Proposed Rules

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This section of the FEDERAL REGISTER contains notices to the public of the proposed issuance of rules and regulations. The purpose of these notices is to give interested persons an opportunity to participate in the rule making prior to the adoption of the final rules.

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. 97–NM–235–AD]

RIN 2120–AA64

Airworthiness Directives; Boeing Model 727 Series Airplanes Modified in Accordance With Supplemental Type Certificate SA1444SO, SA1509SO, SA1543SO, or SA1896SO

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: This document proposes the adoption of a new airworthiness directive (AD) that is applicable to certain Boeing Model 727 series airplanes that have been converted from a passenger to a cargo-carrying (''freighter'') configuration. This proposal would require, among other actions, installation of a fail-safe hinge, redesigned main deck cargo door warning and power control systems, and 9g cargo barrier. This proposal is prompted by the FAA's determination that the main deck cargo door hinge is not fail-safe; that certain main deck cargo door control systems do not provide an adequate level of safety; and that the main deck cargo barrier is not structurally adequate during an emergency landing. The actions specified by the proposed AD are intended to prevent structural failure of the main deck cargo door hinge or failure of the cargo door system, which could result in the loss or opening of the cargo door while the airplane is in flight, rapid decompression, and structural damage to the airplane; and to prevent failure of the main deck cargo barrier during an emergency landing, which could injure occupants.

DATES: Comments must be received by December 27, 1999.

ADDRESSES: Submit comments in triplicate to the Federal Aviation Administration (FAA), Transport Airplane Directorate, ANM–114, Attention: Rules Docket No. 97–NM–235–AD, 1601 Lind Avenue, SW., Renton, Washington 98055–4056. Comments may be inspected at this location by appointment only between the hours of 9 a.m. and 3 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Paul Sconyers, Associate Manager, Airframe and Propulsion Branch, ACE–117A, FAA, Small Airplane Directorate, Atlanta Aircraft Certification Office, One Crown Center, 1895 Phoenix Boulevard, Suite 450, Atlanta, Georgia 30349; telephone (770) 703–6076; fax (770) 703–6097.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in the making of the proposed rule by submitting such written data, views, or arguments as they may desire. Communications shall identify the Rules Docket number and be submitted in triplicate to the address specified above. All communications received on or before the closing date for comments, specified above, will be considered before taking action on the proposed rule.

The proposals contained in this notice may be changed in light of the comments received.

Comments are specifically invited on the overall regulatory, economic, environmental, and energy aspects of the proposed rule. All comments submitted will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons. A report summarizing each FAA-public contact concerned with the substance of this proposal will be filed in the Rules Docket.

Commenters wishing the FAA to acknowledge receipt of their comments submitted in response to this notice must submit a self-addressed, stamped postcard on which the following statement is made: ''Comments to Docket Number 97–NM–235–AD.'' The postcard will be date stamped and returned to the commenter.

Availability of NPRMs

Any person may obtain a copy of this NPRM by submitting a request to the FAA, Transport Airplane Directorate, ANM–114, Attention: Rules Docket No. 97–NM–235–AD, 1601 Lind Avenue, SW., Renton, Washington 98055–4056.

Discussion

Supplemental Type Certificate (STC) SA1509SO specifies a design for a cargo door, associated cargo door cutout, and door systems. STC SA1543SO specifies a design for a Class ''E'' cargo interior with a cargo restraint barrier net. STC's SA1444SO and SA1896SO specify a design for both of these subject areas. (All of these STC's are held by Pemco.) As discussed in notice of proposed rulemaking (NPRM), Rules Docket No. 97–NM–81–AD [the final rule, AD 98–26–21, amendment 39–10964, was published in the **Federal Register** on January 12, 1999 (64 FR 2061)], which is applicable to certain Boeing Model 727 series airplanes that have been converted from a passenger to a cargo-carrying (''freighter'') configuration, the FAA has conducted a design review of Boeing Model 727 series airplanes modified in accordance with STC's SA1590SO and SA1543SO and has identified several potential unsafe conditions. [Results of this design review are contained in ''FAA Freighter Conversion STC Review, Report Number 1, dated September 23–26, 1996,'' (hereinafter referred to as ''the Design Review Report''), which is included in the Rules Docket for this NPRM.] This NPRM proposes corrective action for three of those potential unsafe conditions that relate to the following three areas: main deck cargo door hinge, main deck cargo door systems, and main deck cargo barrier.

Main Deck Cargo Door Hinge

In order to avoid catastrophic structural failure, it has been a typical industry approach to design outward opening cargo doors and their attaching structure to be fail-safe (*i.e.,* designed so that if a single structural element fails, other structural elements are able to carry resulting loads). Another potential design approach is safe-life, where the critical structure is shown by analyses and/or tests to be capable of withstanding the repeated loads of variable magnitude expected in service for a specific service life. Safe-life is usually not used on critical structure because it is difficult to account for manufacturing or in-service accidental damage. For this reason, plus the fact

that none of the STC holders have provided data in support of this approach, the safe-life approach will not be discussed further regarding the design and construction of the main deck cargo door hinge.

Structural elements such as the main deck cargo door hinge are subject to severe in-service operating conditions that could result in corrosion, binding, or seizure of the hinge. These conditions, in addition to the normal operational loads, can lead to early and unpredictable fatigue cracking. If a main deck cargo door hinge is not a fail-safe design, a fatigue crack could initiate and propagate longitudinally undetected, which could lead to a complete hinge failure. A possible consequence of this undetected failure is the opening of the main deck cargo door while the airplane is in flight. Service experience indicates that the opening of a cargo door while the airplane is in flight can be extremely hazardous in a variety of ways including possible loss of flight control, severe structural damage, or rapid decompression, any of which, could lead to loss of the airplane.

