DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 25, 121, and 135

[Docket No. 26530, Notice No. 91-11]

RIN 2120-AC46

Improved Access to Type III Exits

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: This notice proposes amendments to the Federal Aviation Regulations (FAR) which would require improved access to Type III emergency exits (typically smaller over-wing exits) in transport category airplanes with 20 or more passenger seats. These proposals are the result of tests which were conducted at the FAA's Civil Aeromedical Institute (CAMI), and are intended to improve the ability of occupants to evacuate an airplane under emergency conditions. They are applicable to air carriers, air taxi operators, and commercial operators of transport category airplanes as well as the manufacturers of such airplanes.

DATES: Comments must be received on or before October 7, 1991.

ADDRESSES: Comments on this proposal may be mailed in triplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attention: Rules Docket (AGC-10), Docket No. 26530, 800 Independence Avenue SW., Washington, DC 20591, or delivered in triplicate to: room 915G, 800 Independence Avenue SW., Washington, DC. Comments delivered must be marked Docket No. 26530. Comments may be inspected in room 915G weekdays, except Federal holidays, between 8:30 a.m. and 5 p.m. In addition, the FAA is maintaining an information docket of comments in the Office of the Assistant Chief Counsel (ANM-7), FAA, Northwest Mountain Region, 1601 Lind Avenue SW., Renton, Washington, 98055-4056. Comments in the information docket may be inspected in the Office of the Assistant Chief Counsel weekdays, except Federal holidays, between 7:30 a.m. and 4 p.m.

FOR FURTHER INFORMATION CONTACT: Franklin Tiangsing, FAA, Regulations Branch (ANM-114), Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington 98055-4056; telephone (206) 227-2121.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in this proposed rulemaking by submitting such written data, views, or arguments as they may desire. Comments relating to the environmental, energy, or economic impact that might result from adopting the proposals contained in this notice are invited. Substantive comments should be accompanied by cost estimates. Commenters should identify the regulatory docket or notice number and submit comments, in triplicate, to the Rules Docket address specified above. All comments received on or before the closing date for comments will be considered by the Administrator before taking action on this proposed rulemaking. The proposals contained in this notice may be changed in light of comments received. All comments will be available in the Rules Docket, both before and after the closing date for comments, for examination by interested persons. A report summarizing each substantive public contact with FAA personnel concerning this rulemaking will be filed in the docket. Commenters wishing the FAA to acknowledge receipt of their comments must submit with those comments a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. 26530." The postcard will be date/time stamped and returned to the commenter.

Availability of NPRM

Any person may obtain a copy of this NPRM by submitting a request to the Federal Aviation Administration, Office of Public Affairs, Attention: Public Information Center, APA-230, 800 Independence Avenue SW., Washington, DC 20591, or by calling (202) 267-3484. Communications must identify the notice number of this NPRM. Persons interested in being placed on the mailing list for future rulemaking documents should also request a copy of Advisory Circular No. 11-2A, Notice of Proposed Rulemaking Distribution System, which describes the application procedures.

Background

In September 1985, the FAA convened a Public Technical Conference on Emergency Evacuation of Transport Airplanes, in response to issues raised by various sectors of the public regarding the adequacy of existing regulations involved with emergency evacuation. One of the issues discussed at this conference was the access to Type III exits. As defined in § 25.807(a)(3), a Type III passenger emergency exit must have an opening which is not less than 20 inches wide by 36 inches high. It need not be rectangular in shape, provided a rectangle of these dimensions can be enscribed within the opening. The corner radii must not be greater than one-third the width of the exit. The step-up distance inside the cabin must not be more than 20 inches. Type III exits are typically over-wing exits. When so located, the step down to the wing must not be more than 27 inches. Type III exits are typically removable hatches; however, they may be hinged doors.

Access from each aisle to each Type III exit is required by § 25.813(c), although specific passageways are not defined. Additionally, § 25.813(c) requires, for airplanes with 20 or more passenger seats, that the projected opening of the Type III exit may not be obstructed and that there must be no interference (by seats, berths, etc.) in opening the exit.

As a result of questions posed at the public conference, a series of tests were conducted by CAMI to evaluate the ease with which exits can be opened and the effect of passageway width on flow through them. The CAMI Report No. DOT/FAA/AM-89/14—The Influence of Adjacent Seating Configurations on Egress Through a Type III Emergency Exit is available from the National Technical Information Service, Springfield, Virginia 22161. In addition, a copy of the report can be found in the docket for this rulemaking proceeding. The report describes the two sets of tests that were run with a total of 131 subjects, three groups of 33 each and one group of 32. The evacuation rates of the four groups evacuating through a Type III exit were measured in the first set of tests. Each group was tested in four separate runs, passing through four different access configurations on their way to the exit. This phase of the testing used the principles of Latin Square testing. (The Latin Square test, which is defined in FAA Order FS 8110.12, dated May 21, 1964, is a procedure used in evaluating two or more different exit configurations. It is used to factor out differences in test subject groups and experience gained by the groups in succeeding test runs.) The four access configurations were:

A—The current minimum access required by § 25.813(c), which resulted in an unobstructed passageway of approximately 6 inches;

B—A configuration which had a minimum of 10 inches of unobstructed passageway to the exit, with the leading edge of the seat bottom cushion of the

row of seats aft of the exit at the centerline of the exit;

C—A configuration which had a minimum of 20 inches of unobstructed passageway to the exit, with the leading edge of the seat bottom cushion of the row of seats aft of the exit protruding 5 inches forward of the projected aft vertical edge of the exit opening; and

D—A configuration which provided two passageways to the exit by centering a seat row on the exit, but with the outboard seat deleted and with the seat rows forward and aft of this seat row spaced at 32 inches (providing two, approximately 6-inch unobstructed passageways).

