as possible.

We believe that the issues of operational requirements, training, crew staffing levels and duty cycles must be considered before flight attendants participate in ULR operations. As

a first step, we further believe that regulatory authorities (in particular for our members, the FAA) must first establish firm mandatory rest requirements for ULR operations, with no allowance provided for discretionary reductions of these requirements by operators or their personnel. Recently, the FAA began to address the issue of ULR operations and create standards that would help combat fatigue for both pilots and flight attendants. Recognizing that a flight of 16 hours in duration or longer was not addressed in the U.S. regulations, the FAA reached agreement with one operator on an "operations specification" that regulates many of the duty and rest concerns specific to their ULR operation. Around the same time, two other U.S. airlines began considering their own ULR operations. The FAA, to ensure a level playing field, initiated a process to develop a template operations specification for the industry. At first, the FAA presented the two U.S. airlines seeking to start ULR operations with the proposed document; later, the FAA provided other aviation industry stakeholders (including AFA-CWA) the ability to review and comment on the document.

Although the FAA followed a relatively transparent process in developing the ULR operations specification, and in spite of the overwhelming evidence generated over the years regarding fatigue, the ULR operations specification has not been accepted by the majority of U.S. airlines that may conduct such operations. In fact, seven U.S. airline operators sued the FAA for attempting to implement the ULR operations specification outside the standard rulemaking process; within weeks, the FAA bowed to industry pressure and withdrew the requirements.[13] It is interesting to compare the FAA's rapid response to this powerful industry's pressure tactics on the one hand, with its relative indifference to our comments regarding the "interim policy," which effectively negates the current design standard requiring cabin pressure altitude never exceed 40,000 feet following a rapid decompression, as explained above. In both cases, the FAA attempted to circumvent the notice and comment rulemaking process to "fast track" a rule change. When aviation industry leaders got what they wanted with the "interim policy," no manufacturer stood up to criticize the process that led to the change, as the airlines have done with the ULR operations specification.

With respect to the six OMB Watch principles, in this instance the FAA is guilty of violating Principle 1 (Regulatory decisions should be timely and responsive to public need.) It is our belief that the FAA might once have chosen an open and public rulemaking process to develop appropriate regulations governing ULR operations; however, given the general tendency of policy makers to rely too heavily on cost/benefit analysis,[14] in an environment where regulators seem to fear the political, legal and

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[13] *FAA Drops Its Rest Plan for Pilots on Long Hauls*, Wall Street Journal, March 13, 2009. http://online.wsj.com/article/SB123698874004026085.html

[14] U.S. Code Title 49, Transportation, Part A—Air Commerce and Safety. Chapter 401, § 40101 concerns regulation of air transportation:

> (a) ECONOMIC REGULATION.—… the Secretary of Transportation shall consider the following matters, among others, as being in the public interest and consistent with public convenience and necessity:
> (1) assigning and maintaining safety as the highest priority in air commerce.
> …
> (3) preventing deterioration in established safety procedures, recognizing the clear intent, encouragement, and dedication of Congress to further the highest degree of safety in air transportation and air commerce, and to maintain the safety vigilance that has evolved in air transportation and air commerce and has come to be expected by the traveling and shipping public.

financial power of well-funded industry organizations, the FAA chose instead to rely on an easier-to-implement operations specification. This is unfortunate, as regulation of ULR operations should not be delayed. Eventually, the FAA will be required to initiate a formal rulemaking process on ULR operations. Given the pressing need for standards governing long haul operations, we urge the OMB to overhaul the regulatory system and allow rapid development of needed regulations to proceed in a timely manner.

EPA and FDA Regulation of Airplane Potable Water Systems

On April 9, 2008[15] the U.S. Environmental Protection Agency (EPA) published a proposed Aircraft Drinking Water Rule (ADWR). Since 2005, AFA-CWA has been an active participant in the process that led to the proposed rule. Following the severe impacts to the industry after the tragic events of Sept. 11, 2001 that included serial bankruptcies, communicable disease threats including SARS, drug-resistant TB and avian influenza, and passenger fury over long tarmac delays, flight attendants shoulder increased responsibility for the safety and health of passengers and crew during routine on board operations. Potable water for drinking, food (including infant formula) preparation, hand washing and general sanitation helps to ensure the safety and health of travelers; therefore, AFA-CWA and its member flight attendants place great emphasis on working with the EPA (which regulates the quality of domestic source water supplies and the water on board aircraft,[16]) the U.S. Food and Drug Administration (FDA, which regulates culinary water such as ice, the pipes, tankers and other points where aircraft obtain water at the airport,[17] and also requires the presence of handwashing facilities on interstate conveyances in which food or beverages are available,[18]) international agencies such as the World Health Organization (WHO), and industry stakeholders to encourage development, adoption and enforcement of rigorous aircraft water quality standards.

Given the express language of these statutes, AFA-CWA believes it inappropriate for the FAA to place any reliance on cost/benefit analysis when developing or adopting rules that regulate aviation safety. Such use, in our opinion, constitutes a clear violation of OMB Watch Principle 4 (Authority to make decisions about regulations should reflect the statutory delegation granted by Congress.)

[15] EPA, *National Primary Drinking Water Regulations: Drinking Water Regulations for Aircraft Public Water Systems; Proposed Rule*; 73 FR 69, pp. 19320 – 19348, Apr. 9, 2008.

[16] http://www.epa.gov/safewater/airlinewater/regs.html

[17] FDA GUIDE TO INSPECTIONS OF INTERSTATE CARRIERS AND SUPPORT FACILITIES, http://www.fda.gov/ora/inspect_ref/igs/icsf.html

[18] 21 CFR PART 1250, INTERSTATE CONVEYANCE SANITATION, http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?CFRPart=1250

Given the importance of adequate supplies of potable water on board airplanes, AFA-CWA strongly supports the EPA efforts to lead on this contentious issue. However, following a thorough review of the proposed rule, we concluded that publication of the proposed aircraft drinking water rule in April 2008 was premature for several reasons, which are explained in our comments filed to the docket.[19] We therefore requested that the EPA withdraw the proposal, reinstate the collaborative rulemaking process, examine additional data, and introduce an updated proposal. At this time, it is our understanding that the EPA continues to review all of the comments submitted and has yet to decide on the final rule.