The design of the main deck cargo door hinge must be in compliance with Civil Air Regulations (CAR) part 4b, including CAR part 4b.270, which requires, in part, that catastrophic failure or excessive structural deformation, which could adversely affect the flight characteristics of the airplane, is not probable after fatigue failure or obvious partial failure of a single principal structural element. One common feature of a fail-safe hinge design is a division of the hinge into multiple segments such that, following failure of any one segment, the remaining segments would support the redistributed load.

The main deck cargo door installed in accordance with STC SA1509SO, SA1444SO, or SA1896SO is supported by latches along the bottom of the door and one continuous hinge along the top. This single-piece hinge is considered a critical structural element for this STC. A crack that initiates and propagates longitudinally along the hinge line of the continuous hinge will eventually result in failure of the entire hinge, because there is no segmenting of the hinge to interrupt the crack propagation and support the redistributed loads. Failure of the entire hinge can result in the opening of the main deck cargo door while the airplane is in flight.

As discussed in the Design Review Report, an inspection of one Boeing Model 727 series airplane modified in accordance with STC's SA1509SO and SA1543SO revealed a number of fasteners with both short edge margins and short spacing in the cargo door cutout external doublers. Some edge margins were as small as one fastener diameter. Fasteners that are placed too close to the edge of a structural member or spaced too close to an adjacent fastener can result in inadequate joint strength and stress concentrations, which may result in fatigue cracking of the skin. If such defects were to exist in the structure of the door or the fuselage to which the main deck cargo door hinge is attached, the attachment of the hinge could fail, and consequently cause the door to open while the airplane is in flight.

Since unsafe conditions have been identified that are likely to exist or develop on other products of this same type design, this proposed AD would require, within 250 flight cycles after the effective date of the AD, a one-time detailed visual inspection of the external surface of the main deck cargo door hinge (both fuselage and door side hinge elements) to detect cracks, and repair, if necessary. Accomplishment of this inspection will ensure that the subject airplanes are not in immediate risk of hinge failure.

In addition, the proposed AD would require a detailed visual inspection of the mating surfaces of both the hinge and the door skin and external fuselage doubler underlying the hinge to detect cracks or other discrepancies (e.g., double or closely drilled holes, corrosion, chips, scratches, or gouges). The proposed AD also would require installation of a main deck cargo door hinge that complies with the applicable requirements of CAR part 4b, including fail-safe requirements. Accomplishment of this detailed visual inspection will ensure the integrity of the door and fuselage structure to which the hinge is attached. The proposed compliance time for this inspection and installation is within 36 months or 4,000 flight cycles after the effective date of this AD, whichever occurs first. The compliance time is based on the FAA's assessment of the reasonable amount of time to redesign, manufacture, and install a fail-safe hinge. This time is in consideration of the 18-month time period estimated by the Boeing 727 industry working group, which includes operators, affected STC holders, and engineering organizations, to develop FAA-approved redesigns. These actions would be required to be accomplished in accordance with a method approved by the FAA.

Main Deck Cargo Door Systems

In early 1989, two transport airplane accidents were attributed to cargo doors coming open during flight. The first accident involved a Boeing 747 series airplane in which the cargo door separated from the airplane, and damaged the fuselage structure, engines, and passenger cabin. The second accident involved a McDonnell Douglas DC–9 series airplane in which the cargo door opened but did not separate from its hinge. The open door disturbed the airflow over the empennage, which resulted in loss of flight control and consequent loss of the airplane. Although cargo doors have opened occasionally without mishap during takeoff, these two accidents serve to highlight the extreme potential dangers associated with the opening of a cargo door while the airplane is in flight.

As a result of these cargo door opening accidents, the Air Transport Association (ATA) of America formed a task force, including representatives of the FAA, to review the design, manufacture, maintenance, and operation of airplanes fitted with outward opening cargo doors, and to make recommendations to prevent inadvertent cargo door openings while the airplane is in flight. A design working group was tasked with reviewing 14 CFR part 25.783 [and its accompanying Advisory Circular (AC) 25.783–1, dated December 10, 1986] with the intent of clarifying its contents and recommending revisions to enhance future cargo door designs. This design group also was tasked with providing specific recommendations regarding design criteria to be applied to existing outward opening cargo doors to ensure that inadvertent openings would not occur in the current transport category fleet of airplanes.

The ATA task force made its recommendations in the ''ATA Cargo Door Task Force Final Report,'' dated May 15, 1991 (hereinafter referred to as ''the ATA Final Report''). On March 20, 1992, the FAA issued a memorandum to the Director-Airworthiness and Technical Standards of ATA (hereinafter referred to as ''the FAA Memorandum''), acknowledging ATA's recommendations and providing additional guidance for purposes of assessing the continuing airworthiness of existing designs of outward opening doors. The FAA Memorandum was not intended to upgrade the certification basis of the various airplanes, but rather to identify criteria to evaluate potential unsafe conditions demonstrated on in-service airplanes. Appendix 1 of this AD contains the specific paragraphs from the FAA Memorandum that set forth the criteria to which the outward opening doors should be shown to comply.

Applying the applicable requirements of CAR part 4b and design criteria

provided by the FAA Memorandum, the FAA has reviewed the original type design of major transport airplanes, including Boeing 727 airplanes equipped with outward opening doors, for any design deficiency or service difficulty. Based on that review, the FAA identified unsafe condition and issued, among others, the following AD's:

- For certain McDonnell Douglas Model DC–9 series airplanes: AD 89–11–02, amendment 39–6216 (54 FR 21416, May 18, 1989);
- For all Boeing Model 747 series airplanes: AD 90–09–06, amendment 39–6581 (55 FR 15217, April 23, 1990);
- For certain McDonnell Douglas Model DC–8 series airplanes: AD 93–20–02, amendment 39–8709 (58 FR 471545, October 18, 1993);
- For certain Boeing Model 747–100 and –200 series airplanes: AD 96–01–51, amendment 39–9492 (61 FR 1703, January 23, 1996); and
- For certain Boeing Model 727–100 and –200 series airplanes: AD 96–16–08, amendment 39–9708 (61 FR 41733, August 12, 1996).