The data obtained from these tests were then subjected to a statistical evaluation. It was found that the egress rates of configurations C and D were approximately 14 percent better than that of configuration A, a statistically significant improvement. In addition, the rate of egress from configuration D was a statistically significant improvement over that of configuration B.

The exit preparation time, i.e., the time it took to open and dispose of the exit hatch, was measured in the second set of tests. During this testing, each of five seating locations (configuration D has two seating locations from which a person can reasonably be expected to open the exit) was evaluated with eight subjects per location. In this set of tests, the questions of where to dispose of the hatch and whether or not increased space in the vicinity of the exit would reduce the amount of time required to prepare the exit for use were studied. During the testing, the passenger information card purposely omitted any instruction as to what to do with the exit hatch after it had been removed from the side of the fuselage mock-up. This was consistent with some airline passenger information cards which do not recommend specific stowage areas. As expected, the test subjects found a variety of solutions to the question. These included laying the hatch horizontally or vertically against the back of the seat row forward of the exit or vertically in the seat position that the opener had previously occupied, throwing the hatch out the exit, and placing the hatch on the seat row forward of the exit. In some instances, the hatch was stowed in a position considered to be a possible impediment to the smooth flow of passengers to and through the exit.

Discussion

As discussed above, the tests conducted by CAMI showed that a significant improvement in egress rates could be achieved by increasing the access space to Type III exits over that currently required by part 25. This notice proposes to amend § 25.813(c) to require increased access to Type III exits from the nearest main aisle on airplanes with a seating configuration of 20 or more. The proposed rule would require that passageways be provided as described in either test configuration C or D, which are defined in proposed §§ 25.813(c)(1)(i) and (ii), respectively. These passageways are projected vertically with respect to the airplane floor.

While the CAMI tests and the proposed rules focus upon increased access to Type III exits in the area directly adjacent to such exits, the FAA will consider alternative means of increasing the flow rate from Type III exits. The goal of these proposed rules is to achieve the flow rate improvement which the CAMI tests indicate is attainable with the C and D test configurations. Specifically, the CAMI tests demonstrated that either of the alternative proposals contained in this notice would achieve an improvement of 14 percent in the rate of flow at Type III exits. Therefore, the FAA would accept any alternative seat configuration, exit procedure, or other change that would accomplish an improvement in the flow rate equal to or greater than 14 percent. An air carrier or manufacturer desiring to use such an alternative methodology would be expected to establish, through a test procedure acceptable to the Administrator, that the alternative achieves a level of safety equivalent to that which would be provided by these proposals for an improvement in passenger evacuation through Type III exits, and that it continues to comply with all other relevant regulatory requirements. The FAA requests comments on the desirability of employing this alternative methodology.

Current §§ 25.813(c) (1) and (2) are reidentified as §§ 25.813(c)(2) (i) and (ii). This relocation clearly shows that these requirements are separate from the passageway requirements of proposed §§ 25.813(c)(1) (i) and (ii). This also clearly shows that the phrase "this region" in proposed § 25.813(c)(2)(ii) refers to those areas discussed in proposed § 25.813(c)(2)(i). The phrase "excluding pilot's" has been deleted because the reader may incorrectly interpret the sentence to mean that the seats of other crewmembers, such as those of flight attendants or flight engineers, are considered to be passenger seats.

Just prior to the FAA-sponsored public conference, a Boeing 737 operated by British Airtours was destroyed on August 22, 1985, at Manchester, England. The accident occurred prior to takeoff as a result of an engine disintegration. Due to the ensuing fire, 57 of the 137 occupants were unable to escape without suffering fatal injuries. Subsequent to this accident, the British Civil Aviation Authority issued Airworthiness Notice (AN) 79 to require increased access to the Type III exits of British registered airplanes. While the provisions of AN 79 differ somewhat in detail from those proposed in this notice, the basic intent of the document was the same.

When the exit is a removable hatch, a placard would also be required to clearly indicate the method of opening the hatch and to recommend at least one stowage location. This would reduce the probability that the hatch would be left in a position which would hamper the flow to the exit. Where the hatch should be stowed in a specific airplane model would depend on the configuration of the interior in the vicinity of the exit.

Additionally, the placard would also have to indicate the weight of the hatch. This requirement is a result of observation during the phase-two tests that subjects were often overwhelmed by the unexpected weight of the exit hatch. In most instances, they would have been better prepared and positioned to handle the hatch had they known its weight beforehand.

The placard would have to be located in a prominent position in front of each seat which both faces and borders the passageways from the cabin aisle to the exit. The passengers in these seats are the most likely to open the exits in an emergency because of their proximity to the exits. In the case of a configuration D arrangement, this would typically include the passengers in the seat assembly centered on the exit and the passengers in the row aft of the exit. The requirement for the placard is proposed for § 25.813(c) rather than § 25.807(a)(3) because proper disposal of the hatch is an important factor in maintaining access to the exit.

For multi-aisle airplanes, an unobstructed 20-inch cross-aisle would be required between the aisles in the vicinity of each Type III exit, except that one cross-aisle may serve two Type III exits which are within three passenger seat rows of each other. Cross-aisles are currently required for Type A, Type I, and Type III exits by § 25.813(a). Section 25.813(a) would be revised to require that cross-aisles be provided for all exit types in multi-aisle airplanes. The cross-aisle would be required to lead directly to the passageway for a Type A exit, which must have two flows of evacuees in order to be fully utilized. For Type I,

Type II, and Type III exits, which require only one flow of evacuees in order to be fully utilized, the cross-aisle would have to lead to the immediate vicinity of the exit passageway. For purposes of this proposal, "immediate vicinity" means having at least a 5-inch overlap of the cross-aisle and the passageway to any Type II or larger exit and being within the distance of one passenger seat row (at the smallest seat pitch installed in the airplane) from the passageway for a single Type III exit. When two Type III exits are located within three passageway seat rows of each other, one cross-aisle would suffice for both exits. The cross-aisle would have to be located between the two passageways to the exits. This would eliminate the possibility that evacuees using the cross-aisle would have to bypass one Type III exit to get to the other. Notice 90–4 proposes to establish two new exit types, Type B and Type C. If a final rule is adopted establishing these two exit types, this proposal would be modified to account for that change. The crossaisle would be required to lead directly to the passageway for a Type B exit and to the immediate vicinity of the passageway for a Type C exit.

