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## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

#### 14 CFR Part 39

[Docket No. FAA-2010-0173; Directorate Identifier 2009-NM-076-AD; Amendment 39-16374; AD 2010-15-08]

RIN 2120-AA64

**Airworthiness Directives; The Boeing Company Model 737-100, -200, -200C, -300, -400, and -500 Series Airplanes**

**AGENCY:** Federal Aviation Administration (FAA), Department of Transportation (DOT).

**ACTION:** Final rule.

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**SUMMARY:** The FAA is superseding an existing airworthiness directive (AD), which applies to all Model 737-100, -200, -200C, -300, -400, and -500 series airplanes. That AD currently requires repetitive inspections to find cracks, fractures, or corrosion of each carriage spindle of the left and right outboard mid-flaps, and corrective action if necessary. That AD also currently requires repetitive gap checks of the inboard and outboard carriage of the outboard mid-flaps to detect fractured carriage spindles, and corrective actions if necessary. This new AD requires any new or serviceable carriage spindle installed per the requirements of the existing AD to meet minimum allowable diameter measurements taken at three locations. This AD also requires new repetitive inspections, measurements, and overhaul of the carriage spindles, and applicable corrective actions. In addition, this AD requires replacing any carriage spindle when it has reached its maximum life limit. This AD results from reports of fractures that resulted from stress corrosion and pitting along the length of the spindle and spindle diameter, and additional reports of corrosion on the outboard flap carriage spindles. We are issuing this AD to detect and correct cracked, corroded, or fractured carriage spindles, and to prevent severe flap asymmetry, which could result in reduced control or loss of controllability of the airplane.

**DATES:** This AD becomes effective August 31, 2010.

The Director of the Federal Register approved the incorporation by reference of certain publications listed in the AD as of August 31, 2010.

On December 4, 2003 (68 FR 67027, December 1, 2003), the Director of the Federal Register approved the incorporation by reference of a certain other publication listed in the AD.

**ADDRESSES:** For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Data & Services Management, P. O. Box 3707, MC 2H-65, Seattle, Washington 98124-

2207; telephone 206-544-5000, extension 1; fax 206-766-5680; e-mail me.boecom@boeing.com; Internet https://www.myboeingfleet.com.

## Examining the AD Docket

You may examine the AD docket on the Internet at <http://www.regulations.gov>; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and other information. The address for the Docket Office (telephone 800-647-5527) is the Document Management Facility, U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE., Washington, DC 20590.

**FOR FURTHER INFORMATION CONTACT:** Nancy Marsh, Aerospace Engineer, Airframe Branch, ANM-120S, FAA, Seattle Aircraft Certification Office, 1601 Lind Avenue, SW., Renton, Washington 98057-3356; telephone (425) 917-6440; fax (425) 917-6590.

## SUPPLEMENTARY INFORMATION:

### Discussion

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to include an AD that supersedes AD 2003-24-08, Amendment 39-13377 (68 FR 67027, December 1, 2003). The existing AD applies to all Model 737-100, -200, -200C, -300, -400, and -500 series airplanes. That NPRM was published in the Federal Register on March 1, 2010 (75 FR 9137). That NPRM proposed to continue to require repetitive gap checks of the inboard and outboard carriage of the outboard mid-flaps to detect fractured carriage spindles, and corrective actions if necessary, and continue to require repetitive inspections to find cracks, fractures, or corrosion of each carriage spindle of the left and right outboard mid-flaps. That NPRM also proposed to require any new or serviceable carriage spindle installed per the requirements of the existing AD to meet minimum allowable diameter measurements taken at three locations. That NPRM proposed to require new repetitive inspections, measurements, and overhaul of the carriage spindles, and applicable corrective actions. In addition, that NPRM also proposed to require replacing any carriage spindle when it has reached its maximum life limit.

### Actions Since Original NPRM Was Issued

Since we issued the original NPRM, there has been an in-service event of a dual fracture of the outboard flap carriages. This event is currently under investigation. As a result, we consider this AD to be interim action. If final action is later identified, we might consider further rulemaking then.

### Explanation of Changes to AD

We have added paragraph (t)(4) to this final rule to provide credit for actions done in accordance with previously issued AMOCs for individual repairs. In paragraph (m) of this AD, we have also referenced the most current issue of the Boeing (737) Standard Overhaul Practices Manual for actions done as of the effective date of this AD.