Using the criteria specified in the ATA Final Report and the FAA Memorandum as evaluation guides, the FAA conducted an engineering design review and inspection of an airplane modified in accordance with STC's SA1509SO and SA1543SO (held by Pemco). The FAA identified a number of unsafe conditions with the main deck cargo door systems of these STC's. The FAA design review team determined that the design data of these STC's design data did not include a safety analysis of the main deck cargo door systems.

As specified in the criteria contained in Appendix 1 of this AD, for powered lock systems on the main deck cargo door, it must be shown by safety analysis that inadvertent opening of the door after it is fully closed, latched, and locked is extremely improbable.

However, the FAA is aware of two events in which the main deck cargo door open during flight. These events occurred on FedEx passenger/freighter conversion STC's in October 1996, and March 1995. These events are referenced in the Design Review Report.

The FAA has reviewed the design drawings of the main deck cargo door systems installed on Boeing Model 727 series airplanes modified in accordance with STC's SA1444SO, SA1509SO, and SA1896SO, and has determined that the design of the door systems is nearly identical to that installed on the subject FedEx passenger/freighter conversion STC's. Therefore, the door opening events disclosed by FedEx are likely to occur on airplanes modified in accordance with STC SA1444SO, SA1509SO, or SA1896SO.

For airplanes modified in accordance with STC SA1444SO, SA1509SO, SA1543SO, or SA1896SO, the FAA considers the following four specific design deficiencies of the main deck cargo door systems to be unsafe:

1. Indication System

The main deck cargo door indication system for the STC's SA1509SO, SA1444SO, and SA1896SO uses a warning light at the door operator's control panel and a light at the flight engineer's panel. Both of these lights indicate the status of the cargo door latch and lock positions, but do not indicate either the door open or closed status. All three conditions (*i.e.*, door closed, latched, and locked) must be monitored directly so that the door indication system cannot display either ''latched'' before the door is closed or ''locked'' before the door is latched. If a sequencing error caused the door to latch and lock without being fully closed, the subject indication system, as designed, would not alert the door operator or the flight engineer of this condition. As a result, the airplane could be dispatched with the main deck cargo door unsecured, which could lead to the cargo door opening while the airplane is in flight and possible loss of the airplane.

The light on the flight engineer's panel is labeled ''MAIN CARGO'' and is displayed in red since it indicates an event that requires immediate pilot action. However, if the flight engineer is temporarily away from his station, a door unsafe warning indication could be missed by the pilots. In addition, the flight engineer could miss such an indication by not scanning the panel. As a result, the pilots and flight engineer could be unaware of, or misinterpret, an unsafe condition and could fail to respond in the correct manner. Therefore, an indicator light must be located in front of and in plain view of both pilots since one of the pilot's stations is always occupied during flight operations.

The main deck cargo door indication system of STC's SA1509SO, SA1444SO, and SA1896SO does not have a level of reliability that is considered adequate for safe operation. Many components are exposed to the environment during cargo loading operations and may be contaminated by precipitation, dirt, and grease, or damaged by foreign objects or cargo loading equipment. As a result, wires, switches, and relays can fail, jam, or short circuit and cause a loss of indication or a false indication to the door operator and flight crew. The design logic of the indication system (i.e., lights which extinguish when the door is locked) will, in the event of a single point failure that would extinguish the light, result in an erroneous ''safe'' indication regardless of actual door status.

The design of STC's SA1509SO, SA1444S0, and SA1896S0 has a ''Press-to-Test'' red warning light on the main deck cargo door control panel located near the L–1 door. The design of the monitoring system of the main deck cargo door does not include separate lights to provide the door operator with door close, latch, and lock status. The electrical wiring design of the close, latch, and lock sensors of the door monitoring system are wired in parallel instead of in series. In parallel, two sensors could be sensing ''unsafe'' and the third sensor could be sensing ''safe.'' If this situation were to occur, the sensors would not illuminate the red warning light on the door control panel or at the flight engineer's panel. Therefore, the ''Press-to-Test'' feature is adequate to check the light bulb functionality, but is not adequate to check the cargo door close, latch, and lock functions and status without annunciator lights for those three functions.

2. Means to Visually Inspect the Locking Mechanism

The single view port of the main deck cargo door installed in accordance with STC's SA1444SO, SA1509SO, and SA1896SO is included to allow the flight crew to conduct a visual inspection of the door locking mechanism. This view port is used in conjunction with the door warning system and should provide a suitable ''back-up'' in the event that the main deck cargo door warning system malfunctions.

The door locking mechanism is an assembly comprised of multiple lock pins (one for each of the door latches) connected by linkages to a common lock shaft. Although an indicator flag attached to the lock shaft can be seen through the view port when the shaft is in the ''locked'' position, a failure between the shaft and the pins could go undetected, because this flag is attached to the lock shaft and not the actual lock pins. If such a failure goes undetected, the airplane may be dispatched with the main deck cargo door warning system inoperative and the door not fully closed, latched, and locked, which could lead to a main deck cargo door opening while the airplane is in flight and possible loss of the airplane. Therefore, the FAA finds that the

subject view port is not a suitable back-up when the cargo door warning system malfunctions.

As discussed in the ATA Final Report and the FAA Memorandum, there must be a means of directly inspecting each lock or, at a minimum, the locks at each end of the lock shaft of certain designs, such that a failure condition in the lock shaft would be detectable.

