

Airworthiness Directive

Federal Register Information

Header Information

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39 [64 FR 27905 No. 99 05/24/99]

Docket No. 98-NM-383-AD; Amendment 39-11175; AD **99-11-05**

RIN 2120-AA64

Airworthiness Directives; Boeing Model 737 Series Airplanes

PDF Copy (If Available):

Preamble Information

AGENCY: Federal Aviation Administration, DOT

ACTION: Final rule

SUMMARY: This amendment adopts a new airworthiness directive (AD), applicable to all Boeing Model 737 series airplanes, that requires repetitive displacement tests of the secondary slide in the dual concentric servo valve of the power control unit (PCU) for the rudder, and replacement of the valve assembly with a modified valve assembly, if necessary. This amendment is prompted by reports of cracking found in PCU secondary servo valve slides. The actions specified by this AD are intended to prevent failure of the secondary slide and consequent rudder hardover and reduced controllability of the airplane.

DATES: Effective June 28, 1999.

The incorporation by reference of certain publications listed in the regulations is approved by the Director of the Federal Register as of June 28, 1999.

ADDRESSES: The service information referenced in this AD may be obtained from Boeing Commercial Airplane Group, P. O. Box 3707, Seattle, Washington 98124-2207. This information may be examined at the Federal Aviation Administration (FAA), Transport Airplane

Directorate, Rules Docket, 1601 Lind Avenue, SW., Renton, Washington; or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

FOR FURTHER INFORMATION CONTACT: R.C. Jones, 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) 227-1118; fax (425) 227-1181.

SUPPLEMENTARY INFORMATION: A proposal to amend part 39 of the Federal Aviation Regulations (14 CFR part 39) to include an airworthiness directive (AD) that is applicable to all Boeing Model 737 series airplanes was published in the Federal Register on January 13, 1999 (64 FR 2161). That action proposed to require repetitive displacement tests of the secondary slide in the dual concentric servo valve of the power control unit (PCU) for the rudder, and replacement of the valve assembly with a modified valve assembly, if necessary.

Interim Action

This is considered interim action until final action is identified, at which time the FAA may consider further rulemaking.

Opportunity to Comment

Interested persons have been afforded an opportunity to participate in the making of this amendment. Due consideration has been given to the comments received.

Support for the Proposed Rule

Several commenters express support for the proposed rule.

1. Requests to Extend the Initial Compliance Time

Several commenters request that the initial compliance time be extended for the displacement test. While the proposed rule specifies an initial compliance time of 4 months for certain airplanes, the commenters suggest extensions of the initial compliance time ranging from an initial compliance time of 8 months to an initial compliance time of 2 years. The following identifies justifications provided by the commenters for increasing the compliance time:

Some of the commenters state that testing and analysis to date indicate that the servo valve of the

PCU can sustain the highest loads expected to occur in the normal service life of the Model 737 fleet of airplanes. The testing and analysis also indicate that a single valve leg crack still permits the PCU to function normally for periods of time much greater than the proposed 4-month compliance time.

Other commenters assert that an inadequate number of qualified repair facilities exist, and that the number of PCU's in the fleet are inadequate to permit compliance with the proposed AD. To meet the compliance time for the 3,000 and more PCU's that would require testing would likely ground a significant number of airplanes.

Two commenters state that the financial implications of meeting the proposed compliance time could result in bankruptcy of one or more small airlines.

One commenter states that the shipping time alone, without consideration of any other factors, would prevent operators from completing the displacement tests within the compliance time specified in the proposal.

Several commenters state that all spares facilities are at maximum use and spare PCU's are all being used in order to comply with the requirements of AD 97-14-04, amendment 39-10061 (62 FR 35068, June 30, 1997).

Another commenter states that the turnaround time for replacing units not modified in accordance with AD 97-14-04 is approximately 30 to 45 days. Such turnaround time for those units would prevent some operators from complying within the proposed compliance time.

One other commenter expresses a serious concern that accomplishment of all the testing done in the limited time proposed (4 months) could result in the introduction of various maintenance errors that would possibly introduce a new unsafe condition.