While AFA-CWA had many significant concerns with the proposed EPA rule, for the purposes of these comments regarding the regulatory review process, we will focus on one issue, a cost/benefit analysis[20] conducted by the EPA in response to OMB requirements. Quoting from our submitted comments:

> [T]he EPA estimates that "passengers could face a relatively negligible increase of about one cent per ticket." [21] AFA-CWA agrees that this expense is negligible, and one that should be acceptable to all affected parties if it actually *assures* the safety of aircraft potable water supplies. However, a perusal of estimated costs for the various regulatory alternatives examined by the EPA (Table V-2 of the proposed ADWR) suggests that the most expensive option would require the airlines to follow the same rules imposed on public water systems by the National Primary Drinking Water Regulations. [22] This cost, estimated at about $31M per year, is less than *four times* the approximately $8M yearly cost of the proposed ADWR. In other words, the most costly option investigated may add no more than *four cents* per ticket. This hardly seems an inordinate price to pay given the potential benefits to public health. In fact, if reasonable choices are made, one could generate any number of additional alternatives that include all mandatory and non-mandatory items from the proposed ADWR, with additional requirements for some monitoring of disinfectant residuals and turbidity, beefed-up sanitary surveys, and independent monitoring of water quality (by the EPA or independent laboratories), for anywhere from an additional *two to five cents* per ticket depending on the levels of public health protection sought. The bottom line is that whatever the final cost, it appears that any reasonable and appropriate proposed regulatory framework will be affordable; therefore, the only requirement should be the one posed by the EPA in the preamble to the ADWR: "The primary purpose of the proposed Aircraft Drinking Water Rule (ADWR) is to ensure that safe and reliable drinking water is provided to aircraft passengers and crew." [23] Without (at a minimum) requirements for approved water safety plans and independent monitoring of disinfectant residuals, turbidity, and potentially other organic and inorganic contaminants that may find their way into airplane

[19] http://www.regulations.gov/fdmspublic/ContentViewer?objectId=0900006480660eb5&disposition=attachment&contentType=pdf, Docket EPA-HQ-OW-2005-0025, www.regulations.gov

[20] AFA-CWA fundamentally disagrees that the use of cost/benefit analysis for the development of safety, health and security regulations is appropriate; however, we do note that if cost/benefit analysis is required by statute, it should at least conform to the recommendations on page 4 of the OMB Watch report (ref. footnote 2, above.) We find particularly important the recommendations that "[c]ost-benefit analysis should only be used in ways consistent with the values expressed in statutory or judicial provisions" and that "[i]nformation and assumptions used in cost-benefit analysis should be transparent and allow for the analysis to be replicated."

[21] 73 FR 69, paragraph V.D, *Estimated Impacts of Proposed Rule to Air Carrier Passengers*, p. 19338.

[22] 73 FR 69, p. 19337.

[23] 73 FR 69, p. 19322.

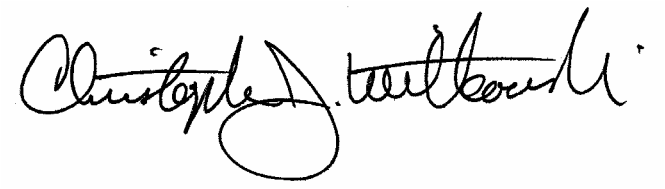
> water systems from domestic and foreign sources, it is unclear to AFA-CWA how the proposed ADWR will meet this "primary purpose." Therefore, it is our recommendation that the EPA further examine the proposed ADWR regulations to determine whether the desired public health objectives are met, and if not, develop, evaluate and propose more comprehensive regulations as necessary to achieve the desired public health objectives.

As mentioned above, the FDA also regulates certain aspects of the airline potable water system. One issue with past FDA regulation that has caused AFA-CWA great concern involves enforcement of FDA rules stating that "[t]oilet and lavatory facilities of suitable design and construction shall be provided for use of food-handling employees"[24] and "[h]and washing facilities shall include soap, sanitary towels and hot and cold running water or warm running water in lieu of hot and cold running water."[25] In spite of these plainly stated rules, many of the smaller regional "feeder" carrier fleets in the U.S. have aircraft that lack proper handwashing facilities in their lavatories and galleys, preferring to stock alcohol or disinfectant wipes instead, despite having one or more flight attendants on board who distribute or sell for passenger consumption drinks with ice and, in most cases, packaged snacks. Many of the aircraft operated by these regional carriers are produced by foreign manufacturers, who may or may not be aware of the FDA requirements, and the FDA generally lacks the number of inspectors required to properly enforce these rules. Regardless, it is incumbent on the FDA to ensure that all U.S. operators are aware of this rule, that no airplanes be purchased without proper potable water systems, and that appropriate levels of funding are requested from Congress. Therefore, with respect to the six principles recommended by the OMB Watch report, we conclude that the FDA, with respect to regulation of airplane potable water systems, is sometimes guilty of violating principles 5 (Agencies must have the resources to meet their statutory obligations and organizational missions) and 6 (Government must do a better job of encouraging compliance with existing regulations and fairly enforce them.)

[24] 21 CFR § 1250.38 (a)
[25] 21 CFR § 1250.38 (b)

In conclusion, we wish to reiterate our appreciation to the Director of OMB for inviting the public to comment on the vitally important issue of regulatory review; we look forward to further discussions with the Executive Branch regarding these matters. Finally, in the interests of full transparency and open government, we recommend that, whenever possible, any new or revised draft Executive Orders, policies or other related initiatives resulting from this regulatory review be provided to the public for review and comment.

Sincerely,



Christopher J. Witkowski
Director, Air Safety, Health and Security Department

Attachments:

A1. Association of Flight Attendants letter to Craig Bolt of the FAA ARAC Transport Airplane and Engine Issues Group, dated August 7, 2003. (Note: This letter includes a listing of supporting attachments, but not the attachments themselves. They can be provided on request.)

A2. Association of Flight Attendants letter to Terry Rees of the FAA Airframe and Cabin Safety Branch, dated May 7, 1999. (Note: This letter includes a listing of supporting attachments, but not the attachments themselves. They can be provided on request.)

Attachment 1

ASSOCIATION OF FLIGHT ATTENDANTS AFL-CIO
1275 K Street, NW, Washington, DC 20005-4006
PHONE 202•712•9799 FAX 202•712•9798

via e-mail

August 7, 2003

Transport Airplane and Engine Issues Group
c/o Craig Bolt

Subject: AFA Dissenting Opinion on the MSHWG Final Report on FAR/JAR 25.841(a)(2,3)

Introduction

This letter expresses the Association of Flight Attendants (AFA) AFL-CIO objections to the Mechanical Systems Harmonization Working Group (MSHWG) Final Report on FAR/JAR 25.841(a)(2,3) (hereinafter referred to as the "Final Report"). AFA, the largest U.S. flight attendant union representing 50,000 members at 26 airlines, is a member of the MSHWG. While the majority of the decisions documented in the Final Report were reached through a consensus process, the MSHWG team decided several significant issues through a more contentious voting process. The remainder of this letter provides background information regarding the AFA dissenting opinion; proposed, specific revisions to portions of the Final Report are contained within AFA Attachment 1.

Background

The MSHWG recommendations put forward in the subject Final Report have been developed at the urging of airframe manufacturers, who argue (primarily) that airplanes with wing-mounted engines approved to current FAA interpretations of Federal Aviation Regulation (FAR) §§ 25.841(a)(2) and (3), as amended by Amendment 25-87, will be limited to a maximum operating altitude of 40,000 feet. [Amendment 25-87 specifies airplane and equipment airworthiness standards for subsonic transport airplanes that can be operated up to an altitude of 51,000 feet, see 61 FR 28684-28696, June 6, 1996.]