3. Means to Prevent Pressurization to an Unsafe Level

Boeing 727–100 and –200 airplanes modified in accordance with STC SA1444SO, SA1509SO, or SA1896SO are configured to utilize the existing pressurization outflow valve for the purpose of preventing fuselage pressurization of the airplane to an unsafe level in the event that the main deck cargo door is not closed, latched, and locked. The FAA design review of these modified Boeing 727–200 airplanes (documented in the Design Review Report) identified single point failures in the door control/outflow valve interface that could result in the valve not sensing and responding to an unsafe door condition. In addition, the FAA found no data to substantiate that the outflow valve location and size could prevent pressurization to an unsafe level. With the current design, it is possible that the outflow valve may not perform its intended function when utilized for the purpose of preventing pressurization of the airplane in the event of an unsecured door. This condition could result in cabin pressurization forcing an unsecured door open while the airplane is in flight and possible loss of the airplane.

In some cases, neither Boeing 727–100 airplanes nor Boeing 727–200 airplanes modified in accordance with the STC SA1444SO or SA1509SO have any means of preventing pressurization in the event that the main deck cargo door is not closed, latched, and locked, and therefore, have a higher risk of a cargo door opening while the airplane is in flight and possible loss of the airplane.

4. Powered Lock Systems

The main deck cargo door control system for STC's SA1444SO, SA1509SO, and SA1896SO that utilizes electrical interlock switches is designed to remove door control power (electrical and hydraulic) prior to flight and to prevent inadvertent door openings. As discussed previously, the door system design of the subject STC's is nearly identical to the FedEx design. The FedEx door opening events, discussed previously, indicate the likelihood that there may be latent and/or single point failures that can restore or continue to allow power to the door controls and cause inadvertent door openings. The failure modes may be found in the electrical portion of the door control panel, which, in turn, activates the door control hydraulics. The potential for the occurrence of these failure conditions is increased by the harsh operating environment of freighter airplanes. Door system components are routinely exposed to precipitation, dirt, grease, and foreign object intrusion, all of which increase the likelihood of damage. As a result, wires, switches, and relays have a greater potential to fail or short circuit in such a way as to allow the cargo door to be powered open without an operator's command and regardless of electrical interlock positions.

A systems safety analysis would normally evaluate and resolve the potential for these types of unsafe conditions. However, the design data for STC's SA1444SO, SA1509SO, and SA1896SO do not include a systems safety analysis to specifically identify these failure modes and do not show that an inadvertent opening is extremely improbable. The need for a system safety analysis is identified in the ATA Final Report and the FAA Memorandum.

Since unsafe conditions have been identified that are likely to exist or develop on other products of this same type design, this proposed AD would require, within 60 days after the effective date, revising the Limitations Section of the FAA-approved Airplane Flight Manual (AFM) Supplement to provide the flight crew with procedures for ensuring that all power is removed from the main deck cargo door prior to dispatch of the airplane, and that the main deck cargo door is closed, latched, and locked prior to dispatch of the airplane; and installing any associated placards.

In addition, the proposed AD would require, within 36 months after the effective date of the AD, incorporation of redesigned main deck cargo door systems (e.g., warning/monitoring, power control, view ports, and means to prevent pressurization to an unsafe level if the main deck cargo door is not closed, latched, and locked), including any associated procedures and placards that comply with the applicable requirements of CAR part 4b and design criteria of the ATA Final Report and the FAA Memorandum. Design data provided in support of the door systems re-design should include a Systems Safety Analysis and Instructions for Continued Airworthiness that are acceptable to the FAA. Accomplishment of the incorporation of redesigned main deck cargo door systems will prevent rapid decompression and/or structural damage to the airplane as a result of loss or opening of the cargo door while the airplane is in flight. The compliance time is based on the FAA's assessment of the reasonable amount of time to incorporate redesigned main deck cargo door systems. This time is in consideration of the 18-month time period estimated by the Boeing 727 industry working group, which includes operators, affected STC holders, and engineering organizations, to develop FAA-approved redesigns.

These actions would be required to be accomplished in accordance with a method approved by the FAA.

Cargo Restraint Barrier

In order to ensure the safety of occupants during emergency landing conditions, the FAA first established in 1934, a set of inertia load factors used to design the structure for restraining items of mass in the fuselage. Because the airplane landing speeds have increased over the years as the fleet has transitioned from propeller to jet design, inertia load factors were changed as specified in CAR part 4b.260. Experience has shown that an airplane designed to this regulation has a reasonable probability of protecting its occupants from serious injury in an emergency landing. The 727 passenger airplane was designed to these criteria which specified an ultimate inertia load requirement of 9g in the forward direction. These criteria were applied to the seats and structure restraining the occupants, including the flight crew, as well as other items of mass in the fuselage.

When the 727 passenger airplane is converted to carry cargo on the main deck, a cargo barrier is required, since most cargo containers and the container-to-floor attaching devices are not designed to withstand emergency landing loads. In fact, the FAA estimates that the container-to-floor attaching devices will only support approximately 1.5g's to 3g's in the forward direction. Without a 9g cargo barrier, it is probable that the loads associated with an emergency landing would cause the cargo to be unrestrained and impact the occupants of the airplane, which could result in serious injury or death.