The FAA concurs that the initial compliance time for accomplishment of the displacement test can be extended. Further, the FAA has reviewed certain testing that indicates that valve slides with cracks can meet the control valve limit and ultimate load requirements as well as survive numerous life cycles. Additionally, the FAA has reviewed the results of analyses that indicate valves with single cracks can withstand an interval greater than the proposed 4-month interval. While the testing and analyses results are not definitive proof that a second crack will not develop, the results are evidence that valves with single cracks are safe in-service for a limited interval. The FAA also acknowledges that the number of PCU's in the fleet and the number of qualified repair facilities may not be adequate to permit compliance for the fleet within 4 months. In light of this information, the FAA has determined that the compliance time of paragraphs (a)(1), (a)(2), and (a)(3) of this AD can be extended to 16 months. The final rule reflects this

change.

2. Requests to Extend the Repetitive Displacement Testing Intervals

One commenter requests that the repetitive testing intervals be extended from 12,000 to 12,800 flight hours to coincide with a major check in the Boeing Maintenance Planning Document. Another commenter, the airplane manufacturer, requests that the interval be extended from 12,000 to 24,000 flight hours. Both commenters state that the displacement testing interval should coincide with scheduled heavy maintenance to preclude an undue burden on operators and to reduce any potential maintenance errors.

The FAA concurs that the repetitive testing interval may be extended from 12,000 to 24,000 flight hours. The FAA finds that, based on results of testing and analysis (referred to in comment 1. of this AD), extending the testing interval will not adversely affect the safety of the fleet. Additionally, the FAA concurs that, in this case, less chance of maintenance errors will occur if the testing is accomplished during scheduled heavy maintenance. Paragraph (b) of this AD has been revised to specify an interval of 24,000 flight hours for the repetitive displacement testing.

3. Requests to Withdraw the Proposed Rule

One commenter, the airplane manufacturer, states that there is no technical data to support the position that "an unsafe condition is likely to exist or develop" as stated in the proposed rule. The commenter states that, on the other hand, the FAA's concern of a possible condition developing into a "thru-crack" condition on both the 1st leg and the 2nd leg of the secondary slide clevis is based on a hypothetical and unsubstantiated extrapolation of failures. Further, the commenter states that, although it agrees that "thru-cracking" of both the 1st leg and 2nd leg of the secondary slide clevis would be an unsafe condition, the commenter strongly disagrees that such a condition exists in service or that it is likely to develop while the slide is installed in a rudder PCU. The commenter also asserts that, based on the results of testing and analyses by both the airplane manufacturer and the PCU manufacturer, the secondary slide is not susceptible to cracking after installation in the PCU. The commenter concludes that the only plausible cause of cracking of the secondary slides is slide mishandling or in-process damage.

Another commenter states that testing and analyses performed by both the airplane manufacturer and PCU manufacturer indicate that sufficient redundancy is provided in the rudder system to operate almost 18 lifetimes with one broken leg of the secondary slide. Additionally, the commenter asserts that, even in a worst-case scenario of both legs of the secondary slide having a thru-fracture, and a piece of material causing both primary and secondary slides to jam that results in full rudder deflection, sufficient controllability of the airplane would be ensured by the rudder pressure limiting device required by AD 97-14-03.

The FAA infers that the commenters are requesting that the proposed rule be withdrawn. The FAA does not concur. The root cause of the cracked servo control valves of the PCU has not been determined. The only way these cracks have been duplicated so far is by dropping or hammering the secondary valve slide. The FAA considers it unlikely that all of the 12 control valves had been dropped or hammered, which suggests that there may be additional factors that make the secondary valve slide susceptible to cracking. This may indicate that lower load phenomena (and possibly normal handling) may be responsible for the cracking. The lack of complete information makes it essential that the valve slides be removed from the fleet. Additionally, a single crack in the secondary control valve slide clevis reduces the load bearing redundancy of the valve to a single load path. Loss of the remaining load path could result in uncommanded rudder motion to a hardover position.

The bases of the design of the control system on Boeing Model 737 series airplanes is that no single failure shall result in an unsafe condition, and that either loss of a single redundant mechanism will be detectable or the remaining redundant mechanism will survive for the life of the airplane. It is generally accepted by the affected operators and the FAA that some valves, possibly up to 50 valves, in the fleet are cracked. Some airplanes may be reduced to single-thread systems. Additionally, the rudder pressure-limiting device does not reduce pressure on the Model 737 "classic" airplanes at altitudes below 1,000 feet on takeoff or below 750 feet during landing. During those particular conditions, uncommanded rudder motion to a hardover condition may be catastrophic. In light of these findings, the FAA has determined that the requirements of this AD are appropriate and necessary.