Finally, § 121.310(f)(3) would be amended to require improved access to Type III exits within 6 months after the effective date of the final rule for all airplanes type certificated after January 1, 1958, and operated under part 121. Compliance is not considered practical for airplanes type certificated prior to January 1, 1958, because of their relatively advanced age and small numbers remaining in service. The FAA is proposing a 6-month compliance period because, assuming that affected operators will elect to comply by changing seat pitch or removing a seat adjacent to the Type III exit, and given the relative ease of reconfiguring transport category airplane seat arrangements, that should provide sufficient time in which to develop the required change, procure the necessary parts, and reconfigure the airplanes.

Section 135.177 presently incorporates the provisions of § 121.310 by reference. It has come to the attention of the FAA that the practice of incorporating certain provisions of part 121 in part 135 by reference may cause confusion. In order to preclude any confusion in this regard, the provisions of § 121.310, including the changes proposed in this notice, would be included in part 135 explicitly rather than by reference.

The FAA recognizes that many factors must be evaluated in designing transport category airplanes for safe evacuations. Cabin safety rulemaking must consider the interaction between cabin size, passenger capacity, the type and number of emergency exits, exit location, distance between exits, aisle design, exit row and escape path marking and lighting, flame resistance of cabin interior materials, and other important variables. The agency considers it preferable, to the extent possible, to employ performance standards for evacuation in the future, so as not to artificially constrain design options. With the specific intent of developing the information necessary to propose such performance standards following a systems-type analysis, the FAA chartered the Aviation Rulemaking Advisory Committee on February 5, 1991. The subcommittee dealing with cabin safety will be tasked to gather the best available cabin safety expertise and undertake a comprehensive review of questions involving emergency evacuation.

I. Regulatory Evaluation

This section summarizes the full regulatory evaluation of the subject proposed rule prepared by the FAA which provides more detailed estimates of the economic consequences of this regulatory action. The full evaluation, which has been placed in the docket, quantifies, to the extent practicable, estimated costs to the private sector, consumers, Federal, state, and local government, as well as anticipated benefits and impact.

Executive Order 12291 dated February 17, 1981, directs Federal agencies to promulgate new regulations or modify existing regulations only if the potential benefits to society for the regulatory change outweigh the potential costs. The order also requires the preparation of a regulatory impact analysis of all "major" rules, except those responding to emergency situations or other narrowly defined exigencies. A "major" rule is one that is likely to result in an annual effect on the economy of $100 million or more, a major increase in consumer costs, a significant adverse effect on competition, or one that is highly controversial.

The FAA has determined that this notice of proposed rulemaking is not "major" as defined in the executive order; therefore, a full regulatory analysis, which includes the identification and evaluation of cost-reducing alternatives to the proposed rule, has not been prepared. In addition to a summary of the regulatory evaluation, this section also contains a trade impact assessment, and a regulatory flexibility determination required by the Regulatory Flexibility Act of 1980.

The requirement to have placards by the exits to provide emergency information is of minimal impact, less than $100 per airplane, and will not be addressed further in this analysis.

Benefits

The benefits of the proposed improved access to Type III exits are the avoidance of prospective casualty losses (fatalities). These benefits would ensue from the reduction in exit time that the increased space would permit when evacuating an airplane under emergency conditions. Faster evacuation time can lead to the saving of life in such conditions as fire or a water environment. The FAA Civil Aeromedical Institute (CAMI) conducted tests of current seating configurations and of those entailed by this proposal. They found that current configurations allow approximately 37 people to exit per minute through Type III exits, and the proposed configuration would allow about 42 people to exit per minute, an improvement of approximately 14 percent.

Some insight to the number of fatalities that might be avoided can be gained by reference to a study performed by the National Bureau of Standards (NBS) (Decision Analysis Model for Passenger Aircraft Fire Safety with Application to Fire-Blocking of Seats, National Bureau of Standards, March 1984, NBSTR 84–2817, DOT/FAA/OT–84–8). The NBS analyzed historical fire incidents involving fatalities during the period 1965 through 1982 and estimated the number of lives that could have been saved if passengers had additional time to escape before a major cabin fire developed, i.e., before flashover occurred.

In evaluating seat fireblocking, the NBS estimated that of 712 fatalities during the period 1965 through 1982, 109 persons could have been saved if there had been 20 additional seconds of evacuation time. This is a rate of approximately 3 lives saved per 100 million passenger enplanements. While having more time to evacuate an airplane is not the same as being able to evacuate an airplane faster, it can nevertheless serve as a proxy for estimating benefits because the end result is the same—more passengers can egress before fire or explosion makes safe egress impossible. If 3 lives per 100 million enplanements could be saved by providing 20 additional seconds of evacuation time, it follows that approximately the same number could

be saved if the rate of evacuation were improved so that the passengers could evacuate the airplane 20 seconds earlier.

Section 25.803 specifies that an evacuation demonstration must be successfully completed within a 90-second time period. Assuming that the first 10 seconds would be used for exit preparation, the actual evacuation of passengers must take place within 80 seconds. Further, assuming that improved access to Type III exits would provide a 14 percent improvement in the Type III exit evacuation rate, as estimated by CAMI, and that Type III exits provide an average of 35 percent of the evacuation capability of the domestic narrow-body fleet, the time needed for all passengers to evacuate would be reduced by approximately 3.9 seconds (14 percent × 35 percent × 80 seconds). By comparing the reduction in time needed to egress as a result of improved access to exits (3.9 seconds) with the additional time afforded by the fireblocking of seats (20 seconds), the FAA estimates that the reduction in fatalities attributable to improved access to exits would be approximately 20 percent of that due to the fireblocking of seats. The improved access can therefore be assigned a fatality reduction of 0.6 persons per 100 million enplanements (20 percent × 3 persons per 100 million enplanements).