The structural inadequacy of the cargo barrier was evident to the FAA during its review in October 1996 of a Boeing 727 modified in accordance with STC SA1543SO. The observations revealed that the design of the net restraint barrier floor attachment and circumferential supporting structure

does not provide adequate strength to withstand the 9g forward inertia load generated by the main deck cargo mass, nor does it provide a load path to effectively transfer the loads from the restraint barrier to the fuselage structure of the airplane. These observations are supported by data contained in ''ER 2785, Structural Substantiation of the 50k 9g Bulkhead Restraint System in Support of STC SA1543SO PN 53–1292–401 for the 9g Bulkhead 53–1980–300 Assembly with Upper Attachment Structure, Lower Attachment Structure, Floor Shear Web Structure, Seat Track Splice Fittings, Seat Tracks, and Seat Track Splices,'' dated September 29, 1996, by M. F. Daniel. Although this report was specific to STC SA1543SO, the FAA has determined that the data are applicable to airplane modified in accordance with STC ST00015AT because the design principles for attachment of the barriers in both STC's are the same. The report reveals that the structural deficiencies were found in the net attach plates and floor attachment structure of the cargo barrier. The data show large negative margins of safety, which indicate that the inertia load capability of the cargo barrier is closer to 2g than the required 9g in the forward direction. From these analyses, it is evident that the cargo restraint barrier would not be capable of preventing serious injury to the occupants during an emergency landing event with the full allowable cargo load.

Since unsafe conditions have been identified that are likely to exist or develop on other products of this same type design, this proposed AD would require installation of a main deck cargo barrier that complies with the applicable requirements of CAR part 4b. Accomplishment of the installation will prevent serious injury to the occupants in the event of an emergency landing. The proposed compliance time for the installation is within 36 months or 4,000 flight cycles after the effective date of the AD, whichever occurs first. This compliance time is based on the FAA's assessment of the reasonable amount of time to redesign, manufacture, and install the cargo barrier. This time is consistent with estimates by affected STC holders and operators that necessary redesigns can by developed and approved by the FAA within 12 to 18 months from August 1998.

Regulatory Evaluation Summary

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.

This analysis examines the cost of a proposed AD that would require the installation of a fail-safe hinge, redesigned main deck cargo door warning and power control systems, and a 9g cargo barrier on Boeing Model 727 series airplanes that have been modified in accordance with STC's held by Pemco. As discussed above, the FAA has determined that the main deck cargo door hinge is not fail-safe, that certain main deck cargo door control systems do not provide an adequate level of safety, and that the main deck cargo barrier is not structurally adequate during a minor crash landing.

Approximately 62 U.S.-registered Boeing Model 727 series airplanes would be affected by the proposed AD. The following discussion addresses, in sequence, the actions in this proposed AD and the estimated cost associated with each of these actions. An analysis of the costs is also available in Rules Docket No. 97–NM–235–AD.

1. Main Deck Cargo Door Hinge

Since unsafe conditions have been identified that are likely to exist or develop on other modified Boeing Model 727 series airplanes, paragraph (a) of the proposed AD would require, within 250 flight cycles after the effective date of this AD, a one-time detailed visual inspection to detect cracks of the external surface of the main deck cargo door hinge. Pemco estimates that this inspection would take 1.5 work hours. At a mechanic's burdened labor rate of $60 per work hour, the cost per airplane would be $90, or $5,580 for the fleet of 62 affected Boeing Model 727 series airplanes.

Paragraph (b)(1) of the proposed AD would require, within 36 months or 4,000 cycles after the effective date of this AD, a detailed visual inspection of the mating surfaces of both the hinge and the door skin and external fuselage doubler underlying the hinge. The FAA estimates that compliance with this inspection would take 200 hours at a cost of $12,000 per airplane, or $744,000 for the affected fleet.

Paragraph (b)(2) of the proposed AD would require installation of a fail-safe door hinge. The compliance time for this installation also would be 36 months or 4,000 cycles after the effective date of this AD. Pemco estimates the cost to design and certificate such a hinge is $20,000, that the parts for a fail-safe door hinge would cost $8,000, and installation would take 300 hours. Total compliance costs for this proposed provision for the affected fleet of 62 airplanes would be $1.6 million.

Paragraph (c) of the proposed AD would require that, if any crack or discrepancy is detected during the inspections required by paragraph (a) or (b)(1) of the proposed AD, repairs must be made prior to further flight. The cost of these repairs is not attributable to this proposed AD.

For purposes of this analysis, the FAA assumes an effective date of July 1, 2000. The cost to comply with proposed paragraphs (a) through (c) over the 36-month compliance period is $2.4 million, or $2.0 million discounted to present value at 7 percent. The FAA assumes that the installation of the main deck cargo door hinge [paragraph (b)(1)] would be accomplished at the same time as the detailed visual inspection of fastener holes [paragraph (b)(2)]. The FAA also assumes that operators of airplanes modified under Pemco AD's would perform these two activities uniformly throughout the 36-month period. Finally, the certification cost for the main deck cargo door hinge would be incurred within the first 6 months after the effective date of this AD.

2. Main Deck Cargo Door Systems

Paragraph (d) of the proposed AD would require, within 60 days after the effective date, revising the Limitations Section of the FAA-approved Airplane Flight Manual (AFM) Supplement to provide the flight crew with procedures for ensuring that all power is removed from the main deck cargo door prior to dispatch of the airplane, and that the main deck cargo door is closed, latched, and locked prior to dispatch of the airplane. In addition, paragraph (d) of the proposed AD would require the installation of any associated placards.

The Pemco door system design as provided by STC's SA1444SO, SA1896SO, and SA1509SO is nearly identical to that of FedEx. Therefore it is likely that the cost associated with the inspection of the door are the same based on FedEx's assumptions. FedEx assumes that an external inspection of the flushness of the cargo door, combined with an ''enhanced B-check'' would be an acceptable means to the FAA to ensure that the cargo door is secured prior to dispatch. Based on this assumption, FedEx estimates, before a redesigned door system is installed [see proposed paragraph (f) below], that it would take a mechanic 30 minutes to inspect for flushness of the main deck cargo door prior to dispatch. Using these

estimates for compliance for airplanes with Pemco STC's, and, assuming each affected airplane flies 1 flight per day, 260 days per year, the estimated cost per inspection would be $30, or $7,800 per airplane per year until the door system is changed, a total of $865,800 over 36 months.