4. Request to Eliminate Paragraph (a)(2) of the Proposed Rule

Another commenter states that requiring performance of the displacement test [as specified in paragraph (a)(2) of the proposal] prior to installation of the PCU required by AD 97-14-04 will have a negative effect in the ability of operators to accomplish compliance with that AD. The commenter points out that the resources and units from the spares pool will be consumed in the effort to comply with the proposed rule. In addition, the commenter states that the wording of the proposal could be interpreted to mean that those PCU's installed prior to the effective date need to be removed and re-tested, even though they could have already been tested. The FAA infers that the commenter is requesting that paragraphs (a)(2) and (c) of the proposal be removed.

The FAA concurs that paragraph (a)(2) of the proposal should be deleted. The FAA considers that it would be more efficient for an operator to install a PCU that is in compliance with AD 97-14-04 and this final rule, but acknowledges that it could prohibit an operator from installing a serviceable unit that complies with AD 97-14-04 simply because the displacement test required by this final rule had not been accomplished. Therefore, the FAA has deleted paragraph (a)(2) of

this AD and revised paragraph (a)(1) to remove the phrase "prior to the effective date of this AD." Paragraph (a)(1) of this AD now applies to all Model 737-100, -200, -300, -400, and -500 series airplanes regardless of whether AD 97-14-04 is incorporated before or after the effective date of this AD. Additionally, the FAA has renumbered the sub-paragraphs of paragraph (a) of this AD to reflect the deletion of paragraph (a)(2) of this AD. The FAA also has revised paragraph (c) of this AD to specify that only PCU's that have completed a successful displacement test, as signified by the letter "C" after the serial number, may be installed as of 16 months after the effective date of this AD. See Item 5. of this AD for further discussion of the revision of paragraph (c) of this AD.

5. Request to Revise Paragraph (c) of the Proposed Rule

One commenter, the airplane manufacturer, requests that the wording of paragraph (c) of the proposal be revised. The commenter states that the current wording stating that no person shall install a main rudder PCU on any airplane unless that PCU's nameplate has been vibro-engraved with the letter "C" following the serial number of the PCU should be revised to specify "with the letter `C' or greater." The commenter states that by adding the words "or greater," it allows for the possibility of future revisions to the PCU. Additionally, the commenter points out that if "or greater" is not added, it would mean that installing a newer version PCU would not comply with the requirements of the proposal.

The FAA concurs for the reasons submitted by the commenter and has revised paragraph (c) of the final rule accordingly. In addition, the FAA has extended the compliance time requirement for this paragraph to "as of 16 months after the effective date of this AD." The FAA has determined that, in light of the data supporting the increase of the initial and repetitive compliance times required for the displacement testing and the fact that there could be a shortage of available spares, extending the compliance time of paragraph (c) to correspond with the initial compliance time for the displacement testing is appropriate.

6. Requests to Revise the Reporting Requirements

Two commenters request that the reporting requirements of paragraph (d) of the proposed AD be revised. One of these commenters requests that the reporting requirement for the initial displacement testing should be revised to 10 days for those failed control valves that fail the initial displacement test and 30 days for those control valves that pass the initial displacement testing. No justification for that request was provided. The other commenter requests deletion of the requirement to report results for control valves that pass the repetitive displacement tests. The commenter states that limiting the reporting data to those control valves that fail any repetitive displacement testing will provide all the necessary data for analysis. The commenter points out that eliminating the requirement to report control valves that pass the displacement testing of the

repetitive inspections would reduce the burden to operators, as well as to the FAA.

The FAA concurs that reporting only PCU's that fail repetitive displacement testing will provide adequate information to determine the secondary valve slide condition after extended in-service time. The FAA considers that, in the interest of relieving some burden on the operators, the reporting times for all displacement testing may be extended from 10 days to 30 days. The FAA finds that extending the reporting time will not adversely affect safety. The FAA has revised paragraph (d) of this AD to reflect these changes.

7. Request to Revise Corrective Action

One commenter requests that paragraph (b)(2) of the proposed rule, which requires accomplishment of corrective action in accordance with a method approved by the Manager, Seattle Aircraft Certification Office, be revised. The commenter states that the only corrective action available to operators is to replace the dual servo valve with a valve that passes the displacement test. Therefore, the commenter asserts that it is unnecessary to require approval of corrective actions from the FAA.