The FAA estimates that 32 lives might be saved over the 20-year period 1993 through 2012 as a result of the proposed rule. Based on these and other estimates, the benefits would total $47.4 million, or $15.9 million discounted to present value at a discount rate of 10 percent. The derivations of these estimates are detailed in the full regulatory evaluation.

Costs

Airline operators could meet the requirements of this proposal in one of two ways. The first would be to increase the distance between the two seat rows fore and aft of the exit. The second would be to remove the outboard seat, i.e., the seat nearest the exit. The corresponding costs of these alternatives would be those resulting from adjusting cabin configurations to provide the necessary access, and the reduction in passenger-carrying capacities due to the reduction in the numbers of seats. Each alternative and its estimated cost is summarized below.

Although the FAA assumes that manufacturers and operators would likely employ the most expedient and least costly alternative to comply with these proposed rules, they may opt to design their own cabin configuration to achieve a 14 percent or better Type III exit flow rate that exceeds costs of compliance options already available. Since the nature of such designs cannot be gleaned at this time, no costs have been evaluated for this possible means of compliance.

Under the first option, affected airplane operators would increase the typical current spacing of about 8 inches between seat rows in the vicinity of Type III exits to 20 inches, an increase of 12 inches. The current spacing, or pitch, between rows is about 33 or 34 inches, and therefore the proposal would increase the pitch of one seat row to 46 inches. The approximately 12 inches of floor space that must be gained per exit to avoid losing seats could be achieved by one or more of the following means: (1) Decrease pitch slightly through the remainder of the passenger cabin; (2) reduce leg room aft of a partition; (3) reduce seat recline forward of a partition; (4) resize, relocate, or remove cabin furnishings such as closets, galleys, or lavatories; or (5) replace existing seats in the vicinity of the exits with thinner profile seats.

Adjusting cabin configurations by moving all seats a few inches would require an estimated 40 to 50 man hours per affected aircraft. Using a $30 per hour full compensation rate and a 50-hour requirement, the FAA estimates that adjusting cabin configurations in affected airplanes would result in a $5.4 million one-time cost ($375 per Type III exit), or $4.1 million when discounted to present value. Any reduction of passenger seat pitch would decrease "knee room" available to passengers, with a possible corresponding reduction of passenger comfort and convenience. The FAA requests comments on the costs, if any, resulting from possible passenger discomfort or inconvenience. The FAA believes that most carriers would choose this option rather than the option of removing seats. The FAA specifically requests comments relating to the numbers of airplanes for which reconfiguration would provide the proposed access without an accompanying loss of passenger seats and any additional costs that would be involved to achieve such reconfiguration.

Under the second option, the costs to affected operators would consist primarily of the foregone revenues, less expenses, that lost seats would have otherwise generated. Evaluating the costs of reduced seating capacities can be approached in two ways. One method is to determine how much operators are willing to pay for additional capacity. The other is to determine the revenue generated by the lost seat minus expenses involved in generating that revenue. Each method is described below.

The theoretical purchase price of an aircraft is the present value of its net future earnings stream. Included among the major price determinants are its passenger capacity, its speed, its range, and its operating costs. Although not based on a detailed analysis, a rule of thumb is that new airplanes sell for about $200,000 per seat, an airplane with 100 seats sells for about $20 million, one with 200 seats for $40 million, and one with 400 seats for $80 million. This is not a strict relationship, but can serve as a rough estimate. The theoretical annual revenue to justify this price (25-year life, 10 percent discount rate) is $22,000. Used aircraft with 10 years remaining life sell for about $50,000 per seat, justified by annual revenue of $8,000.

Another approach to calculating the marginal value of a seat is by reference to the net revenue it generates. Type III exits are mainly used on narrow-body jet aircraft. These aircraft generate about $330 in revenue per seat per day or $120,000 per year. Marginal expenses for an additional passenger, i.e., costs for passenger services (ticketing, baggage handling, food, etc.) and fuel, are estimated at 20 percent of revenue. Therefore, the net revenue per additional passenger is approximately $96,000 per year ($120,000 x 80 percent). The occupancy rate or load factor of the last seat or two, of course, will influence the net foregone revenue.

As a cross-check, the FAA asked the aviation industry for an estimate of the expected occupancy rate or load factor for the last one to four seats. One estimate was about 20 percent. Another estimate, from a major airline, indicated that revenues of about $19,600 per year would be lost per seat removed. Assuming that expenses amount to 20 percent of a seat's revenue, the net annual lost revenue per seat would be $15,700. For purpose of this analysis, the FAA assumes that the annual net revenue lost per seat is $15,700. This is less than the $22,000 per seat market price approach (sales price of an aircraft on a per seat basis) for new aircraft but nearly two times as much as that for an average used aircraft ($8,000 per seat). The FAA makes this assumption because the airline operator supplied a seemingly reasonable approach to its estimate of lost revenue per seat. In total, these estimates yield total foregone revenues of $4.57 billion, or $1.59 billion when discounted to present value, over the 20-year period (see Tables A and B of the full regulatory evaluation for details on how these foregone revenues were calculated).

In addition to lost seat revenues, costs of removing and replacing seats would be incurred. Assuming a net cost per exit of $2,000 per exit (including seats and labor), the FAA estimates that the costs of removing and replacing all affected seats would be $28.8 million, or $21.6 million discounted to present value. Further, not having to carry the seat weight would result in some fuel savings. The FAA estimates that affected operators would save about $180 per removed seat per year, or approximately $52.4 million ($18.2 million discounted) over the 20-year period.