B-checks on these Boeing Model 727 series airplanes occur approximately twice a year. FedEx estimates the incremental cost for maintenance during this ''enhanced B-check'' is $11,700 per year until the door system is changed. Assuming incorporation of the redesigned door system occurs uniformly over the 36-month period, the total cost to operators of Pemco-modified Boeing Model 727 series airplanes would be $1.3 million. In addition, Pemco estimates the setup costs for the daily inspection (i.e., procedure materials for the mechanics to perform the inspection and training requirements) would be $50,000.

Paragraph (e) of the proposed AD would require, within 36 months after the effective date of this AD, incorporation of a redesigned main deck cargo door system. Pemco estimates that the development and certification of the system would cost $138,800. Modification parts would cost $10,000 per airplane and labor costs would be $18,000 per airplane. The FAA assumes that operators would incorporate the redesigned main deck cargo door system during regularly scheduled maintenance but that, on average, each airplane in the affected fleet would be out of service for 3 additional days at a cost of $18,300. The total costs of installing a redesigned main deck cargo door system, including certification, parts, labor, and down time would be $3.0 million over the 36-month period.

The total estimated cost to comply with proposed requirements for the main deck cargo door system is $5.2 million or $4.6 million, discounted to present value.

3. Main Deck Cargo Barrier

Paragraph (f) of the proposed AD would require, within 36 months or 4,000 flight cycles after the effective date of this AD, installation of a main deck cargo barrier that complies with the applicable requirements of CAR part 4b. Pemco estimates that development and certification of a 9g barrier would cost $126,500, while parts would cost $25,000 and labor would cost $18,000 per airplane for 300 hours of labor at $60 per hour burdened rate.

The FAA assumes that operators would install 9g barriers in their affected fleets uniformly over the 36-month compliance period. The total non-discounted cost would be $2.8 million, or $2.4 million discounted to present value.

4. Alternative Methods of Compliance (AMOC) and Special Flight Permits

Paragraph (g) of the proposed AD would allow an AMOC or adjustment of compliance time that provides an acceptable level of safety if approved by the Manager of the Atlanta ACO. The FAA is unable to determine the cost of an AMOC, but assumes it would be less than the cost of complying with the proposed provisions in paragraphs (a) through (f) of the proposed AD.

Paragraph (h) of the proposed AD would allow special flight permits in accordance with the regulations to operate an affected airplane to a location where the requirements of the proposed AD could be accomplished.

5. Total Cost of the Proposed AD

The FAA estimates that the total compliance cost of the proposed AD would be $10.4 million, or $9.0 million discounted to present value.

The Regulatory Flexibility Act (RFA) of 1980 establishes ''as a principle of regulatory issuance that agencies shall endeavor, consistent with the objective of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the business, organizations, and governmental jurisdictions subject to regulation. To achieve that principle, the RFA requires agencies to solicit and consider flexible regulatory proposals and to explain the rationale for their actions. The RFA covers a wide-range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions.

Agencies must perform a review to determine whether a proposed or final rule will have a significant economic impact on a substantial number of small entities. If the determination is that it will, the Agency must prepare a regulatory flexibility analysis as described in the RFA. However, if an agency determines that a proposed or final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the RFA provides that the head of the agency may so certify and an RFA is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

Six of the 11 operators that would be affected by this proposed AD are small, that is, they employ fewer than 1,500 persons. The estimated total cost of the proposed AD is $10.4 million, or approximately $167,700 for each of the 62 affected airplanes.

Therefore, the FAA has determined that the proposed rule would have a significant impact on a substantial number of small entities and a regulatory flexibility analysis is required.

Under Section 63(b) of the RFA, the analysis must address:

1. Reasons why the agency is promulgating the rule;

2. The objectives and legal basis for the rule;

3. The kind and number of small entities to which the rule will apply;

4. The projected reporting, recordkeeping, and other compliance requirements of the rule; and

5. All federal rules that may duplicate, overlap, or conflict with the rule. These elements of the RFA are addressed below.

A. Reasons Why Agency Action is Being Considered

The FAA has determined that the main deck cargo door hinge is not fail-safe; that certain main deck cargo door control systems do not provide an adequate level of safety; and the main deck cargo barrier is not structurally adequate during a minor crash landing.

The actions specified in the proposed AD are intended to prevent structural failure of the main deck cargo door hinge or failure of the cargo door system, which could result in the loss or opening of the cargo door while the airplane is in flight, and consequent rapid decompression and/or structural damage to the airplane; and to prevent failure of the main deck cargo barrier during an emergency landing, which could injure occupants.

B. Statement of Objective and Legal Basis

Under the United States Code (U.S.C.), the FAA Administrator is required to consider the following matter, among others, as being in the public interest: assigning, maintaining, and enhancing safety and security as the highest priorities in air commerce. [See 49 U.S.C. § 44101(d).] 49 U.S.C. § 44701(a) provides broad rulemaking authority to ''promote safe flight of civil aircraft in air commerce.'' Accordingly, this proposed AD will amend Title 14 of the Code of Federal Regulations to require operators of Boeing Model 727 series airplanes that have been converted from a passenger-to a cargo-carrying configuration to correct the identified unsafe conditions.

C. Kind and Number of Small Entities

The RFA requires the FAA to determine whether or not a rule significantly affects a substantial number of small entities. This determination is typically based on small entity size and cost thresholds that vary depending on the affected industry. The entities affected by the rule are those operating U.S.-registered converted Boeing Model 727 series airplanes. The FAA has determined that approximately 6 of the 11 entities are small, i.e., employ fewer than 1,500 persons. Two small entities operate 1 affected airplane each, 1 small entity operates 2 affected airplanes, 1 small entity operates 7 affected airplanes, and 2 small entities operate 9 affected airplanes each. Assuming the total costs of the proposed rule are divided equally among the affected fleet of 62 airplanes, the costs per airplane would be about $167,700. Therefore, the FAA has determined that this proposed AD would significantly affect a substantial number of small entities.