The FAA concurs for the reason given by the commenter. Paragraph (b)(2) of the final rule has been revised to specify that the corrective action (replacement of the dual servo valve with a valve that passes the displacement test) shall be accomplished in accordance with the applicable alert service bulletin.

8. Request to Add Precautionary Language

Two commenters request that the FAA add wording to the proposed rule to specify that only properly trained maintenance personnel and appropriate repair facilities are used to accomplish the displacement testing and replacement of the valve assemblies specified in the proposal. The commenters state that, in the past, it appears that some repair stations did not have proper facilities or properly trained personnel, and maintenance errors were made. The commenters assert that the disassembly and testing are complex and require special maintenance knowledge and special equipment. The commenters request that precautionary language specifying that only appropriately trained personnel and appropriate maintenance facilities may be used to accomplish the requirements of this AD be added to the proposal to preclude the risk of maintenance errors.

The FAA does not concur with the commenters' request to include the requested precautionary language in the final rule. The FAA acknowledges that displacement testing and replacement of the valve assemblies specified in this final rule may be complex and may require special maintenance knowledge and special equipment. However, existing maintenance regulations and

guidance should ensure that appropriate personnel perform maintenance and that appropriate equipment and repair facilities are used.

9. Request to Clarify Compliance With Testing Requirements

One commenter requests that the proposal be revised to clarify that vibro-engraving the letter "C" on the serial number constitutes compliance that the unit has met the requirements of the AD and that no further testing is required. The commenter states that the clarification is necessary because the proposal applies to airplanes by line number and does not account for the possibility that a tested PCU may be installed on an affected airplane.

The FAA acknowledges that some clarification is necessary. First, this AD applies to all Boeing Model 737 series airplanes as stated in the applicability of this AD, not just to airplanes that are specified by certain line numbers. Second, the application of the letter "C" (or greater letters, see Item 5.) to the serial number of the PCU does not mean that the PCU is in compliance with the full requirements of this AD. Such application of the letter "C" or greater letters constitutes only compliance with the requirements of the initial displacement test. Third, the application of the letter "C" or greater letters does not mean that no further testing is required. The specific reasons for the repetitive testing requirements of this AD and the consideration of these requirements as interim action is discussed elsewhere in Item 12. of this AD. The FAA, however, concurs that clarification may be necessary in paragraph (c) of this AD to ensure that accomplishment of the application of the letter "C" or greater letters does constitute compliance with the requirement to accomplish the initial displacement test. Paragraph (c) of this AD has been revised to clarify this point.

10. Request to Add New Service Information

One commenter, the airplane manufacturer, requests that both Revisions 1 of Boeing Alert Service Bulletins 737-27A1221 and 737-27A1222, both dated January 28, 1999, be added to the proposed rule as appropriate sources of service information. The commenter states that minor changes were made in the new alert service bulletins.

The FAA has reviewed and approved both Revisions 1 of the alert service bulletins. The FAA has determined that the revised alert service bulletins contain not only minor changes, but changes that contain descriptive material that is clarifying in nature. Since those revisions do not add any burden to operators, the FAA has revised paragraphs (a) and (b) of the final rule to reflect both Revisions 1 of the service bulletins as the applicable sources of service information for this AD. The FAA also has revised the final rule by adding a new NOTE 2 that specifies that accomplishment of the initial displacement testing in accordance with earlier editions of the service bulletins is acceptable for the initial displacement testing required by this AD.

11. Requests to Revise Cost Impact

Several commenters request that the cost impact information provide more realistic estimates of the costs for affected airplanes. These commenters request that the proposal include estimates of cost for such items as: scheduling and administrating; removing and replacing of the PCU, shipping of the PCU's; performing the displacement testing and the full Acceptance Test Procedure (ATP) if completed by a third party; and the estimated costs of performing the displacement testing repetitively.

The FAA does not concur that the cost impact information should be revised.

The cost estimates provided in this AD represent the time necessary to perform only the actions actually required by this AD. The FAA recognizes that, in accomplishing the requirements of any AD, operators may incur "incidental" costs in addition to the "direct" costs. The cost analysis in AD rulemaking actions, however, typically does not include incidental costs, such as the time required to gain access and close up; planning time; or time necessitated by other administrative actions. Because incidental costs may vary significantly from operator to operator, they are almost impossible to calculate.