The regulations objected to by industry specify design requirements for aircraft cabin pressure during an emergency descent following certain failure conditions, such that:

§ 25.841(a)(2)(i)	Cabin pressure not to exceed 25,000 feet for more than two minutes.
§ 25.841(a)(2)(ii)	Cabin pressure not to exceed 40,000 feet for any time.
§ 25.841(a)(3)	Fuselage, structure, engine and system failures are to be considered in evaluating the decompression.

Under Amendment 25-87, the airframe industry argues that new and amended type design airplanes with wing-mounted engines will be unable to achieve certification above a maximum operating altitude of 40,000 feet, resulting in a loss of potential benefits, including airplane performance gains due to reduced drag and lower fuel burn. In response, the MSHWG is proposing that the FAA publish an "interim" policy memorandum to allow a relaxed interpretation of the existing rules, until such time as a new rule can be promulgated. Of greatest

concern to AFA with respect to this proposal is that, for decompression events following uncontained engine failure (UEF), it significantly relaxes the cabin pressure altitude limit to "the maximum performance capability of the flight deck crew oxygen system," and it would allow manufacturers to achieve partial compliance through application of an unproven "Depressurization Exposure Integral" (DEI, a representative physiological pressure-time integral) analysis method.

As a member of the MSHWG reviewing the high altitude regulations, AFA has contributed greatly to progress in developing alternatives to the existing regulations. AFA is working within the ARAC system to achieve a *consensus* recommendation for a harmonized regulation that appropriately balances public safety and economic considerations. AFA believes that portions of the proposed MSHWG Final Report recommendations fail to properly achieve this balance. Specifically, the proposal falls short in addressing three specific issues:

Issue 1: The 40,000-foot cabin altitude limit specified in Amendment 25-87 is generally recognized by experts as necessary to protect the health and safety of unprotected airplane occupants following rapid decompression failures.

Issue 2: Pending appropriate testing, validation and peer review, the DEI methodology proposed as a means of compliance lacks the theoretical support and empirical evidence needed prior to use as a compliance tool.

Issue 3: The proposed "interim" policy will allow manufacturers to circumvent existing regulations, which may significantly diminish the motivation to conduct new research and obtain data necessary to validate the compliance methodology. This is bad public policy, and should be rejected by the regulatory authorities.

These issues are discussed in detail below.

<u>Issue 1: 40,000-foot Cabin Altitude Limit</u>

During the past half-century and more of high altitude commercial aviation, the 40,000-foot cabin pressure altitude limit has been respected as an effective regulatory barrier protecting the safety and health of the traveling public and airplane crews. Support for this limit is, of course, a key component of Amendment 25-87 itself, which in its background section states: "The regulatory changes adopted by this amendment codify and consolidate the different high-altitude criteria that have been made applicable by special conditions to previously certificated subsonic transport airplanes. In addition, the changes [*i.e., 40,000 feet cabin altitude limit, with 2 minutes to 25,000 feet*] acknowledge a human physiological limit of 34,000 feet … the level above which persons not using supplementary oxygen are in serious peril."

Long before the FAA published Amendment 25-87, numerous experts in high altitude physiology have strongly supported a pressure altitude limit at or even below 40,000 feet. For example, in 1950 Sir Harold Whittingham [Reference AFA1, p. 246] published the following observations regarding the dangers of sudden or explosive decompression (a potential problem for smaller transport aircraft) to airplane occupants:

> "The physiological stresses which would follow explosive decompression in the cabins of pressurized aircraft operating at altitudes of 35,000 to 40,000 feet would be severe and lead to fatalities within a few minutes, unless oxygen were immediately available or a descent could be made to 14,000 feet in four to five minutes … [H]ealthy individuals, even at rest, would lose useful consciousness in twenty seconds and die within three to five minutes at altitudes between 35,000 and 40,000 feet. Movement would materially shorten these periods, as would physical unfitness resulting from age or disease, particularly heart or lung affections or anaemia. Naturally, tests in the low pressure chamber have not been done on such unfit persons, so that accurate figures cannot be given. … The descent from 40,000 to 14,000 feet should be within five minutes, preferably four…"

It should be noted that Sir Harold acknowledged the need for conservatism to protect "unfit persons", owing to a lack of adequate chamber testing. Indeed, in the more than 50 years since these comments were published, it is apparent (with good reason) that no useful data have been obtained on individuals considered unfit for high altitude exposure.

In 1961, Blockley and Hanifan [Reference AFA2, pp. 13-15] published the following comments:

> "There is a frequently encountered opinion that exposure to altitudes above 40,000 feet is excessively hazardous, even in an experimental situation." and "A basic assumption which underlies the study reported here is that the protection of passengers in aircraft flying at altitudes above 40,000 feet can be assured only if apparatus and equipment are provided which will deliver to each individual supplementary oxygen to enrich the inhaled air."

Regarding this issue of supplementary oxygen, the FAA acknowledges in Amendment 25-87 (61 FR 28685), "some passengers might be exposed to high cabin altitudes following decompression without the use of oxygen." In a 1965 paper, Barron and Cook [Reference AFA3, p. 430] noted that their study of oxygen mask use by representative pilots and passengers "confirmed the findings of other investigators in noting that unless 100 per cent oxygen was inspired within five to seven seconds after exposure to 45,000 feet unconsciousness would occur 13 to 16 seconds from the start of decompression. The study also emphasized the need for wearing an oxygen mask during all rapid decompressions to 45,000 feet and demonstrated most graphically the need for improvement in oxygen dispensing devices for passengers."

In 1970, Mohler [Reference AFA4, p. 9], referring to supersonic flight, presented further support for a cabin altitude limit even stricter than 40,000 feet:

> "It is felt that the BAC/SUD maximum cabin altitude limit of 35,000 feet is a proper goal, as is the Boeing proposal to limit the time to thirty seconds at 37,000 feet. For regulatory purposes, a 37,000 foot maximum with a more rapid descent profile, is considered to be equivalent to a lower cabin altitude or time with a slower descent."

In 1990 Marotte *et al* [Reference AFA5, pp. 26-27] published the following comments regarding protection of pilots, based on their study of the response of healthy volunteers to rapid decompressions up to a peak altitude of 45,000 feet:

> "Rapid decompression tests suggest that pathophysiological consequences of a sudden arterial oxygen desaturation are much more serious than those of slow desaturation. … The performed tests and their discussion allow us to make the following [recommendation]: the minimum altitude for donning the oxygen mask should be decreased to FL 380 [from FL 410]…"

Finally, the FAA states in the preamble to Amendment 25-87 (61 FR page 28685) that 40,000 feet had been considered the acceptable Part 25 cabin altitude limit:

> "Section 25.841(a)(2) as amended limits exposure of the airplane occupants, after decompression, to a cabin altitude no greater than 40,000 feet. This requirement is *unchanged from that previously established in part 25 for certification of transport category airplanes* using diluter demand (flightcrew) and continuous flow (passenger) oxygen equipment…" [italics added]

Thus, it is clear that the 40,000-foot cabin altitude limit has been a generally-accepted means to protect public health and safety, especially given the absence of data on the effects of high altitude decompression on individuals regarded as "unfit", as well as the acknowledgement that not all passengers will be expected to properly don supplemental oxygen. (In fact, implied in the Amendment 25-87 statement quoted above is the implicit recognition that supplemental oxygen systems are insufficient to protect the flying public above 40,000 feet.) Furthermore, adopting this proposal is not in the public interest and will circumvent full notice and comment rulemaking procedures as required by law. Therefore, AFA recommends that the regulatory authorities reject the MSHWG proposal to relax the 40,000 foot restriction on maximum cabin altitude.