### Comments

We provided the public the opportunity to participate in the development of this AD. We have considered the comments that have been received on the NPRM.

## Support for the NPRM

Boeing supports the intent of the NPRM.

## Request for Stricter Inspection and Overhaul Limits in Lieu of Life Limits

Safair states that it has experienced only one flap carriage spindle failure before AD 2003-24-08 was issued. Safair states that its main concern is scrapping serviceable carriages in order to enforce the life limits on the flap carriages. Safair states that stricter inspections and overhaul requirements would ensure that stress and pitting corrosion are detected and corrected, which would avoid failures and would extend the life of the flap carriages.

We do not agree that substituting stricter inspection and overhaul limits for life limits would address the unsafe condition. Since AD 2003-24-08 was issued, we have received many additional reports of carriage spindle fractures, including fractures caused by fatigue. Because of the difficulty in detecting small cracks and the rapid crack growth in these parts, in combination with the concerns with reduced fatigue life of reworked and overhauled parts, the most effective way to maintain the continued operational safety of the fleet is to mandate life limits. We have not changed the AD in regard to this issue.

## Request for Clarification of Requirements to Remove Flap Carriage

KLM requests clarification concerning the requirements to remove the carriage spindle in order to perform a detailed inspection for corrosion, pitting, cracking, and measurement of some minimal allowable spindle diameters. KLM points out that the times specified for this action are the same as for the initial gap check and the nondestructive test for new carriage spindles. KLM asks whether the removal of the carriage spindle is required at 12,000 flight cycles, if the initial or repetitive gap check and the non-destructive test (NDT) at the same time are still useful. KLM further states that carriage spindles that receive a thorough detailed inspection and have been found to be serviceable do not require a gap check or an NDT inspection at the times specified in the 12,000- to 20,000-flight-cycle range as specified in Table 1 and Table 2 of Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003. KLM states that the gap checks and NDTs are still required, although at a different time interval after completing the requirements of paragraph (o) of the NPRM.

We agree that clarification might be necessary. Paragraph (o) of this final rule requires the overhaul to be performed on the new carriage spindle before the accumulation of 12,000 flight cycles. Therefore, the new carriage spindle should not accumulate more than 11,999 flight cycles before being overhauled in order to comply with this requirement. Paragraph (g) of this AD refers to Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003, for the compliance times for the gap checks and NDT inspections. Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003, states that the gap check and NDT inspections are not required for a new flap carriage spindle that has accumulated fewer than 12,000 flight cycles without being overhauled.

Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003, requires relatively stringent gap checks and NDT inspections for flap carriage spindles that have accumulated 12,000 or more flight cycles on them since being overhauled. This requirement should become obsolete as this AD requires that all spindles be overhauled before accumulating 12,000 flight cycles since new or overhauled.

We have not changed the AD in regard to this issue.

## Conclusion

We have carefully reviewed the available data, including the comments that have been received, and determined that air safety and the public interest require adopting the AD with the changes

described previously. We have determined that these changes will neither increase the economic burden on any operator nor increase the scope of the AD.

### Costs of Compliance

There are about 2,852 airplanes of the affected design in the worldwide fleet. The following table provides the estimated costs for U.S. operators to comply with this AD.

Estimated Costs						
Action	Work hours	Average labor rate per hour	Parts	Cost per airplane	Number of U.S.-registered airplanes	Fleet cost
Inspections (required by AD 2003-24-08)	12	\$85	None	\$1,020 per inspection cycle	652	\$665,040 per inspection cycle
Inspections and measurements (new actions)	2	\$85	None	\$170 per inspection and measurement cycle	652	\$110,840 per inspection and measurement cycle
Overhauls (new actions)	16	\$85	\$28,000 <sup>1</sup>	\$29,360 per overhaul cycle	652	\$19,142,720 per overhaul cycle
Replacements (new actions)	16	\$85	\$60,000 <sup>2</sup>	\$61,360 per replacement cycle	652	\$40,006,720 per replacement cycle

<sup>1</sup> \$7,000 per spindle; 4 spindles per airplane.

<sup>2</sup> \$15,000 per spindle; 4 spindles per airplane.