The replacement of the valve assembly that the commenters refer to are actions that must be accomplished in the event that the results of the displacement testing are outside the limits specified in the service bulletin. Typically, the economic analysis of an AD is limited to the cost of actions actually required by the rule. It does not consider the costs of "on condition" actions (that is, actions taken to correct an unsafe condition if found), since those actions would be required to be accomplished, regardless of AD direction, in order to correct an unsafe condition identified in an airplane and to ensure operation of that airplane in an airworthy condition, as required by the Federal Aviation Regulations.

12. Request to Delete the "Interim Action" Section

One commenter, the airplane manufacturer, requests that the "Interim Action" section of the proposal be deleted. The commenter states that there is no data to indicate that there continues to be any diminished level of safety once the rudder PCU has successfully completed a displacement test. The commenter concludes that there is no known safety concern that will require a "final action." The commenter also requests that reference in the preamble of the proposal to a final action not being identified yet be deleted. The commenter asserts that satisfactory results of displacement testing is adequate proof that cracking does not exist in the PCU.

The FAA does not concur; a final solution to terminate the required repetitive displacement tests may be necessary. As stated previously, 12 cracked control valves have been reported to date. However, the root cause for the cracking has not been positively determined. The only way these cracks have been duplicated so far is by dropping or hammering the secondary valve slide. The FAA considers it unlikely that all 12 control valves had been dropped or hammered. The FAA considers it more likely that lower load phenomena (and possibly normal handling) may be responsible for the cracking, which indicates that there may be additional factors that make the secondary valve slide susceptible to cracking. The lack of a root cause, varying sensitivity of different control valves to cracking, and uncertainties associated with damage tolerance analyses on the valve material indicates to the FAA that valve design may not be adequate and that cracking may occur in the future. The FAA does not consider that the results of a single displacement test is proof that cracking will not eventually occur in the PCU valve.

For the reasons stated above, the FAA does not concur that it is unnecessary to specify that the FAA may consider further rulemaking. No change to the final rule in this regard is necessary.

13. Requests to Allow Dye Penetrant Inspections

Several commenters request that dye penetrant inspections be required instead of displacement testing. One commenter asserts that, if a cracked valve has been dye penetrant inspected and found to be free of cracking, no further displacement testing should be required. This same commenter states that, since there are no delayed cracking mechanisms involved, a previous dye penetrant inspection to detect any cracking is sufficient. Another commenter states that dye penetrant inspection actually detects cracking better than the displacement test. That commenter states that the dye penetrant inspection is better because it can detect all cracking and that accomplishment of a displacement test could leave a valve installed that contains small cracks. The commenter further asserts that completion of a dye penetrant inspection should suffice as a terminating action for the proposed actions.

The FAA does not concur that dye penetrant inspection should be required in lieu of displacement testing. The FAA considers that dye penetrant inspection techniques have varied levels of crack detection capability. Some dye penetrant inspection techniques may not have the capability to detect some cracking that can propagate to failure of a single leg. Additionally, the displacement test is performed on an assembled PCU. This ensures that secondary control valve is in its most protected configuration, and that the secondary valve slide is not subjected to further handling. Therefore, it is unnecessary to revise the final rule in this regard.

14. Requests to Credit Dye Penetrant Inspections

Two commenters request that PCU's that have been inspected previously with dye penetrant be

exempt from the proposed requirement to accomplish displacement testing. The commenters also request that, at a minimum, the FAA increase the initial compliance time and repetitive intervals of the proposed AD for those PCU valves that have had a dye penetrant inspection. The commenters assert that, since the cause of the valve cracking is due to handling prior to the valve assembly, accomplishment of a dye penetrant inspection and careful assembly provide acceptable assurance that the control valve is not cracked and does not need to be displacement tested.