Issue 2: DEI Pressure-Time Integral Method

The DEI pressure-time integral analysis attempts to achieve the useful objective of an "engineering" solution to the problem of protecting human physiology following a rapid decompression event. Unfortunately, to estimate acceptable limits of the DEI to ensure human physiological tolerance at high altitude conditions, the proposed method relies almost exclusively on a very limited set of animal data, including only five baboon and seven macaque hypobaric chamber studies conducted in the late 1960's. While this is an acceptable way to develop a methodological *approach*, for definition of specific, numerical limits, it is little more than educated guesswork.

Therefore, rather than implementing the DEI limits as proposed in the Final Report, AFA recommends that the regulatory authorities immediately initiate and sponsor an independent program of high altitude chamber research, with results and conclusions subjected to rigorous peer review. Such a step is badly needed to address the uncertainties embedded in the method and the limits as proposed by the MSHWG. This research should first test the strengths and weaknesses of this methodology and determine appropriate critical values *prior* to implementing the methodology as a means of compliance. AFA is deeply concerned that use of this untested methodology and unproven limits for certification of new or amended airplane type designs could lead to reductions in aviation safety that will eventually be hazardous to human health.

Issue 3: Bad Public Policy

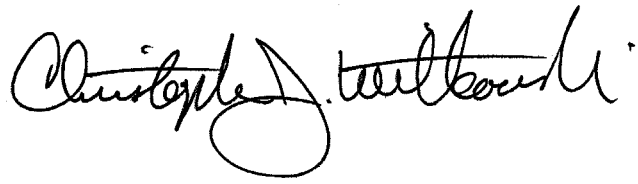
For at least two reasons (in addition to the possibility of unacceptable future reductions in aviation safety,) AFA considers the "interim" policy proposed in the MSHWG Final Report to be bad public policy. First, the proposed policy, if adopted in its present form, outlines a method for applicants to *circumvent* an existing substantive regulation without going through full notice and comment rulemaking procedures as is required by law. This is in contrast to the approach taken in FAA Advisory Circular documents, which provide applicants the means to *show* compliance to one or more regulations. Second, the policy that is eventually adopted by the regulatory authorities may well become more "permanent" than "interim" – especially if the well-accepted cabin altitude limit of 40,000 feet is increased to whatever performance capability is achievable with flight deck crew oxygen systems – since any pressure on the regulatory authorities and industry to rigorously test and peer review the new means of compliance will diminish with each successive aircraft type certificated under the "interim" policy.

Summary

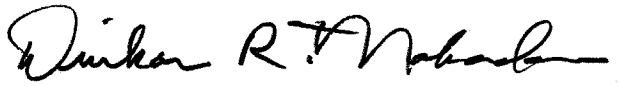
For the reasons discussed above – that the 40,000-foot cabin altitude represents a useful regulatory limit for high altitude flight in the absence of sufficient, comprehensive data on human tolerance at high altitudes, that the proposed DEI pressure-time integral method lacks sufficient data and a rigorous peer review to validate its use as a means of compliance, and that the "interim" policy proposal recommends means to circumvent existing regulations and may reduce or even eliminate any motivation to validate the means of compliance, and is therefore policy that is not in the public interest – AFA recommends that the TAEIG and regulatory authorities consider and adopt the specific changes to the MSHWG Final Report presented in AFA Attachment 1.

Thank you for considering AFA's position on this matter.

Sincerely,



Christopher J. Witkowski
Director, Air Safety, Health and Security



Dinkar R. Mokadam
OSHA Specialist, Air Safety, Health and Security

Attachments

A1. Association of Flight Attendants Dissenting Opinion / Revisions to Selected Portions of the Mechanical Systems Harmonization Working Group (MSHWG) Final Report on FAR/JAR 25.841(a)(2,3), August, 2003

A2. Reference AFA1, Whittingham, June 1950.

A3. Reference AFA3, Barron and Cook, May 1965.

List of References

AFA1. "Physiological Considerations Regarding Safety Measures for Sudden Decompression in Civil Passenger Aircraft," Sir Harold Whittingham, Aviation Medicine, pp. 246-250, June 1950.

AFA2. "An Analysis of the Oxygen Protection Problem at Flight Altitudes Between 40,000 and 50,000 Feet, Final Report," prepared for the Federal Aviation Agency, Contract FA-955, W. V. Blockley and D. T. Hanifan, February 20, 1961. *[Note: Same as Reference 3 in the MSHWG Final Report]*

AFA3. "Effects of Variable Decompressions to 45,000 Feet," Charles I. Barron and Thomas J. Cook, Aerospace Medicine, pp. 425-430, May 1965.

AFA4. "Physiologically Tolerable Decompression Profiles for Supersonic Transport Type Certification," Stanley R. Mohler, DOT/FAA/AM 70-12, July 1970. *[Note: Same as Bibliography item 8 in the MSHWG Final Report]*

AFA5. "Rapid Decompression of a Transport Aircraft Cabin: Protection Against Hypoxia," H. Marotte, C. Toure, J. M. Clere, and H. Vieillefond, Aviation, Space and Environmental Medicine, pp. 21-27, January 1990. *[Note: Same as Bibliography item 5 in the MSHWG Final Report]*

Attachment 2

ASSOCIATION OF FLIGHT ATTENDANTS AFL-CIO
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PHONE 202•712•9799 FAX 202•712•9798

May 7, 1999

Federal Aviation Administration
Attention: Mr. Terry Rees
Airframe and Cabin Safety Branch
ANM- 115
Transport Airplane Directorate
Aircraft Certification Service
1601 Lind Avenue, SW
Renton, WA 98055-4056

Via Fax: 425-227-1149

Re: Notice of availability of proposed Advisory Circular (AC) 25.803-1A and request for comments, 64 F.R. 26, pp. 6416-17, Feb. 9, 1999.

Dear Mr. Rees:

I am writing on behalf of the Association of Flight Attendants (AFA) to oppose the adoption of proposed Advisory Circular 25.803-1A. AFA represents over 44,000 flight attendants at 24 airlines.

Need for the Full-Scale Emergency Evacuation Test

The Association of Flight Attendants strongly advocates requirement of a full scale evacuation demonstration for each new aircraft design or an increase in an existing design's seating capacity of more than five percent.