The cost impact figures discussed above are based on assumptions that no operator has yet accomplished any of the actions required by this AD, and that no operator would accomplish those actions in the future if this AD were not adopted. However, we have been advised that the carriage spindles are already being overhauled and replaced on some affected airplanes. In addition, the replacement cycle is approximately every 20 years. Therefore, the future economic cost impact of this rule on U.S. operators is expected to be less than the cost impact figures indicated above.

### Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

## Regulatory Findings

We have determined that this AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect 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.

For the reasons discussed above, I certify that this AD:

- (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.

We prepared a regulatory evaluation of the estimated costs to comply with this AD and placed it in the AD docket. See the ADDRESSES section for a location to examine the regulatory evaluation.

## List of Subjects in 14 CFR Part 39

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

## Adoption of the Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 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. The Federal Aviation Administration (FAA) amends § 39.13 by removing Amendment 39-13377 (68 FR 67027, December 1, 2003) and by adding the following new airworthiness directive (AD):



**2010-15-08 The Boeing Company:** Amendment 39-16374. Docket No. FAA-2010-0173; Directorate Identifier 2010-NM-076-AD.

#### Effective Date

- (a) This AD becomes effective August 31, 2010.

#### Affected ADs

- (b) This AD supersedes AD 2003-24-08, Amendment 39-13377.

#### Applicability

- (c) This AD applies to all The Boeing Company Model 737-100, -200, -200C, -300, -400, and -500 series airplanes, certificated in any category.

#### Subject

- (d) Air Transport Association (ATA) of America Code 57: Wings.

#### Unsafe Condition

- (e) This AD results from a report indicating that the inboard and outboard carriage spindles were fractured on the right outboard flap during approach to landing. We are issuing this AD to detect and correct cracked, corroded, or fractured carriage spindles and to prevent severe flap asymmetry, which could result in reduced control or loss of controllability of the airplane.

#### Compliance

- (f) You are responsible for having the actions required by this AD performed within the compliance times specified, unless the actions have already been done.

#### RESTATEMENT OF CERTAIN REQUIREMENTS OF AD 2003-24-08, WITH UPDATED SERVICE INFORMATION

#### Compliance Times

- (g) The tables in paragraph 1.E., "Compliance" of Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003, specify the compliance times for paragraphs (g) through (k) of this AD. For carriage spindles that have accumulated the number of flight cycles or years in service specified in the "Threshold" column of the tables, accomplish the gap check and nondestructive test (NDT) and general visual inspections specified in paragraphs (h) and (j) of this AD within the corresponding interval after December 4, 2003 (the effective date AD 2003-24-08), as specified in the "Interval" column. Repeat the gap check and NDT and general visual inspections at the same intervals, except:

(1) The gap check does not have to be done at the same time as an NDT inspection; after doing an NDT inspection, the interval for doing the next gap check can be measured from the NDT inspection; and

(2) As carriage spindles gain flight cycles or years in service and move from one category in the "Threshold" column to another, they are subject to the repetitive inspection intervals corresponding to the new threshold category.

### **Work Package 2: Gap Check**

(h) Perform a gap check of the inboard and outboard carriage of the left and right outboard mid-flaps to determine if there is a positive indication of a severed carriage spindle, in accordance with Work Package 2 of paragraph 3.B., "Work Instructions" of Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003.

### **Work Package 2: Corrective Actions**

(i) If there is a positive indication of a severed carriage spindle during the gap check required by paragraph (h) of this AD, before further flight, remove the carriage spindle and install a new or serviceable carriage spindle in accordance with the "Work Instructions" of Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003; or Boeing Alert Service Bulletin 737-57A1218, Revision 5, dated February 9, 2009. If, as a result of the detailed inspection described in paragraph 4.b. of Work Package 2 of Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003, a carriage spindle is found not to be severed and no corrosion and no cracking is present, it can be reinstalled on the mid-flap in accordance with Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003; or Boeing Alert Service Bulletin 737-57A1218, Revision 5, dated February 9, 2009. After the effective date of this AD, use only Boeing Alert Service Bulletin 737-57A1218, Revision 5, dated February 9, 2009.

### **Work Package 1: Inspections**

(j) Perform a NDT inspection and general visual inspection for each carriage spindle of the left and right outboard mid-flaps to detect cracks, corrosion, or severed carriage spindles, in accordance with the "Work Instructions" of Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003.