The FAA does not concur with the commenters' request. The FAA finds that PCU valves that have had a dye penetrant inspection must undergo the displacement testing at the same initial and repetitive intervals as the other valves. As discussed previously (Item 13.), dye penetrant inspection techniques have varied levels of crack detection capability. Some dye penetrant inspection techniques may not have the capability to detect partial cracks that can propagate into a leg failure. The displacement testing will detect partial cracking by causing the crack to propagate to failure of a single leg. Additionally, after a dye penetrant inspection is accomplished, the secondary control valve slide is again subject to handling because the valve must be cleaned and reassembled. The FAA considers that the increase in initial compliance time (as discussed in Item 1.) and the intervals for the repetitive displacement testing provided in this final rule should provide some additional time for completing the displacement testing. No change is necessary to the final rule in regard to dye penetrant inspection.

15. Request to Eliminate the Installation Requirements of AD 97-14-04

One commenter requests that the FAA suspend the requirement to install PCU valves required by AD 97-14-04. The commenter states that until the root cause of the secondary slide cracking is identified, the PCU's required by AD 97-14-04 should not be installed.

The FAA does not concur. Although the root cause of the PCU valve cracking has not been identified, testing and analysis indicate that a cracked valve will perform its intended function for a certain period of time. The repetitive displacement testing will identify any cracked valves and facilitate their removal. The valves installed in accordance with AD 97-14-04 eliminate design "features" that could lead to potentially unsafe flight conditions (e.g., reversal, overstroke, and high residual pressures). Therefore, the FAA considers the benefits of continued incorporation of AD 97-14-04 to outweigh the risks of secondary valve cracking. The FAA has determined that unless new information develops that reveals evidence contrary to the need for the implementation of the requirements of AD 97-14-04, those requirements are still valid and necessary to ensure the operational safety of the fleet. No change is necessary to the requirements of this final rule in this regard.

16. Request to Add an Inspection to the Requirements of the Proposed Rule

One commenter requests that the proposed rule be revised to add an inspection for chipping in the area of the clevis. The commenter states that a control valve that was removed from a kit had a particle missing from the clevis end that appeared to be chipped off. Therefore, the commenter states that it would be prudent to inspect for chipping to ensure that other chipped valves are in the fleet.

The FAA does not concur that an inspection for chipping should be added to the final rule. Although the FAA agrees that the valves in the fleet should not be chipped, only one control valve that was chipped has been detected. The FAA considers that the mechanism causing the chip is independent of the cause of the cracking of control valves. If an inspection requirement to the final rule increases the burden of the operator, it would necessitate issuing a supplemental notice of proposed rulemaking (NPRM) to permit public comment in accordance with the Administrative Procedures Act (APA). The FAA has determined that delay of the final rule is not warranted based on the identified unsafe condition addressed in this rule. However, the FAA may consider separate rulemaking to address the concern of possible chipped secondary control valves.

17. Request to Remove Requirement to Test Slides Already In Service

The commenter states that slides currently installed on PCU's do not need to be displacement tested. The commenter asserts that, once control valves are installed, they are protected from damage. The commenter concludes that the requirement to test slides already in service should be deleted from the proposal.

The FAA does not concur. Even though slides installed on PCU's are substantially protected, two issues exist that indicate that PCU's in service need to be tested. One, a cracked valve was detected on a PCU removed from service. Two, the root cause of the cracking and sensitivity to cracking has not been established. Since the FAA finds that all cracked control valves must be removed from the fleet, all valves that are installed must be tested. No change to the final rule is necessary in this regard.

18. Request to Postpone Requirements Until a Terminating Action is Provided

One commenter, an airline operator, requests that the FAA define a terminating action for the repetitive displacement tests required by the proposed AD. The commenter states that time should be allotted to find a terminating action in order to reduce the risk of errors occurring from repeating displacement testing. The FAA infers that the commenter is requesting that the requirements specified in the proposal be postponed until a terminating action is provided.

The FAA does not concur that additional time to develop and approve a terminating action is warranted to delay issuance of this final rule. The FAA has determined that the identified unsafe condition must be addressed even though the terminating action has not been developed and approved yet. The FAA, however, has been advised that a design improvement of the clevis of the secondary control valve slide that is not susceptible to cracking may be currently in development. Once a design is reviewed and approved by the FAA, further rulemaking may be considered as specified in the "Interim Action" section of this AD.

19. Request to Revise the Initial Compliance Time

One commenter requests that the FAA revise the initial compliance time for the displacement testing from the proposed 4 months to 120 days. The commenter states that correction of the identified unsafe condition addressed by the proposal is critical to flight safety.

