

DEPARTMENT OF TRANSPORTATION**Federal Aviation Administration****14 CFR Part 39**

[Docket No. 97-NM-272-AD]

RIN 2120-AA64

Airworthiness Directives; Boeing Model 747-100, -200, and -300 Series Airplanes**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 all Boeing Model 747-100, -200, and -300 series airplanes. This proposal would require the installation of components for the suppression of electrical transients and/or the installation of shielding and separation of the electrical wiring of the fuel quantity indication system (FQIS). This proposal is prompted by testing results, which revealed that excessive energy levels in the electrical wiring and probes of the fuel system could be induced by electrical transients. The actions specified by the proposed AD are intended to prevent electrical transients induced by electromagnetic interference (EMI) or electrical short circuit conditions from causing arcing of the FQIS electrical wiring or probes in the fuel tank, which could result in a source of ignition in the fuel tank.

DATES: Comments must be received by March 3, 1998.

ADDRESSES: Submit comments in triplicate to the Federal Aviation Administration (FAA), Transport Airplane Directorate, ANM-103, Attention: Rules Docket No. 97-NM-272-AD, 1601 Lind Avenue, SW., Renton, Washington 98055-4056. Comments may be inspected at this location between 9:00 a.m. and 3:00 p.m., Monday through Friday, except Federal holidays.

Information concerning this proposal may be obtained from or examined at the FAA, Transport Airplane Directorate, 1601 Lind Avenue, SW., Renton, Washington.

FOR FURTHER INFORMATION CONTACT: Chris Hartonas, Aerospace Engineer, Systems and Equipment Branch, ANM-130S, FAA, Transport Airplane Directorate, Seattle Aircraft Certification Office, 1601 Lind Avenue, SW., Renton, Washington 98055-4056; telephone (425) 227-2864; fax (425) 227-1181.

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-272-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-103, Attention: Rules Docket No. 97-NM-272-AD, 1601 Lind Avenue, SW., Renton, Washington 98055-4056.

Discussion

On July 17, 1996, a Boeing Model 747 series airplane was involved in an accident shortly after takeoff from John F. Kennedy International Airport in Jamaica, New York. In support of the subsequent accident investigation, the FAA participated in testing of the fuel quantity indication system (FQIS). Results of that testing revealed that excessive energy could be induced by high transient voltage levels in the electrical wiring and probes of the fuel system. These excessive levels occurred when the wiring of the FQIS was subjected to electrical transient testing. These electrical transients may be caused in the airplane when switching electrical loads in the wiring adjacent to the FQIS wiring.

The FQIS was tested to determine its performance in accordance with

airplane electromagnetic interference (EMI) requirements. In this test, conductive debris, such as steel wool and lockwire, was used to bridge the FQIS probes to simulate debris that has been found during inspections of transport category airplanes. Results of this test indicated that transient voltage levels induced in the FQIS wiring and probes could be in excess of 800 volts, and the resulting energy levels in the FQIS wiring and probes could be greater than the energy required to ignite fuel vapor inside a fuel tank.

In addition, recent inspections of the fuel probe wiring in Model 747 fuel tanks revealed damaged wiring insulation, which exposed the conductors inside the fuel tank. This condition, together with the introduction of induced transients or short circuit conditions, increases the likelihood for potential ignition sources in the fuel tank.

The conditions described above, if not corrected, could result in excessive levels of energy in the FQIS wiring and a consequent potential source of ignition in the fuel tank.

FAA's Conclusions

While none of the above conditions have been identified at this time as the cause of the accident discussed previously, the FAA concludes that results of the tests and inspections that have been performed indicate that modifications are required to limit the energy level induced in the FQIS wiring and probes. Further, the FAA has determined that shielding and separation of the FQIS electrical wiring from adjacent wiring is necessary to provide protection from wire-to-wire electrical short circuit conditions, which are a potential source of ignition in the fuel tank.

Explanation of Requirements of Proposed Rule

Since an unsafe condition has been identified that is likely to exist or develop on other products of this same type design, the proposed AD would require the installation of components for the suppression of electrical transients and/or the installation of shielding and separation of the electrical wiring of the FQIS. The actions would be required to be accomplished in accordance with a method approved by the FAA.

Cost Impact

There are approximately 650 Model 747-100, -200, and -300 series airplanes of the affected design in the worldwide fleet. The FAA estimates that 167

airplanes of U.S. registry would be affected by this proposed AD.

Since the manufacturer has not yet developed a modification commensurate with the requirements of this proposal, the FAA is unable at this time to provide specific information as to the number of work hours or the cost of parts that would be required to accomplish the proposed modification. A further problem in developing a specific cost estimate is the fact that modification costs are expected to vary from operator to operator and from airplane to airplane depending upon airplane configuration. The proposed compliance time of 12 months should provide ample time for the development, approval, and installation of an appropriate modification.

However, based on similar modifications accomplished previously on other airplane models, the FAA can reasonably estimate that the proposed modification would require 40 work hours to accomplish, at an average labor rate of \$60 per work hour. The cost of required parts is estimated to be \$10,000 per airplane. Based on these figures, the cost impact of the proposed AD on U.S. operators is estimated to be \$2,070,800, or \$12,400 per airplane.

As indicated earlier in this preamble, the FAA specifically invites the submission of comments and other data regarding this economic aspect of proposal.

The cost impact figure discussed above is based on assumptions that no operator has yet accomplished any of the proposed requirements of this AD action, and that no operator would accomplish those actions in the future if this AD were not adopted.

Regulatory Impact

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.

For the reasons discussed above, I certify that this proposed regulation (1) is not a "significant regulatory action" under Executive Order 12866; (2) is not a "significant rule" under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and (3) if promulgated, will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. A copy of the draft regulatory evaluation prepared for this action is contained in the Rules Docket. A copy of it may be obtained by contacting the Rules Docket at the location provided under the caption **ADDRESSES**.

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-272-AD.

Applicability: All Model 747-100, -200, and -300 series airplanes, 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 (b) 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 electrical transients induced by electromagnetic interference (EMI) or electrical short circuit conditions from causing arcing of the fuel quantity indication system (FQIS) electrical wiring or probes in the fuel tank, which could result in a source of ignition in the fuel tank, accomplish the following:

(a) Within 12 months after the effective date of this AD, install components for the suppression of electrical transients and/or install shielding and separation of the wiring of the FQIS, in accordance with a method approved by the Manager, Seattle Aircraft Certification Office (ACO), FAA, Transport Airplane Directorate.

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

Note 2: Information concerning the existence of approved alternative methods of compliance with this AD, if any, may be obtained from the Seattle ACO.

(c) 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.

Issued in Renton, Washington, on November 26, 1997.

Stewart R. Miller,

Acting Manager, Transport Airplane Directorate, Aircraft Certification Service.

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