### **Work Package 1: Corrective Actions**

(k) If any corroded, cracked, or severed carriage spindle is found during any inspection required by paragraph (j) of this AD, before further flight, remove the carriage spindle and install a new or serviceable carriage spindle in accordance with the "Work Instructions" of Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003; or Boeing Alert Service Bulletin 737-57A1218, Revision 5, dated February 9, 2009. After the effective date of this AD, use only Boeing Alert Service Bulletin 737-57A1218, Revision 5, dated February 9, 2009.

### **Parts Installation**

(l) Except as provided in paragraph (i) of this AD: As of December 4, 2003, no person may install on any airplane a carriage spindle that has been removed as required by paragraph (i) or (k) of this AD, unless it has been overhauled in accordance with the "Work Instructions" of Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003; or Boeing Alert Service Bulletin 737-57A1218, Revision 5, dated February 9, 2009. After the effective date of this AD, use only Boeing Alert Service Bulletin 737-57A1218, Revision 5, dated February 9, 2009. To be eligible

for installation under this paragraph, the carriage spindle must have been overhauled in accordance with the requirements of paragraph (m) of this AD.

(m) During accomplishment of any overhaul specified in paragraph (l) of this AD, use the procedures specified in paragraphs (m)(1) and (m)(2) of this AD during application of the nickel plating to the carriage spindle in addition to those specified in Chapter 20-42-09, Electrodeposited Nickel Plating, of the Boeing (737) Standard Overhaul Practices Manual. As of the effective date of this AD, use only Chapter 20-42-09, Electrodeposited Nickel Plating, of the Boeing (737) Standard Overhaul Practices Manual, Revision 25, dated July 1, 2009.

(1) The maximum deposition rate of the nickel plating in any one plating/baking cycle must not exceed 0.002-inches-per-hour.

(2) Begin the hydrogen embrittlement relief bake within 10 hours after application of the plating, or less than 24 hours after the current was first applied to the part, whichever is first.

### **Exception to Reporting Recommendations in Certain Service Bulletins**

(n) Although Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003, recommends that operators report inspection findings to the manufacturer, this AD does not contain such a reporting requirement.

### **NEW ACTIONS REQUIRED BY THIS AD**

#### **Inspections, Measurements, and Overhauls of the Carriage Spindle**

(o) At the applicable times specified in paragraph (o)(1) or (o)(2) of this AD: Do the detailed inspection for corrosion, pitting, and cracking of the carriage spindle, the magnetic particle inspection for cracking of the carriage spindle, measurements of the spindle to determine if it meets the allowable minimum diameter, and overhauls, and applicable corrective actions by accomplishing all the applicable actions specified in the Accomplishment Instructions of Boeing Alert Service Bulletin 737-57A1218, Revision 5, dated February 9, 2009. The applicable corrective actions must be done before further flight. Repeat these actions thereafter at intervals not to exceed 12,000 flight cycles on the carriage spindle or 8 years, whichever comes first.

(1) For Model 737-100, -200, -200C series airplanes, at the later of the times specified in paragraph (o)(1)(i) or (o)(1)(ii) of this AD:

(i) Before the accumulation of 12,000 total flight cycles on the carriage spindle since new or overhauled, or within 8 years after the installation of the new or overhauled part, whichever comes first.

(ii) Within 1 year after the effective date of this AD.

(2) For Model -300, -400, and -500 series airplanes, at the later of the times specified in paragraph (o)(2)(i) or (o)(2)(ii) of this AD:

(i) Before the accumulation of 12,000 total flight cycles on the carriage spindle since new or overhauled, or within 8 years after the installation of the new or overhauled part, whichever comes first.

(ii) Within 2 years after the effective date of this AD.

#### **Replacement of the Carriage Spindle**

(p) For Model 737-100, -200, -200C series airplanes: Replace the carriage spindle with a new or documented (for which the service life, in total flight cycles, is known) carriage spindle, in accordance with Boeing Alert Service Bulletin 737-57A1218, Revision 5, dated February 9, 2009, at the later of the times specified in paragraphs (p)(1) and (p)(2) of this AD, except as required by



paragraph (r) of this AD. Overhauling the carriage spindles does not zero-out the flight cycles. Total flight cycles accumulate since new.

(1) Before the accumulation of 48,000 total flight cycles on the new or overhauled carriage.

(2) Within three years or 7,500 flight cycles after the effective date of this AD, whichever occurs first.