The FAA does not concur that the compliance time should be revised for the reason suggested by the commenter. However, the FAA has revised the initial compliance time of the final rule to 16 months for the reasons specified in Item 1. The FAA considers that the extension of compliance time is justified and will not adversely effect the safety of the fleet.

Editorial Change to the Proposal

The FAA inadvertently included Boeing Model 737-900 series airplanes in the applicability of the NPRM. Since that model has not yet been certificated, the FAA has removed it from the final rule.

Conclusion

After careful review of the available data, including the comments noted above, the FAA has determined that air safety and the public interest require the adoption of the rule with the changes previously described. The FAA has determined that these changes will neither increase the economic burden on any operator nor increase the scope of the AD.

Cost Impact

There are approximately 3,059 Boeing Model 737 series airplanes of the affected design in the worldwide fleet. The FAA estimates that 1,334 airplanes of U.S. registry will be affected by this AD, that it will take approximately 1 work hour per airplane to accomplish the required actions, and that the average labor rate is \$60 per work hour. Based on these figures, the cost impact of the AD on U.S. operators is estimated to be \$80,040, or \$60 per airplane, per cycle.

It will take 9 work hours to remove and reinstall or replace the PCU. For Model 737-100, -200, -300, -400, and -500 series airplanes, however, concurrent accomplishment of this AD and AD 97-14-04 will preclude the necessity to accomplish this replacement action twice, thereby offsetting the cost impact on operators.

The cost impact figure discussed above is based on assumptions that no operator has yet accomplished any of the 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 adopted herein will 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 final rule does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

For the reasons discussed above, I certify that this action (1) is not a "significant regulatory action" under Executive Order 12866; (2) is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and (3) 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 final evaluation has been prepared for this action and it is contained in the Rules Docket. A copy of it may be obtained from the Rules Docket at the location provided under the caption "**ADDRESSES**."

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

Regulatory Information

99-11-05 BOEING: Amendment 39-11175. Docket 98-NM-383-AD.

Applicability: All Model 737 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 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 (e) 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 failure of the secondary servo valve slide in the rudder power control unit (PCU) due to cracking of the slide, and consequent rudder hardover and reduced controllability of the airplane, accomplish the following:

Displacement Testing

(a) Perform a displacement test of the secondary slide in the dual servo valve in the rudder PCU, in accordance with Boeing Alert Service Bulletin 737-27A1221, Revision 1, dated January 28, 1999 (for Model 737-100, -200, -300 -400, and -500 series airplanes); or 737- 27A1222, Revision 1, dated January 28, 1999 (for Model 737-600, -700, and -800 series airplanes); at the applicable time specified by paragraph (a)(1), (a)(2), (a)(3), or (a)(4) of this AD. Repeat the displacement test on that PCU thereafter at intervals not to exceed 24,000 flight hours.

NOTE 2: Accomplishment of the initial displacement testing required by paragraph (a) of this AD in accordance with Boeing Alert Service Bulletin 737-27A1221, dated January 14, 1999 (for Model 737-100, -200, -300, -400, and -500 series airplanes); or 737-27A1222, dated January 14, 1999 (for Model 737-600, -700, and -800, series airplanes) is acceptable only for the initial compliance requirements of this AD.

(1) For Model 737-100, -200, -300, -400, and -500 series airplanes: Conduct the displacement test within 16 months after the effective date of this AD.

(2) For airplanes on which a PCU specified in paragraph (a)(2)(I) or (a)(2)(ii) of this AD is installed within 16 months after the effective date of this AD: Conduct the displacement test within 16 months after the effective date of this AD.

(i) Part number 65-44861-12 and having serial number (S/N) 3509A or lower,

(ii) Part number 65C37053-(XX).

(3) For Model 737-600, -700, and -800 series airplanes having line numbers 1 through 222 inclusive that are equipped with PCU's having P/N 251A301-(XX) and serial number 299 or lower: Conduct the displacement test within 16 months after the effective date of this AD.

(4) For all other airplanes: Conduct the displacement test prior to the accumulation of 24,000 total flight hours on the PCU, or within 30 days after the effective date of this AD, whichever occurs later.