Design standards are used in the design phase of a project, and can be verified while the product, in this case, an airplane, is still "on the drawing board," i.e., before the airplane is built. Performance standards evaluate the performance of the product, often under the influence of factors that cannot be effectively integrated or evaluated during the design. Typically, a performance standard involves a test of the product after it is built. In the case of a full-scale evacuation demonstration (a performance standard) of an airplane, the factors that must be evaluated are the performance of the passengers and crew.

A recently announced FAA policy change and draft AC 25.803-1A would allow new airplane designs or any increase in an existing design's capacity to be approved using analysis of data from past tests, rather than conducting a full-scale evacuation test of the model requiring certification. But there currently is no analytical method that is capable of predicting failure of the crew and passengers to meet the performance standard after the design standard has been met.

There have been such failures in the recent past. Since there are no analytical methods that can properly substitute for the full-scale demonstration, the FAA can't enforce its recently announced policy change.

The analytical method, including that contained in draft AC 25.803-1A (throughout this document, references to analytical methods include the method specified in AC 25.803-1A), does little more than calculate that, if the design standards are met, the aircraft could be evacuated within the requirements of the performance standard. Since the design requirements were intended to provide an airplane capable of being evacuated within the requirements of the performance standard, use of the analytical method is redundant.

The result of the FAA's new policy and of the inadequate analytical methods accepted under the policy, is that the first full-scale evacuation of a new airplane will be performed by the traveling public under emergency conditions rather than by paid test subjects under the controlled test conditions of a demonstration. There is no assurance that the evacuation would be successful.

The FAA must rescind its policy of allowing the use of analysis in lieu of the full-scale demonstration and not adopt draft AC 25.803-1A (draft AC) until acceptable analytical methods are developed that integrate the performance of the passengers, the crew and the airplane design in a computation that can predict failure, as well as a successful evacuation.

The draft AC would implement the FAA intent to use analysis and sub-scale tests in lieu of full-scale evacuation demonstrations for certification of passenger transport airplanes that involve considerations other than increases of passenger capacity by five percent. It also provides the regulatory history that is now interpreted by the FAA to provide a basis for this action. We have carefully considered the draft AC, and have further reviewed the reasons for the requirement for full scale evacuation demonstrations, the five percent limitation on increasing passenger capacity without performing additional full scale evacuation demonstrations, and the acceptance of analysis in lieu of such full-scale evacuation demonstration. We appreciate this opportunity to provide the results of our review as comments which clearly justify rejection of the draft AC proposed by this Notice.

Regulatory Background

The requirement for full-scale emergency evacuation demonstrations was introduced by NPRM 63-42 (28 FR 11507, October 23, 1963). This notice justified this proposal by stating: "Recently, the Agency observed several simulated passenger emergency evacuation demonstrations which were conducted by various air carriers using different types of airplanes. The time required to accomplish each of these demonstrations varied from 131 to 213 seconds using 178 to 189 persons. In all instances, it was evident that a more realistic assignment of functions within the cabin would have resulted in lesser time to evacuate the airplane satisfactorily. From these demonstrations, it has been concluded that a physical demonstration of an air carrier's ability to execute its established emergency evacuation procedures within a specific time period is necessary in the interest of safety and to insure a more realistic assignment of functions which, in

turn, will result in satisfactory accomplishment of emergency evacuation procedures." Clearly, the original intent of the evacuation demonstration was to show the satisfactory accomplishment of emergency evacuation *procedures*. This intent was reinforced by the final rule, Amendment 121-2 (30 FR 3200, March 9, 1965), which stated that the purpose of the Amendment was to "Require air carriers and commercial operators using large aircraft to physically demonstrate the adequacy of procedures established for passenger emergency evacuation on each type and model of airplane used in passenger carrying operations that has a seating capacity of over 44 passengers. This final rule also added a new provision that allowed up to a five percent increase in seating capacity without the need for further demonstrations (14 CFR 121.291(a)(3), June 7, 1965). No analysis or other demonstration was required for that increase. It was simply provided for the purpose of "allowing some latitude."

This initial requirement for full scale evacuation demonstrations required action only by air carriers and operators. FAA Notice 66-26 (31 FR 10275, July 29, 1966) proposed to establish comparable requirements for the airplane manufacturers. This notice stated that "... traditionally, it has been considered sufficient to provide the necessary components for emergency evacuation through the detailed quantitative requirements prescribed in the airworthiness rules. However, experience has shown that compliance with these requirements does not ensure that the airplane can be evacuated, during an emergency, within an acceptable time interval. Differences in the relationships between elements of the emergency evacuation system introduce a considerable variation in evacuation time, and this variation is expected to be even more marked on larger transport aircraft under development." Thus, it was acknowledged that relationships between the various elements of the evacuation system, not just the elements themselves, had a critical influence on evacuation time. In other words, the whole was considerably more complicated than the sum of its parts. Since the manufacturer would be demonstrating the basic capability of a new airplane type without regard to crewmember training, operating procedures and similar items (such demonstration was still required under Part 121), this new demonstration was not expected to validate the evacuation procedures of the air carriers or operators. FAA Notice 66-26 also proposed that once a manufacturer had successfully conducted an evacuation demonstration for a particular airplane type, the passenger seating capacity could be increased not more than five percent if the manufacturer could substantiate, by analysis that all the passengers could be evacuated within the prescribed time limit. This appears to be the first proposal to suggest the use of "analysis" in lieu of full-scale evacuation testing. However, this analysis was intended to provide comparison with the full scale evacuation actually conducted on the airplane, and even this was more than was being asked of the air carriers and operators under Amendment 121-2. These proposals were adopted, with minor changes, as Amendment 25-15 in 1967 (32 FR 13255, September 20, 1967).

The FAA issued Notice No.75-26 as part of the First Biennial Airworthiness Review Program in 1975 (40 FR 24802, June 10, 1975). This Notice contained numerous proposals resulting from an Airworthiness Review Conference held in Washington in December, 1974. Included was a proposal to revise 14 CFR 25.803, pertaining to the evacuation demonstration, "...to allow means other than actual demonstration to be used to comply with the emergency evacuation performance requirements and to replace the present demonstration conditions with conditions

which satisfy both Part 25 and Part 121, thus providing for one demonstration that serves both airworthiness and operational requirements." The discussion pertaining to Amendment 25-46, the final rule resulting from that proposal, concluded that: "Several commentators objected to the proposed amendment to §25.803(d) which would allow analysis in showing that the airplane is capable of being evacuated within 90 seconds. One commentator stated that analysis alone is an incomplete means of showing compliance and should not be allowed. Another commentator stated that extrapolations based on analytical testing have no practical relation to actual conditions which occur in accidents and in evacuation demonstrations. The FAA agrees that the limitations on the use of analytical procedures should be made clear. The requirement that the Administrator find the analysis data acceptable was intended to *preclude approvals which might be based on insufficient test data, such as in the case of a completely new model or a model which has major changes or a considerably larger passenger capacity than a previously approved model"* (Italics ours.) The resultant change to §25.803(c) read: "A combination of analysis and tests may be used to show that the airplane is capable of being evacuated within 90 seconds under the conditions specified in §25.803(c) of this section if the Administrator finds that the combination of analysis and tests will provide data with respect to the emergency evacuation capability of the aircraft equivalent to that which would be obtained by actual demonstration." (43 FR 50578, October 30, 1978). This is the regulatory provision referenced by the draft AC (Sec. 6a) as the basis for using analysis based on tests in lieu of actual emergency evacuation demonstrations. Amendment 25-46 also upgraded the evacuation demonstration requirements of §25.803 to be equivalent to those required by Part 121, so that a demonstration conducted by the manufacturer of the airplane could suffice for compliance with the operational requirement of §121.291.