D. Projected Reporting, Recordkeeping, and Other Compliance Requirements

With two minor exceptions, the rule will not mandate additional reporting or recordkeeping. The proposed AD would require operators to report results of the visual inspection of the main deck cargo door hinge and the visual inspection of the fastener holes common to the main deck cargo door hinge and underlying door and fuselage structure. The cost of these reports is negligible.

E. Overlapping, Duplicative, or Conflicting Federal Rules

The rule will not overlap, duplicate, or conflict with existing Federal rules.

F. Analysis of Alternatives

The FAA acknowledges that the rule will impose a financial requirement on small entities. Therefore, the agency considered alternatives to the proposed rule. These alternatives are:

- Exclude small entities; and
- Extend the compliance date for small entities.

The FAA has determined that the option to exclude small entities from the requirements of the rule is not justified. The unsafe condition that exists on an affected Boeing Model 727 series airplane operated by a small entity is as potentially catastrophic as that on an affected Boeing Model 727 series airplane operated by a large entity.

The FAA also considered options to extend the compliance period for small operators. The Boeing 727 Freighter Industry Working Group, which includes all affected U.S. operators (including small entities), provided input on the incorporation of corrective actions for the door hinge, door systems, and 9g barrier issues. The FAA initially proposed a compliance time of 28 months, consistent with a related AD dealing with the cargo floor structure on the same airplanes. The Industry Working Group requested an extension to 36 months. Following review of the Working Group's request, the FAA finds 36 months to be an acceptable compliance time. Therefore, the FAA has, in fact, considered and accepted this alternative and has accommodated small entity concerns about compliance time.

Title II of the Unfunded Mandates Reform Act of 1995 (the Act), enacted as Pub. L. 104–4 on March 22, 1995, requires each Federal agency, to the extent permitted by law, to prepare a written assessment of the effects of any Federal mandate in a proposed or final agency rule that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $100 million or more (adjusted annually for inflation) in any one year. Section 204(a) of the Act, 2 U.S.C. 1534(a), requires the Federal agency to develop an effective process to permit timely input by elected officers (or their designees) of State, local, and tribal governments on a proposed ''significant intergovernmental mandate.'' A ''significant intergovernmental mandate'' under the Act is any provision in a Federal agency regulation that would impose an enforceable duty upon State, local, and tribal governments, in the aggregate, of $100 million (adjusted annually for inflation) in any one year. Section 203 of the Act, 2 U.S.C. 1533, which supplements section 204(a), provides that before establishing any regulatory requirements that might significantly or uniquely affect small governments, the agency shall have developed a plan that, among other things, provides for notice to potentially affected small governments, if any, and for a meaningful and timely opportunity to provide input in the development of regulatory proposals.

This proposed AD does not contain any Federal intergovernmental or private sector mandate. Therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Safety.

The Proposed Amendment

Accordingly, pursuant to the authority delegated to me by the Administrator, the Federal Aviation Administration proposes to amend part 39 of the Federal Aviation Regulations (14 CFR part 39) as follows:

PART 39—AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. Section 39.13 is amended by adding the following new airworthiness directive:

Boeing: Docket 97–NM–235–AD.

Applicability: Model 727 series airplanes that have been converted from a passenger to a cargo-carrying (''freighter'') configuration in accordance with Supplemental Type Certificate (STC) SA1444SO, SA1509SO, SA1543SO, or SA1896SO; certificated in any category.

Note 1: This AD applies to each airplane identified in the preceding applicability provision, regardless of whether it has been otherwise modified, altered, or repaired in the area subject to the requirements of this AD. For airplanes that have been modified, altered, or repaired so that the performance of the requirements of this AD is affected, the owner/operator must request approval for an alternative method of compliance in accordance with paragraph (g) of this AD. The request should include an assessment of the effect of the modification, alteration, or repair on the unsafe condition addressed by this AD; and, if the unsafe condition has not been eliminated, the request should include specific proposed actions to address it.

Compliance: Required as indicated, unless accomplished previously.

To prevent structural failure of the main deck cargo door hinge or failure of the cargo door system, which could result in the loss or opening of the cargo door while the airplane is in flight, rapid decompression, and structural damage to the airplane; and to prevent failure of the main deck cargo barrier during an emergency landing, which could injure occupants; accomplish the following:

Actions Addressing the Main Deck Cargo Door Hinge

(a) Within 250 flight cycles after the effective date of this AD, perform a detailed visual inspection of the external surface of the main deck cargo door hinge (both fuselage and door side hinge elements) to detect cracks.

Note 2: For the purposes of this AD, a detailed visual inspection is defined as: ''An intensive visual examination of a specific structural area, system, installation, or assembly to detect damage, failure, or irregularity. Available lighting is normally supplemented with a direct source of good lighting at intensity deemed appropriate by the inspector. Inspection aids such as mirror,

magnifying lenses, etc., may be used. Surface cleaning and elaborate access procedures may be required.''

(b) Within 36 months or 4,000 flight cycles after the effective date of this AD, whichever occurs first, accomplish paragraphs (b)(1) and (b)(2) of this AD.

(1) Perform a detailed visual inspection of the mating surfaces of both the hinge and the door skin and external fuselage doubler underlying the hinge to detect cracks or other discrepancies (e.g., double or closely drilled holes, corrosion, chips, scratches, or gouges). The detailed visual inspection shall be accomplished in accordance with a method approved by the Manager, Atlanta Aircraft Certification Office (ACO), FAA, Small Airplane Directorate. The requirements of this paragraph may be accomplished prior to or concurrently with the requirements of paragraph (b)(2) of this AD.