Combining the costs of net revenue loss, the costs of seat removal and replacement, and the savings in fuel costs yields a total net cost of this option of $4.57 billion, or $1.59 billion discounted. The FAA requests that industry and the public provide information regarding the number of seats that would be lost under this proposal and the gross and net revenues that would be foregone due to the loss of seats.

Comparison of Benefits and Costs

The FAA believes that operators would do everything possible to avoid losing seats and would most likely reconfigure cabins by reducing the pitch slightly in order to provide the additional space that would be required by the proposed rules. In this event, the estimated costs at present value would be $4.1 million (discounted), which compares very favorably with the estimated $15.9 million (discounted) in benefits.

If, on the other hand, all affected operators choose to remove seats to comply with this proposed regulation, a value of at least $150.8 million would have to represent a statistical life saved in order for benefits to equal or exceed costs. As noted above, the FAA does not expect that many operators would choose the latter method, although it recognizes that some operators in some instances for various reasons may choose to do so. The FAA has no way to confidently project the number of operators that would remove seats or how many seats would be removed. The FAA requests information from industry regarding the number of seats, if any, that would be removed in order to comply with this regulation. Also, commentors maintaining that they would remove seats should indicate why they would be unable to comply with the proposed regulation by reconfiguring cabins.

II. International Trade Impact Analysis

The proposal is unlikely to have any impact on international trade. U.S. airplane manufacturers can easily configure an airplane cabin to suit a foreign customer. Generally, widebody airplanes are used in international air commerce and do not have Type III exits. U.S. carriers using these airplanes are not expected to be at a competitive disadvantage. To the extent that carriers using smaller airplanes in international operations would be unable to meet these requirements without removing seats, they would be at a competitive disadvantage by the amount of the resulting lost net revenues. Adoption of similar rules by other countries would mitigate this disadvantage (a somewhat related rule has already been adopted by the United Kingdom).

III. Regulatory Flexibility Act Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily and disproportionately burdened by government regulations. The RFA requires agencies to review rules which have "a significant economic impact on a substantial number of small entities." The proposal would have an impact on airline operators whose fleets contain Type III exits.

Only two U.S. manufacturers specialize in commercial transport category airplanes—the Boeing Company and the McDonnell Douglas Corporation. In addition, a number of general aviation entities, including Cessna Aircraft Corporation, Beech Aircraft Corporation, Gulfstream American Corporation and Gates Learjet Corporation, manufacture other transport category airplanes, such as large business jets.

The FAA size threshold for determination of a small entity for U.S. airplane manufacturers is 75 employees; any manufacturer with more than 75 employees is not considered to be a small entity. None of the transport category airplane manufacturers employs fewer than 75 employees and thus is considered to be a small entity.

The FAA size threshold for determination of a small entity for airplane operators is nine owned airplanes or fewer; that is, any airplane operator with more than nine airplanes is considered not to be a small entity. The cost thresholds in 1988 dollars are $98,274, $54,935, and $3,865 for scheduled carriers with all airplanes having over 60 seats, other scheduled carriers, and unscheduled air carriers, respectively. The lowest estimated cost impact of the proposed rules is $375 per exit. This cost impact would amount to $13,500 for an operator with nine airplanes who chooses to reconfigure cabins to meet the requirements of the proposed rule. This estimated cost exceeds the cost thresholds for small unscheduled aircraft operators and, therefore, an initial regulatory flexibility analysis follows.

IV. Initial Regulatory Flexibility Analysis

As required by sections 603(b) and (c) of the Regulatory Flexibility Act, the following analysis deals with the proposed rule as it relates to small entities.

A. *Why agency action is taken.* The reasons for agency action are detailed in the NPRM. Briefly, the proposal requires improved access to Type III emergency exits so as to facilitate the evacuation of airplanes under emergency conditions.

B. *Objective of and legal basis for the rule.* The objective of the proposed rule is to reduce prospective casualty losses by improving access to Type III exits. This objective is more thoroughly discussed in this preamble to the NPRM. The legal basis of the proposal is Sections 313, 314, and 601 through 610 of the Federal Aviation Act of 1958, as amended (49 U.S.C. 1354, 1355, and 1421 through 1430), and the Department of Transportation Act (49 U.S.C. 106(g)).

C. *Description of the small entities affected by the rule.* The small entities that would be impacted by the rule would be those with nine or fewer aircraft operating under parts 121 or 135 of the Federal Aviation Regulations. This matter is further discussed in part V of the full evaluation contained in the docket.

D. *Compliance requirements of the rule.* The proposal would require each airplane operating in accordance with part 121 or 135, or certificated under part 25, to have improved access to Type III emergency exits at a date 6 months after the effective date of the regulation.

E. *Overlap of the rule with other federal regulations.* No other Federal rules duplicate, overlap, or conflict with the proposal.

F. *Alternatives to the proposal.* As part of the rulemaking process, the FAA considered several alternative approaches to the problems addressed in the proposal. Three alternative proposals were considered, and a discussion of their merits follows.

Alternative one—apply proposal only to new production airplanes. This alternative would save the operators the cost of retrofitting and allow for a more

optimum cabin configuration. The compliance cost for new production airplanes would be less than the cost of retrofitting current fleet airplanes, and thus the benefit to cost ratio would be improved. Naturally, the benefits would only be available for new production airplanes, and some operators may decide to retrofit to remain competitive in regards to safety. The FAA rejected this proposal because it would delay, up to 15 years, the reduction of casualty losses resulting from accidents of airplanes now in the fleet.

Alternative two—have different standards based on size of affected air carrier. This alternative would save small firms the compliance cost of the proposal, yet would provide protection to the majority of air travelers who utilize large air carriers. Small air carriers (fewer than nine aircraft) might implement the proposal anyway to remain competitive. Additionally, the public would not be afforded full protection. The FAA rejected this approach because it believes that all members of the traveling public should be equally protected.