Amendment 25-46 was followed by NPRM No.81-1 (46 FR 5484, January 19, 1981) and then Amendment 121-176 (46 FR 61450, December 17, 1981) that allowed an air carrier certificate holder to use the results of a successful emergency evacuation demonstration conducted by either a manufacturer or another Part 121 certificate holder, and to conduct a partial demonstration of emergency evacuation procedures if certain requirements were met.

There have been industry complaints about the costs of the emergency evacuation demonstration since it was first required by regulation in 1965, but attempts to reduce safety requirements solely on the basis of cost are not politically palatable. More recent complaints that such testing was prohibited by laws regulating the use of human subjects or caused unreasonable exposure to injury on the part of the people who volunteered to be passengers in the tests have been voiced. If true, these allegations, combined with the argument of excessive costs, would seem to provide a basis for a petition to the FAA to initiate the regulatory process to eliminate the regulatory requirement for the emergency evacuation demonstration. This has not been done. The manufacturers, and the FAA have followed another path to rid themselves of the bother of a full scale evacuation demonstration.

In 1985 testimony before the U.S. House of Representatives Subcommittee on Investigations and Oversight, the FAA Administrator suggested that a reassessment of regulations pertaining to

emergency evacuation of transport airplanes was warranted. Consequently, an Emergency Evacuation Task Force, open to the public, for that purpose was established in September, 1985. The continued use of full scale emergency evacuation demonstrations was one of the matters considered by that task force. One of the presentations, by Boeing, suggested that a rudimentary analytical procedure be used in lieu of full scale evacuation demonstrations. The task force was unable to reach a consensus on when to accept an analysis in lieu of a demonstration. Basically, the manufacturers favored analysis, while the representatives of people who flew on the airplanes, either as crewmembers or passengers, opposed analysis.

In 1991, the FAA established the industry dominated Aviation Rulemaking Advisory Committee (ARAC), and gave it the responsibility for developing regulations, performing cost/benefit studies, and responding to public comments on notices of proposed rulemaking for the full range of the FAA's safety-related rulemaking activity. Among these responsibilities were the restatement of emergency evacuation rules in terms of performance standards and revisions to the rules to eliminate or minimize injuries to participants in the emergency evacuation demonstration. The ARAC Performance Standards Working Group, responsible for work on these assignments, discussed injuries but did not make a systematic analysis of the causes of the few serious injuries that had occurred during emergency evacuation demonstrations. The subsequent recommendations for reducing injuries were directed towards reducing the minor cuts, scrapes, strains and burns that are sometimes encountered by participants in emergency evacuations. There were no recommendations for reducing the serious injuries simply because the working group made no systematic study of the reasons for those injuries. While we believe that the few serious injuries that occurred in the evacuation demonstrations could be related to the industry practice of forcibly "assisting" passengers out of the exit and onto the slide, there was no attempt to investigate the scenario that produced those injuries. Instead, elimination of serious injuries became the basis for eliminating the full-scale evacuation demonstration. Once again, the rudimentary Boeing analytical method was proposed as an alternative to the evacuation demonstration. Once again, no consensus could be reached. (This time, not even a majority vote in favor of the analysis could be achieved.) Once again, analysis was supported by the manufacturers, and opposed by representatives of the people who must fly in the airplanes. But this time, the Boeing analytical method was forwarded by the ARAC chairman to the FAA for implementation.

The draft AC serves as the vehicle to specify the rudimentary analytical method and policy described in ANM-98-2 and results in a de facto elimination of the regulatory requirement for a full-scale evacuation demonstration. The draft AC allows analysis in place of full scale evacuation demonstrations unless the manufacturer could not show that sufficient data are available to support the analysis. (This proposed analysis can be accepted for completely new models or models which have major changes or a considerably larger passenger capacity than a previously approved model, which makes the exception of analysis the rule and the requirement to conduct a full scale evacuation demonstration an unenforceable exception. The preamble to

Amendment 25-46 states that the requirement that the Administrator find the analysis data acceptable was intended to preclude its use as the certification tool in such cases.) Since the manufacturer's argument will be "informally coordinated" with the FAA prior to formal submission for certification, the manufacturer will be able to adjust his product's design configuration to accommodate any concerns that the FAA might express before actually applying for certification. Considering the industry's long opposition to the full scale evacuation demonstration, we cannot envision any designer foolhardy enough to suggest an improved aircraft design that would require full-scale evacuation demonstration or any manufacturer formally submitting data for certification that would lead to requirement for a full-scale evacuation demonstration. The rule requiring a full-scale evacuation demonstration has, for all realistic considerations, been replaced with the exception that allows demonstration by analysis.

Procedures for Analysis

Analytical procedures for predicting the results of emergency evacuations of airplanes are not new. One of the first analytical procedures was developed by the FAA in the early 1970's.[1,2] Using data from rudimentary evacuation tests, the analysis was able to "closely simulate actual evacuations from current transport aircraft." The analysis used a program developed to determine the best arrangement of facilities such as grocery store cashiers to minimize waiting times. This analysis was quickly followed by a method specifically designed for wide and narrow body aircraft that would trace a passenger from the seat to the exit during the evacuation.[3,4] Boeing developed an extensive evacuation performance data base and an evacuation model (EVAC) that, unfortunately, was never publicly released. The FAA sponsored Gourary Associates to develop a "user friendly" analytical model of evacuation that used a personal computer.[5] The Air Transport Association supported the development of an analytical model, AIREVAC, to investigate the impact of handicapped passengers on emergency evacuation, and to represent the evacuation demonstration.[6] AIREVAC determines a passenger response to the evacuation by randomly assigning a set of psychological/social parameters to each passenger, so as to create a representative sample of the American population. The EXODUS analysis considers evacuation in terms of the interaction of movement, behavior, passenger characteristics, hazards and toxicity in a fire.[7]

As sophisticated as these analytical procedures may be, the aircraft manufacturers have chosen to instead use a rudimentary manual analysis in support of their objective of eliminating the requirement for full-scale evacuation demonstrations.[8] This approach was presented to the FAA in the Fall of 1982. Essentially, this analysis depends on a "time line" which begins at the time of the signal for evacuation and ends when the final occupant is on the ground. Elements in this time line include the time for exit preparation, hesitation for the initial evacuee moving through

the exit, and the flow period of passengers through the exit. The flow period is assumed to depend only on the rate of flow assigned to a particular exit type and the number of passengers assigned to evacuate through the exit. In order to minimize the flow period, imaginary boundaries are established between the seats to govern the number of passengers that will use each exit. The time for exit preparation, the hesitation time, and the flow rate are defined by previous tests. The boundaries are chosen to minimize the flow period. This procedure formed the basis for the analytical procedure considered by the members of the Aviation Rulemaking Advisory Committee (ARAC). Because of deficiencies and limitations in the procedure, it failed to achieve approval of even a simple majority of the members of the Emergency Evacuation Issues Group (EEIG) responsible for the ARAC document. Nevertheless, the draft AC is based on the ARAC draft that was never approved by the ARAC Emergency Evacuation Issues Group.