(2) Install a main deck cargo door hinge that complies with the applicable requirements of Civil Air Regulations (CAR) part 4b, including fail-safe requirements, in accordance with a method approved by the Manager, Atlanta ACO.

(c) If any crack or discrepancy is detected during the detailed visual inspection required by either paragraph (a) or (b)(1) of this AD, prior to further flight, repair in accordance with a method approved by the Manager, Atlanta ACO.

Actions Addressing the Main Deck Cargo Door Systems

(d) Within 60 days after the effective date of this AD, revise the Limitations Section of the FAA-approved Airplane Flight Manual (AFM) Supplement by inserting therein the procedures specified in paragraphs (d)(1) and (d)(2) of this AD, and install any associated placards. The AFM revision procedures and installation of any associated placards shall be accomplished in accordance with a method approved by the Manager, Atlanta ACO.

(1) Procedures to ensure that all power is removed from the main deck cargo door prior to dispatch of the airplane. And

(2) Procedures to ensure that the main deck cargo door is closed, latched, and locked prior to dispatch of the airplane.

(e) Within 36 months after the effective date of this AD, incorporate redesigned main deck cargo door systems (e.g., warning/monitoring, power control, view ports, and means to prevent pressurization to an unsafe level if the main deck cargo door is not closed, latched, and locked), including any associated procedures and placards, that comply with the applicable requirements of CAR part 4b and criteria specified in Appendix 1 of this AD; in accordance with a method approved by the Manager, Atlanta ACO.

Note 3: The design data submitted for approval should include a Systems Safety Analysis and Instructions for Continued Airworthiness that are acceptable to the Manager, Atlanta ACO.

Actions Addressing the Main Deck Cargo Barrier

(f) Within 36 months or 4,000 flight cycles after the effective date of this AD, whichever occurs first, install a main deck cargo barrier that complies with the applicable requirements of CAR part 4.b, in accordance with a method approved by the Manager, Atlanta ACO.

Note 4: The maximum main deck total payload that can be carried is limited to the lesser of the approved cargo barrier weight limit, weight permitted by the approved maximum zero fuel weight, weight permitted by the approved main deck position weights, weight permitted by the approved main deck running load or distributed load limitations, or approved cumulative zone or fuselage monocoque structural loading limitations (including lower hold cargo).

Note 5: Installation of a Ventura Aerospace Inc. cargo barrier STC ST00848LA is an approved means of compliance with the requirements of paragraph (f) of this AD.

(g) An alternative method of compliance or adjustment of the compliance time contained in this proposal that provides an acceptable level of safety may be used if approved by the Manager, Atlanta ACO. Operators shall submit their requests through an appropriate FAA Principal Maintenance Inspector, who may add comments and then send it to the Manager, Atlanta ACO.

Note 6: Information concerning the existence of approved alternative methods of compliance with this AD, if any, may be obtained from the Atlanta ACO.

(h) Special flight permits may be issued in accordance with sections 21.197 and 21.199 of the Federal Aviation Regulations (14 CFR 21.197 and 21.199) to operate the airplane to a location where the requirements of this AD can be accomplished.

Appendix 1

Excerpt from an FAA Memorandum to the Director-Airworthiness and Technical Standards of ATA, dated March 20, 1992.

''(1) *Indication System:*

(a) The indication system must monitor the closed, latched, and locked positions, directly.

(b) The indicator should be *amber* unless it concerns an outward opening door whose opening during takeoff could present an immediate hazard to the airplane. In that case the indicator must be *red* and located in plain view in front of the pilots. An aural warning is also advisable. A display on the master caution/warning system is also acceptable as an indicator. For the purpose of complying with this paragraph, an immediate hazard is defined as significant reduction in controllability, structural damage, or impact with other structures, engines, or controls.

(c) Loss of indication or a false indication of a closed, latched, and locked condition must be improbable.

(d) A warning indication must be provided at the door operators station that monitors the door latched and locked conditions directly, unless the operator has a visual indication that the door is fully closed and locked. For example, a vent door that monitors the door locks and can be seen from the operators station would meet this requirement.

(2) *Means to Visually Inspect the Locking Mechanism:*

There must be a visual means of directly inspecting the locks. Where all locks are tied to a common lock shaft, a means of inspecting the locks at each end may be sufficient to meet this requirement provided no failure condition in the lock shaft would go undetected when viewing the end locks. Viewing latches may be used as an alternate to viewing locks on some installations where there are other compensating features

(3) *Means to Prevent Pressurization:*

All doors must have provisions to prevent initiation of pressurization of the airplane to an unsafe level, if the door is not fully closed, latched and locked.

(4) *Lock Strength:*

Locks must be designed to withstand the maximum output power of the actuators and maximum expected manual operating forces treated as a limit load. Under these conditions, the door must remain closed, latched and locked.

(5) *Power Availability:*

All power to the door must be removed in flight and it must not be possible for the flight crew to restore power to the door while in flight.

(6) *Powered Lock Systems:*

For doors that have powered lock systems, it must be shown by safety analysis that inadvertent opening of the door after it is fully closed, latched and locked, is extremely improbable.''

Issued in Renton, Washington, on November 4, 1999.

D. L. Riggin,

Acting Manager, Transport Airplane Directorate, Aircraft Certification Service.

[FR Doc. 99–29476 Filed 11–10–99; 8:45 am]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. 97–NM–234–AD]

RIN 2120–AA64

Airworthiness Directives; Boeing Model 727 Series Airplanes Modified in Accordance with Supplemental Type Certificate ST00015AT

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: This document proposes the adoption of a new airworthiness directive (AD) that is applicable to certain Boeing Model 727 series airplanes that have been converted from a passenger to a cargo-carrying (''freighter'') configuration. This proposal would require, among other actions, installation of a fail-safe hinge, redesigned main deck cargo door warning and power control systems, and 9g cargo barrier. This proposal is