(q) For Model 737-300, -400, and -500 series airplanes: Replace the carriage spindle with a new or documented (for which the service life, in flight cycles, is known) carriage spindle, in accordance with Boeing Alert Service Bulletin 737-57A1218, Revision 5, dated February 9, 2009, at the later of the times specified in paragraphs (q)(1) and (q)(2) of this AD, except as required by paragraph (r) of this AD. Overhauling the carriage spindles does not zero-out the flight cycles. Total flight cycles accumulate since new.

(1) Before the accumulation of 48,000 total flight cycles on the new or overhauled carriage.

(2) Within six years or 15,000 flight cycles after the effective date of this AD, whichever occurs first.

(r) For airplanes with an undocumented carriage: Do the applicable actions specified in paragraph (p) or (q) of this AD at the applicable time specified in paragraph (r)(1) or (r)(2) of this AD.

(1) For Model 737-100, -200, -200C series airplanes: Do the actions specified in paragraph (p) of this AD at the time specified in paragraph (p)(2) of this AD.

(2) For Model -300, -400, and -500 series airplanes: Do the actions specified in paragraph (q) of this AD at the time specified in paragraph (q)(2) of this AD.

### **Repetitive Replacements of Carriage Spindle**

(s) For all airplanes: Repeat the replacement of the carriage spindle specified by paragraph (p) or (q) of this AD, as applicable, thereafter at intervals not to exceed 48,000 total flight cycles on the new or overhauled carriage spindle.

### **Alternative Methods of Compliance (AMOCs)**

(t)(1) The Manager, Seattle Aircraft Certification Office (ACO), FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. Send information to ATTN: Nancy Marsh, Aerospace Engineer, Airframe Branch, ANM-120S, FAA, Seattle Aircraft Certification Office, 1601 Lind Avenue, SW., Renton, Washington 98057-3356; telephone (425) 917-6440; fax (425) 917-6590. Or, e-mail information to 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) To request a different method of compliance or a different compliance time for this AD, follow the procedures in 14 CFR 39.19. Before using any approved AMOC on any airplane to which the AMOC applies, notify your principal maintenance inspector (PMI) or principal avionics inspector (PAI), as appropriate, or lacking a principal inspector, your local Flight Standards District Office. The AMOC approval letter must specifically reference this AD.

(3) An AMOC that provides an acceptable level of safety may be used for any repair required by this AD, if it is approved by the Boeing Commercial Airplanes Organization Designation Authorization (ODA) that has been authorized by the Manager, Seattle ACO, to make those findings. For a repair method to be approved, the repair must meet the certification basis of the airplane, and the approval must specifically refer to this AD.

(4) AMOCs previously approved in accordance with AD 2003-24-08, Amendment 39-13377, for individual repairs are acceptable for compliance with the corresponding provisions of this AD. All other existing AMOCs are not acceptable.

## Material Incorporated by Reference

(u) You must use Boeing Alert Service Bulletin 737-57A1218, Revision 5, dated February 9, 2009; Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003; and Chapter 20-42-09, Electrodeposited Nickel Plating, of the Boeing (737) Standard Overhaul Practices Manual, Revision 25, dated July 1, 2009, to do the actions required by this AD, unless the AD specifies otherwise.

(1) The Director of the Federal Register approved the incorporation by reference of Boeing Alert Service Bulletin 737-57A1218, Revision 5, dated February 9, 2009; and Chapter 20-42-09, Electrodeposited Nickel Plating, of the Boeing (737) Standard Overhaul Practices Manual, Revision 25, dated July 1, 2009; under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) The Director of the Federal Register previously approved the incorporation by reference of Boeing Alert Service Bulletin 737-57A1277, Revision 1, dated November 25, 2003, on December 4, 2003 (68 FR 67027, December 1, 2003).

(3) For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Data & Services Management, P.O. Box 3707, MC 2H-65, Seattle, Washington 98124-2207; telephone 206-544-5000, extension 1; fax 206-766-5680; e-mail me.boecom@boeing.com; Internet <https://www.myboeingfleet.com>.

(4) You may review copies of the service information at the FAA, Transport Airplane Directorate, 1601 Lind Avenue, SW., Renton, Washington. For information on the availability of this material at the FAA, call 425-227-1221.

(5) You may also review copies of the service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

Issued in Renton, Washington, on July 14, 2010.

Ali Bahrami,  
Manager, Transport Airplane Directorate,  
Aircraft Certification Service.