We believe that any analytical procedure used in lieu of an actual full scale evacuation demonstration must be validated to show that it can predict the results of the full scale demonstration, be those results, success or failure. An analytical method that can predict only success is invalid. The currently available analytical methods are invalid, and should not be used in lieu of full-scale emergency evacuation demonstrations.

Discussion

The requirement for full-scale emergency evacuation demonstrations was initially based on the need for demonstrating satisfactory accomplishment of emergency evacuation procedures. These procedures involve the interaction of the crew and passengers with the features of the airplane. Passenger management during an evacuation was the major concern in 1963, and remains so today. A recent review of emergency evacuation demonstrations found that "the single biggest contributor to evacuation variation is the result of differences in evacuee management. The variations in this management of evacuees has been observed to vary from 10-30 seconds for essentially similar conditions."[9] The causes of this variation are not well defined, but the variation is so important that it must be considered in any analytical procedure that claims to produce "data equivalent to that which would be obtained by actual demonstration." The analytical procedure proposed by the draft AC allows the flow rates to be determined by the average of the data measured in successful demonstrations. By selecting the average of the best, this procedure could exclude the important variation in flow management. Thus it would not produce data equivalent to that which would be obtained by actual demonstration, and is an unacceptable means of compliance with 14 CFR 25.803(c). This was a reason for our opposition to the ARAC analytical procedure, and was a significant factor in its rejection by the members of the Emergency Evacuation Issues Group. Reducing the evacuation time found by analysis to 60 seconds, or some other arbitrary number, in order to compensate for the measured effects on evacuation time caused by the variation in flow management (up to 30 seconds) would be inconsistent with the requirement established in 14 CFR 25.803(c), and thus unenforceable.

This problem is reflected in the recent failures of evacuation demonstrations of the MD-11 and B-777 aircraft to achieve evacuation of all the occupants within 90 seconds as required by 14 CFR 25.803(c). For example, in the MD-11 case, its manufacturer requested certification for carrying 410 passengers. See attached. (The MD-11 had been previously certified for carrying 399 passengers by analysis in lieu of the full-scale evacuation demonstration.) Two attempts to conduct an evacuation demonstration with 410 passengers were unsuccessful. A subsequent test, conducted with exit platforms in place of evacuation slides, with subdued light instead of darkness, and with relatively young people as passengers, also failed to achieve the predicted exit use distribution that had been set as a goal for that test. These failures were not predicted by the ARAC analytical procedure. (If it is argued that the ARAC analysis could or did predict those failures, the fact that those demonstrations were conducted would indicate that the industry didn't believe the results of the analysis or that there was a shocking disregard for the injuries that might occur in a demonstration that was likely to fail.) Nor could the failures that occurred be predicted by any currently available analytical procedure with the knowledge that existed at the time of the tests. A valid analytical procedure must be able to predict failure as well as success. Until an analytical procedure can predict the results of the evacuation demonstration, and can provide data equivalent to that obtained in an actual demonstration, it is invalid. Any analytical procedure must be validated.

However, the data obtained in actual evacuation demonstrations is not limited just to a count of the number of passengers evacuated in 90 seconds. The actual demonstration integrates the features of the airplane, as required by the traditional quantitative design requirements prescribed in the rules, with the performance of the crew and passengers. This performance often differs from that anticipated by the airplane manufacturer, and has been noted even in successful evacuation demonstrations. Knowledge obtained from the full-scale evacuation demonstrations is used to improve flight attendant training, and has resulted in improved evacuation procedures. The fact that differences in relationships between the elements of the emergency evacuation (the airplane, the crew and the passengers) introduce a considerable variation in evacuation time was a basis for establishing the requirement for full scale demonstrations. This relationship cannot be evaluated by discrete sub-system tests of the individual elements. It is the integration of these elements that is assessed by the full-scale demonstration, and must be effectively considered by any analytical procedure considered for use in lieu of the full scale demonstrations. The rudimentary approach used in the proposed draft AC's analytical procedure assumes that a linear supposition of individual sub-scale test results will always produce a valid conclusion. In other words, it assumes that the whole is just a linear supposition of its various parts. This is an over-simplification. In fact, when dealing with the human factors such as those involved in the evacuation, the whole depends just as much on the relationship between the parts as it does on the parts themselves. The proposed analytical procedure makes no provision for evaluating the relationships among the discrete elements used in the procedure

The preceding discussion presents several main reasons why we joined with members of the

EEIG in rejecting the ARAC analytical procedure. There are numerous other objections to details in the procedure which support that rejection. We have attached a copy of the basis of AFA's rejection of that procedure to this response to Proposed draft AC 25.803-1A , and in doing so, intend it to be part of our response. We offered to continue working with the ARAC to develop an analytical method that includes the essential elements of passenger flow management. The more sophisticated analytical procedures mentioned previously offer hope that the technology has improved to the point where an accurate model of the evacuation process can be developed for actual emergency evacuations as well as the demonstration. We extend our offer of assistance to the FAA, and urge that they formally support the development of such a model.

In the interim, we are seriously concerned about the confusion alluded to in last year's Policy Statement No. ANM-98-2 regarding the interpretation of that portion of 14 CFR 25.803(c) that permits the use of analysis in lieu of evacuation demonstrations. The 1986 Administrator policy statement, the 1989 Advisory Circular, the new Policy Statement No. ANM-98-2 and draft AC 25.803-1A offer different interpretations of that same portion of 14 CFR 25.803(c). As noted above, the preamble to Amendment 25-46, the Amendment that established the rule allowing analysis that is expressed in 14 CFR 25.803(c), can be interpreted as precluding analysis "in the case of a new model or a model which has major changes or a considerably larger passenger capacity than a previously approved model." The meaning of "a combination of analysis and testing" that would "provide data equivalent to that which would be obtained by actual demonstration" is undefined by the rule. Furthermore, it appears that the intent of the rule was that the Administrator judge each application on a "case by case" basis, so that the requirements of the rule could change for each application, according to the judgment of the Administrator.