A variation of this approach would be to lessen the impact on small air carriers by allowing them more time in which to comply. This approach was also rejected because there would be a period of time in which some members of the traveling public would not be afforded the protection enjoyed by persons traveling on larger carriers. Furthermore, it does not appear that delayed compliance would result in a significant overall cost reduction for the smaller carriers.

Alternative three—let the marketplace decide. Under this alternative, the public would select the airline based on competitive factors, including those of a safety nature. This would assume that the public is knowledgeable about the safety aspects of each airline. The airline would be free to implement the proposal or not and do what it considers to be in its best interest. Because the public is generally not informed about safety systems, the FAA would have to inform passengers as to the absence or presence of approved systems which meet the requirements of the proposal. Moreover, in many instances the traveling public would not have a competitive carrier available to choose over the carrier not providing the additional space. The FAA believes that this alternative would also be rejected by industry and the public and has decided it has less merit than the selected proposal. In fact, while air carriers have always been free to voluntarily comply with the substance of this proposal, to date none have chosen to do so.

Federalism Implications

The regulations proposed herein would not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this proposal would not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

For the reasons given earlier in the preamble, the FAA has determined that this is not a major regulation as defined in Executive Order 12291. As this notice concerns a matter on which there is significant public interest, the FAA has determined that this action is significant as defined in Department of Transportation Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). In addition, the FAA has endeavored to consider feasible alternatives to this proposal which would minimize the impact on small entities. After careful consideration of these entities, the FAA has concluded that the proposal might have a significant impact on a substantial number of small entities, but it is the best course to achieve the desired safety objectives. Other alternatives and views are solicited from interested persons. They will be carefully considered by the FAA in the development of a final rule.

List of Subjects

14 CFR Part 25

Air transportation, Aircraft, Aviation safety, Safety.

14 CFR Part 121

Aviation safety, Safety, Air carriers, Air transportation, Aircraft, Airplanes, Airworthiness directives and standards, Transportation, Common carriers, Crashworthiness, Emergency evacuation.

14 CFR Part 135

Aviation safety, Safety, Air carriers, Air transportation, Aircraft, Airplanes, Cargo, Hazardous baggage, Materials, Transportation, Mail.

The Proposed Amendment

Accordingly, the FAA proposes to amend parts 25, 121, and 135 of the Federal Aviation Regulations (FAR), 14 CFR parts 25, 121, and 135 as follows:

PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

1. The authority citation for part 25 continues to read as follows:

Authority: 49 U.S.C. 1344, 1354(a), 1355, 1421, 1423, 1424, 1425, 1428, 1429, 1430; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983); and 49 CFR 1.47(a).

2. By amending § 25.813 by revising paragraphs (a) and (c) to read as follows:

§ 25.813 Emergency exit access.

(a) There must be a passageway leading from the nearest main aisle to each Type I, Type II, or Type A emergency exit and between individual passenger areas. Each passageway leading to a Type A exit must be unobstructed and at least 36 inches wide. Other passageways must be unobstructed and at least 20 inches wide. Unless there are two or more main aisles, each Type A exit must be located so that there is passenger flow along the main aisle to that exit from both the forward and aft directions. If two or more main aisles are provided, there must be unobstructed cross-aisles at least 20 inches wide between main aisles. There must be—

(1) A cross-aisle which leads directly to each passageway between the nearest main aisle and a Type A exit; and

(2) A cross-aisle which leads to the immediate vicinity of each passageway between the nearest main aisle and a Type I, Type II or Type III exit; except that when two Type III exits are located within three passenger rows of each other, a single cross-aisle may be used if it leads to the vicinity between the passageways from the nearest main aisle to each exit.

* * * * *

(c) The following must be provided for each Type III or Type IV exit—

(1) There must be access from the nearest aisle to each exit. In addition, for each Type III exit in an airplane that has a passenger seating configuration of 20 or more—

(i) Except as provided in paragraph (c)(1)(ii) of this section, the access must be provided by an unobstructed passageway that is at least 20 inches in width. The centerline of the passageway must not be displaced more than 5 inches horizontally from that of the exit.

(ii) In lieu of one 20-inch passageway, there may be two passageways, between seat rows only, that must be at least 6 inches in width and which lead to an unobstructed space adjacent to the exit. The unobstructed space adjacent to

the exit must extend vertically from the floor to the ceiling (or bottom of sidewall stowage bins), inboard from the exit for a distance not less than the width of the narrowest passenger seat installed on the airplane, and from the forward edge of the forward passageway to the aft edge of the aft passageway. The exit opening must be totally within the fore and aft bounds of the unobstructed space.

(2) In addition to the access—

(i) For airplanes that have a passenger seating configuration of 20 or more, the projected opening of the exit provided must not be obstructed and there must be no interference in opening the exit by seats, berths, or other protrusions (including any setback in the most adverse position) for a distance from that exit not less than the width of the narrowest passenger seat installed on the airplane.

(ii) For airplanes that have a passenger seating configuration of 19 or fewer, there may be minor obstructions in this region, if there are compensating factors to maintain the effectiveness of the exit.

(3) For each Type III exit, there must be placards installed which—

(i) Are readable by all persons seated adjacent to and facing a passageway to the exit;

(ii) Accurately state or illustrate the proper method of opening the exit, including the use of handholds; and

(iii) If the exit is a removable hatch, indicate an appropriate location to stow the hatch and state the weight of the hatch.

* * * * *

PART 121—CERTIFICATION AND OPERATIONS: DOMESTIC, FLAG, AND SUPPLEMENTAL AIR CARRIERS AND COMMERCIAL OPERATORS OF LARGE AIRCRAFT

3. The authority citation for part 121 continues to read as follows:

Authority: 49 U.S.C. 1354(a), 1355, 1356, 1357, 1401, 1421 through 1430, 1472, 1485, and 1502; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983); and 49 CFR 1.47(a).