Corrective Actions

(b) If the results of the displacement test required by paragraph (a) of this AD are outside the limits specified by Boeing Alert Service Bulletin 737-27A1221, Revision 1, dated January 28, 1999 (for Model 737-100, -200, -300, -400, and -500 series airplanes), or 737-27A1222, Revision 1, dated January 28, 1999 (for Model 737-600, -700, and -800 series airplanes): Prior to further flight, accomplish the actions specified in paragraphs (b)(1) and (b)(2) of this AD.

(1) Replace the valve assembly, in accordance with the applicable alert service bulletin, with a serviceable valve assembly. And

(2) Following installation of the replacement valve assembly in accordance with paragraph (b)(1) of this AD, perform the displacement test required by paragraph (a) of this AD on that assembly, in accordance with the applicable alert service bulletin. If the test results are outside the limits specified by the applicable alert service bulletin, prior to further flight, replace the valve assembly with a serviceable valve assembly in accordance with the applicable alert service bulletin, and repeat the displacement test required by paragraph (a) of this AD on that assembly.

NOTE 3: Boeing Alert Service Bulletin 737-27A1222, Revision 1, dated January 28, 1999, refers to Parker Service Bulletin 381500-27-01, dated December 22, 1998, as an additional source of service information for accomplishment of the displacement test for Model 737-600, -700, and -800 series airplanes.

(c) As of 16 months after the effective date of this AD, no person shall install a main rudder PCU specified in paragraph (c)(1) or (c)(2) of this AD unless that PCU's nameplate has been vibro-engraved with the letter "C" following the serial number. (Subsequent serial numbers greater than those listed below are displacement tested as part of the certified production process, and do not require the letter "C" to be vibro-engraved.)

(1) For Boeing Model 737-100, -200, -300, -400, and -500 series airplanes: A PCU having P/N 65-44861-12 and a serial number (S/N) 3509A or lower; or any PCU having P/N 65C37053-(XX).

(2) For Boeing Model 737-600, -700, and -800 series airplanes: A PCU having P/N 251A301-(X) and a S/N 0299 or lower.

(d) (1) Within 30 days after accomplishing the initial displacement test required by paragraph (a) of this AD: Submit a report of the testing to the Manager, Seattle Aircraft Certification Office (ACO), FAA, Transport Airplane Directorate, 1601 Lind Avenue, SW., Renton, Washington 98055-4056; fax (425) 227-1181. The report must include the displacement testing results (both positive and negative findings), test data for any failed valve assemblies, a description of any discrepancies if found, the part number and serial number of each rudder PCU tested, and the airplane serial number.

(2) Within 30 days after accomplishing any repetitive displacement testing required by paragraph (a) of this AD: Submit a report of any failed valve assembly to the Manager, Seattle Aircraft Certification Office (ACO), FAA, Transport Airplane Directorate, 1601 Lind Avenue, SW., Renton, Washington 98055-4056; fax (425) 227-1181. The report must include the displacement testing results of any failed valve assembly, test data for any failed valve assemblies, a description of any discrepancies found, the part number and serial number of each rudder PCU with a failed valve assembly, and the airplane serial number.

(3) Within 30 days after accomplishing the initial displacement test required by paragraph (a) of this AD: Submit failed valve assemblies for analysis to Parker Hannifin Corporation, Chief Engineer, Customer Support Operations, 16666 Von Karman Avenue, Irvine, California 92606.

(4) Information collection requirements contained in this regulation have been approved by the Office of Management and Budget (OMB) under the provisions of the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.) and have been assigned OMB Control Number 2120-0056.

Alternative Methods of Compliance

(e) 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. 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 4: Information concerning the existence of approved alternative methods of compliance with this AD, if any, may be obtained from the Seattle ACO.

Special Flight Permits

(f) 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.

Incorporation by Reference

(g) The actions shall be done in accordance with Boeing Alert Service Bulletin 737- 27A1221, Revision 1, dated January 28, 1999, or Boeing Alert Service Bulletin 737-27A1222, Revision 1, dated January 28, 1999. This incorporation by reference of those documents was previously approved by the Director of the Federal Register as of June 28, 1999 (64 FR 27905, May 24, 1999). Copies may be obtained from Boeing Commercial Airplane Group, P. O. Box 3707, Seattle, Washington 98124-2207. Copies may be inspected at the FAA, Transport Airplane Directorate, 1601 Lind Avenue, SW., Renton, Washington; or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

(h) The effective date of this amendment remains June 28, 1999.

Footer Information

Comments