Executive Order 12866, signed by President Clinton on September 30, 1993 (58 FR 51735, October 4, 1993) establishes Principles of Regulation for the Federal agencies. Generally, in order to be legally valid, a regulation must establish a requirement or standard that is sufficiently clear to persons required to comply with it so that they can have a reasonable understanding of what is expected of them, without having to resort to material not published in the rule. [10]

This obligation is expressed as a basic Principle of Regulation in §1(b)(12) of E.O. 12866. Furthermore, Order 1320.46A, "Advisory Circular System," states that Advisory Circulars may not be used to interpret Federal Aviation Regulations. The confusion attending the interpretation of 14 CFR 25.803(c) attests that the regulation does not comply with the Principles of Regulation ordered by E.O. 12866. The regulation demands interpretation before it can be implemented. Clear definitions of the analysis required, the testing that must be done, and the meaning of "data equivalent to that which would be obtained by actual demonstration" must be provided in the rule. This interpretation cannot be legally provided in an Advisory Circular.

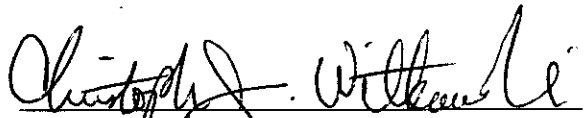
We are forced to conclude that the requirements purportedly established by 14 CFR 25.803(c) for enabling the use of analysis in lieu of evacuation demonstrations are so vague as to be legally

invalid under the requirements of E.O. 12866. Regulatory requirements cannot be interpreted by an advisory circular, as suggested in Policy Statement ANM-98-2, including by draft AC 25.803-1A. All actions anticipated under the invalid portion of rule 14 CFR 25.803(c), by using analysis in lieu of full scale evacuation demonstrations, should be terminated. The invalid portion of the rule should be withdrawn.

None of the arguments we made against the now proposed draft AC in its tortuous journey from Boeing through ARAC were ever properly rebutted. The FAA must reject draft AC 25.803-1A, which was railroaded into and derailed in ARAC, only to be finally sent to the FAA by the ARAC Emergency Evacuation Issues Group Chairman. It is not acceptable for the FAA to ignore the strong arguments against draft AC 25.803-1A or simply say "we disagree." The reason the FAA is apparently using its "policy change," ANM-98-2 and draft AC 25.803-1A to get rid of the requirement for full-scale evacuation demonstrations and allow unsafe procedures in actual emergency evacuations (see draft AC 25.803-1A, Section 8 s. and the two exit bypass letters attached to these comments) is that the arguments against these proposals couldn't be rebutted and disposed of in a rulemaking proceeding. The FAA still hasn't even conducted a comprehensive analysis of the types and causes of injuries in full-scale evacuation demonstrations which would be needed to show why the demonstration should be eliminated. Even if such were done, analysis and sub-system testing are not equivalent to a full-scale demonstration.

We appreciate the opportunity to provide comments in response to draft AC 25.803-1A, and strongly urge that it be rejected, since it is not in the public interest for the reasons provided above.

Sincerely,



Christopher J. Witkowski
Director of Air Safety and Health

Attachments

[1]Folk, ED; Garner, JD; Cook, EA; and Broadhurst, JL; CPSS/360 Computer Models to Simulate Aircraft Passenger Emergency Evacuation, FAA-AM-72-30, September 1972.

[2]Garner, JD; Chandler, RF; Cook, EA; GPSS Computer Simulation of Aircraft Passenger Emergency Evacuations, FAA-AM-78-23, June 1978.

[3]Gillespie, J; Emergency Computer Simulation - Program Description and Users Guide, FAA-216-76A, October 1976.

[4]Gillespie, J; Emergency Evacuation Computer Simulation - Program Description and Users Guide, FAA-223-77A, June 1980.

[5]Gourary, BS; PC-Based Simulation of the Evacuation of Passengers from a Transport Airplane, Proceedings of the Eleventh International Cabin Safety Symposium, Southern California Safety Institute, Los Angeles, CA, 1994.

[6]Schroeder, JE; Grant, T; Tuttle, ML; Modeling Human Behavior in Aircraft Evacuations, Proceedings of the 1992 Winter Simulation Conference, Georgia Institute of Technology, 1992.

[7]Galea, ER; The Role of Evacuation and Fire Modeling in the Development of Safer Air Travel, Proceedings of the International Conference on Cabin Safety, DOT/FAA/AR-95/120, March 1996.

[8]Veryioglou, G; Analysis in Evacuation System Certification, Emergency Evacuation of Transport Airplanes - Public Technical Conference, Volume I, Cascade Reporting Company, Seattle, Washington, 1985.

[9]Likes, JT; Evacuation - Airframe Manufacturer's Viewpoint, Proceedings of the International Conference on Cabin Safety Research, DOT/FAA/AR-95/120, March 1996.

[10]FAA Memorandum Re: Rulemaking by AC, ANM-7D to ANM-110, December 18, 1997.

ATTACHMENTS

Attachment Listing:

- Letter from Christopher Witkowski (AFA) to Jim Likes (Emergency Evacuation Issues Group - ARAC), regarding *8-1-95 Draft AC on the Conduct of Full-Scale Emergency Evacuation Demonstrations and on Using Analysis in Lieu of a Full-Scale Demonstration*, September 15, 1998.

- Letter from Christopher Witkowski (AFA) et al., to Jane Garvey (FAA) regarding *Boeing 777-300 and Airbus 330 and 340 airplane certification for emergency evacuation*, April 3, 1998.

- Memo from Doug Anderson (Regional Counsel's Office) to Stu Miller (FAA) regarding *Rulemaking by AC*, December 18, 1997.

- Letter from Christopher Witkowski (AFA) to David R. Hinson (FAA) regarding *Exit Bypass in the Certification of Aircraft*, July 19, 1996.

- Letter from Barry Valentine (FAA) to Christopher Witkowski (AFA) regarding *Exit Bypass in the Certification of Aircraft*, August 30, 1996.

- MD-11 Evacuation Testing:
  - Report from McDonnell Douglas regarding *MD-11, 410 passenger, Capacity Substantiation Analysis*, December 17, 1992.

  - FAA Briefing Paper on MD-11 Flight Attendant Requirements, October 30, 1992.

  - FAA Memo on MD-11 410 Passenger Emergency Evacuation Demonstration Utilizing Ramp Subtest (Update), November 27, 1992.

  - FAA Memo on MD-11 Platform Test Criteria

  - FAA Memo on MD-11 410 Passenger Emergency Evacuation Demonstration Utilizing Ramp Subtest (Update), November 6, 1992.

  - *Overview* on MD-11 Evacuation Demonstration from [McDonnell] Douglas Aircraft Company to FAA.

  - FAA Briefing Paper, in response to McDonnell Douglas Overview Document, 3-25-92.

- Advisory Circular No. 25.803-1, *Emergency Evacuation Demonstrations*, November 13, 1989.