4. By amending § 121.310 by revising paragraph (f)(3) to read as follows:

§ 121.310 Additional emergency equipment.

* * * * *

(f) * * *

(3) * * *

(i) * * *

(ii) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, the access must meet the emergency exit access requirements under which the airplane was type certificated; except that,

(iii) For an airplane type certificated after January 1, 1958, after [Insert date 6 months after the effective date of the final rule], the access must meet the requirements of § 25.813(c) of this chapter, effective [Insert effective date of the final rule].

* * * * *

PART 135—AIR TAXI OPERATORS AND COMMERCIAL OPERATORS

5. The authority citation for part 135 continues to read as follows:

Authority: 49 U.S.C. 1354(a), 1355, 1356, 1357, 1401, 1421-1431, and 1502; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983); and 49 CFR 1.47(a).

§ 135.177 [Amended]

6. By amending § 135.177 by removing and reserving paragraph (a)(4).

7. By adding a new § 135.178 to read as follows:

§ 135.178 Additional emergency equipment.

No person may operate an airplane having a passenger seating configuration of more than 19 seats, unless it has the additional emergency equipment specified in paragraphs (a) through (l) of this section.

(a) *Means for emergency evacuation.* Each passenger-carrying landplane emergency exit (other than over-the-wing) that is more than 6 feet from the ground, with the airplane on the ground and the landing gear extended, must have an approved means to assist the occupants in descending to the ground. The assisting means for a floor-level emergency exit must meet the requirements of § 25.809(f)(1) of this chapter in effect on April 30, 1972, except that, for any airplane for which the application for the type certificate was filed after that date, it must meet the requirements under which the airplane was type certificated. An assisting means that deploys automatically must be armed during taxiing, takeoffs, and landings. However, if the Administrator finds that the design of the exit makes compliance impractical, he may grant a deviation from the requirement of automatic deployment if the assisting means automatically erects upon deployment and, with respect to required emergency exits, if an emergency evacuation demonstration is conducted in accordance with § 121.291(a) of this chapter. This paragraph does not apply to the rear window emergency exit of Douglas DC-3 airplanes operated with fewer than 36 occupants, including crewmembers, and fewer than five exits authorized for passenger use.

(b) *Interior emergency exit marking.* The following must be complied with for each passenger-carrying airplane:

(1) Each passenger emergency exit, its means of access, and its means of opening must be conspicuously marked. The identity and location of each passenger emergency exit must be recognizable from a distance equal to the width of the cabin. The location of each passenger emergency exit must be indicated by a sign visible to occupants approaching along the main passenger aisle. There must be a locating sign—

(i) Above the aisle near each over-the-wing passenger emergency exit, or at another ceiling location if it is more practical because of low headroom,

(ii) Next to each floor level passenger emergency exit, except that one sign may serve two such exits if they both can be seen readily from that sign; and

(iii) On each bulkhead or divider that prevents fore and aft vision along the passenger cabin, to indicate emergency exits beyond and obscured by it, except that if this is not possible, the sign may be placed at another appropriate location.

(2) Each passenger emergency exit marking and each locating sign must meet the following:

(i) For an airplane for which the application for the type certificate was filed prior to May 1, 1972, each passenger emergency exit marking and each locating sign must be manufactured to meet the requirements of § 25.812(b) of this chapter in effect on April 30, 1972. On these airplanes, no sign may continue to be used if its luminescence (brightness) decreases to below 100 microlamberts. The colors may be reversed if it increases the emergency illumination of the passenger compartment. However, the Administrator may authorize deviation from the 2-inch background requirements if he finds that special circumstances exist that make compliance impractical and that the proposed deviation provides an equivalent level of safety.

(ii) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, each passenger emergency exit marking and each locating sign must be manufactured to meet the interior emergency exit marking requirements under which the airplane was type certificated. On these airplanes, no sign may continue to be used if its luminescence (brightness) decreases to below 250 microlamberts.

(c) *Lighting for interior emergency exit markings.* Each passenger-carrying

airplane must have an emergency lighting system, independent of the main lighting system. However, sources of general cabin illumination may be common to both the emergency and the main lighting systems if the power supply to the emergency lighting system is independent of the power supply to the main lighting system. The emergency lighting system must—

(1) Illuminate each passenger exit marking and locating sign;

(2) Provide enough general lighting in the passenger cabin so that the average illumination when measured at 40-inch intervals at seat armrest height, on the centerline of the main passenger aisle, is at least 0.05 foot-candles; and

(3) For airplane type certificated after January 1, 1958, include floor proximity emergency escape path marking which meets the requirements of § 25.812(e) of this chapter in effect on November 26, 1984.

(d) *Emergency light operation.* Except for lights forming part of emergency lighting subsystems provided in compliance with § 25.812(h) of this chapter (as prescribed in paragraph (h) of this section) that serve no more than one assist means, are independent of the airplane's main emergency lighting systems, and are automatically activated when the assist means is deployed, each light required by paragraphs (c) and (h) of this section must;

(1) Be operable manually both from the flightcrew station and from a point in the passenger compartment that is readily accessible to a normal flight attendant seat;

(2) Have a means to prevent inadvertent operation of the manual controls;

(3) When armed or turned on at either station, remain lighted or become lighted upon interruption of the airplane's normal electric power;

(4) Be armed or turned on during taxiing, takeoff, and landing. In showing compliance with this paragraph a transverse vertical separation of the fuselage need not be considered;

(5) Provide the required level of illumination for at least 10 minutes at the critical ambient conditions after emergency landing, and

(6) Have a cockpit control device that has an "on," "off," and "armed" position.

(e) *Emergency exit operating handles.* (1) For a passenger-carrying airplane for which the application for the type certificate was filed prior to May 1, 1972, the location of each passenger emergency exit operating handle, and instructions for opening the exit, must be shown by a marking on or near the exit that is readable from a distance of 30 inches. In addition, for each Type I and Type II emergency exit with a locking mechanism released by rotary motion of the handle, the instructions for opening must be shown by—

(i) A red arrow with a shaft at least three-fourths inch wide and a head twice the width of the shaft, extending along at least 70° of arc at a radius approximately equal to three-fourths of the handle length; and

(ii) The word "open" in red letters 1 inch high placed horizontally near the head of the arrow.

(2) For a passenger-carrying airplane for which the application for the type certificate was filed on or after May 1, 1972, the location of each passenger emergency exit operating handle and instructions for opening the exit must be shown in accordance with the requirements under which the airplane was type certificated. On these airplanes, no operating handle or operating handle cover may continue to be used if its luminescence (brightness) decreases to below 100 microlamberts.

(f) *Emergency exit access.* Access to emergency exits must be provided as follows for each passenger-carrying airplane.

(1) Each passageway between individual passenger areas, or leading to a Type I or Type II emergency exit, must be unobstructed and at least 20 inches wide.

(2) There must be enough space next to each Type I or Type II emergency exit to allow a crewmember to assist in the evacuation of passengers without reducing the unobstructed width of the passageway below that required in paragraph (f)(1) of this section. However, the Administrator may authorize deviation from this requirement for an airplane certificated under the provisions of part 4b of the Civil Air Regulations in effect before December 20, 1951, if he finds that special circumstances exist that provide an equivalent level of safety.

(3) There must be access from the main aisle to each Type III and Type IV exit. The access from the aisle to these exits must not be obstructed by seats, berths, or other protrusions in a manner that would reduce the effectiveness of the exit. In addition—

(i) For an airplane for which the application for the type certificate was filed prior to May 1, 1972, the access must meet the requirements of § 25.813(c) of this chapter in effect on April 30, 1972; and

(ii) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, the access must meet the emergency exit access requirements under which the airplane was type certificated; except that,

(iii) For an airplane type certificated after January 1, 1958, after [Insert date 6 months after the effective date of the final rule], the access must meet the requirements of § 25.813(c) of this chapter, effective [Insert effective date of the final rule].

(4) If it is necessary to pass through a passageway between passenger compartments to reach any required emergency exit from any seat in the passenger cabin, the passageway must not be obstructed. However, curtains may be used if they allow free entry through the passageway.

(5) No door may be installed in any partition between passenger compartments.

(6) If it is necessary to pass through a doorway separating the passenger cabin from other areas to reach a required emergency exit from any passenger seat, the door must have a means to latch it in the open position, and the door must be latched open during each takeoff and landing. The latching means must be able to withstand the loads imposed upon it when the door is subjected to the ultimate inertia forces, relative to the surrounding structure, listed in § 25.561(b) of this chapter.

(g) *Exterior exit markings.* Each passenger emergency exit and the means of opening that exit from the outside must be marked on the outside of the airplane. There must be a 2-inch colored band outlining each passenger emergency exit on the side of the fuselage. Each outside marking, including the band, must be readily distinguishable from the surrounding fuselage area by contrast in color. The markings must comply with the following;

(1) If the reflectance of the darker color is 15 percent or less, the reflectance of the lighter color must be at least 45 percent.

(2) If the reflectance of the darker color is greater than 15 percent, at least a 30 percent difference between its reflectance and the reflectance of the lighter color must be provided.

(3) Exits that are not in the side of the fuselage must have the external means of opening and applicable instructions marked conspicuously in red or, if red is inconspicuous against the background color, in bright chrome yellow and, when the opening means for such an exit is located on only one side of the fuselage, a conspicuous marking to that effect must be provided on the other side. "Reflectance" is the ratio of the luminous flux reflected by a body to the luminous flux it receives.

(h) *Exterior emergency lighting and escape route.* (1) Each passenger-carrying airplane must be equipped with exterior lighting that meets the following requirements:

(i) For an airplane for which the application for the type certificate was filed prior to May 1, 1972, the requirements of § 25.812(f) and (g) of this chapter in effect on April 30, 1972.

(ii) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, the exterior emergency lighting requirements under which the airplane was type certificated.

(2) Each passenger-carrying airplane must be equipped with a slip-resistant escape route that meets the following requirements:

(i) For an airplane for which the application for the type certificate was filed prior to May 1, 1972, the requirements of § 25.803(e) of this chapter in effect on April 30, 1972.

(ii) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, the slip-resistant escape route requirements under which the airplane was type certificated.

(i) *Floor level exits.* Each floor level door or exit in the side of the fuselage (other than those leading into a cargo or baggage compartment that is not accessible from the passenger cabin) that is 44 or more inches high and 20 or more inches wide, but not wider than 46 inches, each passenger ventral exit (except the ventral exits on Martin 404 and Convair 240 airplanes), and each tail-cone exit, must meet the requirements of this section for floor level emergency exits. However, the Administrator may grant a deviation from this paragraph if he finds that circumstances make full compliance impractical and that an acceptable level of safety has been achieved.

(j) *Additional emergency exits.* Approved emergency exits in the passenger compartments that are in excess of the minimum number of required emergency exits must meet all of the applicable provisions of this section, except paragraphs (f)(1), (2), and (3) of this section, and must be readily accessible.

(k) *On each large passenger-carrying* turbojet-powered airplane, each ventral exit and tail-cone exit must be—

(1) Designed and constructed so that it cannot be opened during flight; and

(2) Marked with a placard readable from a distance of 30 inches and installed at a conspicuous location near the means of opening the exit, stating that the exit has been designed and constructed so that it cannot be opened during flight.

(l) *Portable lights.* No person may operate a passenger-carrying airplane unless it is equipped with flashlight stowage provisions accessible from each flight attendant seat.

Issued in Washington, DC, on April 4, 1991.

Thomas E. McSweeny,

Deputy Director, Aircraft Certification Service.

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