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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2015-7527; Directorate Identifier 2015-NM-094-AD; Amendment 39-18686; AD 2016-21-05]

RIN 2120-AA64

Airworthiness Directives; The Boeing Company Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: We are adopting a new airworthiness directive (AD) for certain The Boeing Company Model 777-200, -200LR, -300, and -300ER series airplanes. This AD was prompted by a report indicating that the manufacturer discovered locations where the control components and wiring of the left and right engine fuel spar valves do not have adequate physical separation to meet the redundant system separation requirements. This AD requires modifying the wiring, and installing a new relay bracket and new location for the relay on the left and right engine fuel spar valves. This AD also requires an inspection to identify the part number of the motor operated valve (MOV) actuators for the left and right engine fuel spar valves; replacement of specified MOV actuators with new MOV actuators; certain bonding resistance measurements; and applicable corrective actions. We are issuing this AD to prevent loss of control of both the left and right engine fuel spar valves during a single event, such as local wire bundle damage or a wire bundle fire, which could cause both engines to shut down or result in the inability to control an engine fire.

DATES: This AD is effective December 19, 2016.

The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of December 19, 2016.

ADDRESSES: For service information identified in this final rule, contact Boeing Commercial Airplanes, Attention: Data & Services Management, P.O. Box 3707, MC 2H-65, Seattle, WA 98124-2207; telephone 206-544-5000, extension 1; fax 206-766-5680; Internet <https://www.myboeingfleet.com>. You may view this referenced service information at the FAA, Transport Airplane Directorate, 1601 Lind Avenue SW., Renton, WA. For information on the availability of this material at the FAA, call 425-227-1221. It is also available on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2015-7527.

Examining the AD Docket

You may examine the AD docket on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2015-7527; 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 (phone: 800-647-5527) is Docket 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: Brendan Shanley, Aerospace Engineer, Systems and Equipment Branch, ANM-130S, FAA, Seattle Aircraft Certification Office, 1601 Lind Avenue SW., Renton, WA 98057-3356; telephone: 425-917-6492; fax: 425-917-6590; email: brendan.shanley@faa.gov.

SUPPLEMENTARY INFORMATION:

Discussion

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to certain The Boeing Company Model 777-200, -200LR, -300, and -300ER series airplanes. The NPRM published in the Federal Register on December 23, 2015 (80 FR 79754) ("the NPRM"). The NPRM was prompted by a report indicating that the manufacturer discovered locations where the control components and wiring of the left and right engine fuel spar valves do not have adequate physical separation to meet the redundant system separation requirements. The NPRM proposed to require modifying the wiring, and installing a new relay bracket and new location for the relay on the left and right engine fuel spar valves. The NPRM also proposed to require an inspection to identify the part number of the MOV actuators for the left and right engine fuel spar valves; replacement of specified MOV actuators with new MOV actuators; certain bonding resistance measurements; and applicable corrective actions. We are issuing this AD to prevent loss of control of both the left and right engine fuel spar valves during a single event, such as local wire bundle damage or a wire bundle fire, which could cause both engines to shut down or result in the inability to control an engine fire.

Comments

We gave the public the opportunity to participate in developing this AD. The following presents the comments received on the NPRM and the FAA's response to each comment. Boeing stated that it has reviewed the NPRM and concurs with the contents of the NPRM.

Request To Reduce the Compliance Time

One commenter, Geoffrey Barrance, requested that we reduce the compliance time in paragraph (g) of the proposed AD. Mr. Barrance stated he is concerned that the timescale proposed for implementing the required modification, 60 months after the effective date of the AD, is too long. Mr. Barrance commented that the unsafe condition is a common failure affecting the continued operation of both engines, and therefore is critical to the safe flight and landing of any airplane.

We disagree with the commenter's request. It is important to note that while the commenter has indicated there is currently a common mode failure affecting the continued operation of both engines, it is more accurate to say that certain airplanes are currently in a configuration that makes them vulnerable to a single event causing a common mode failure. However, there have been no reports of any events causing this condition. This AD is intended to eliminate that condition.

The compliance time is determined to be appropriate in consideration of the risk and the safety implications, the average utilization rate of the affected fleet, the practical aspects of an orderly modification of the fleet during regular maintenance periods, and the availability of required modification parts. In addition to our own criteria, we have also considered the manufacturer's safety assessment and recommendation for the compliance time. The compliance time accounts for the risk to the fleet, availability of parts, and other factors. Therefore, we have determined that the compliance time is acceptable. We have not changed this AD in this regard.

Request To Remove the Concurrent Requirements

All Nippon Airways (ANA), Japan Airlines (JAL), and United Airlines (UAL) requested that we remove the concurrent requirement for accomplishing Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015. JAL and ANA stated that there was no relationship between the wiring change and the actuator replacement. ANA, JAL, and UAL commented that Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015, is already mandated by AD 2013-05-03, Amendment 39-17375 (78 FR 17290, March 21, 2013) ("AD 2013-05-03"), and it addressed MOV actuator part number (P/N) MA20A1001-1; therefore, it should not be a concurrent requirement. ANA also added that because the MOV actuator has been addressed, paragraphs (i)(2) and (i)(3) of the proposed AD should not be included.

We partially agree with the commenters. We agree that the actions in Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015, are the same actions that are required by AD 2013-05-03 in accordance with Boeing Service Bulletin 777-28A0034, Revision 2, dated September 20, 2010, with a compliance date of April 25, 2018. Because of the overlap in compliance times, the action required by AD 2013-05-03 may not be fully completed by the time the requirements of this AD become effective. To ensure that the actuator change, in accordance with Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015, is done prior to the wiring change in accordance with Boeing Special Attention Service Bulletin 777-28-0061, Revision 2, dated May 4, 2015, we have required Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015, as a concurrent requirement in this AD. Without this concurrent requirement, it is possible that this AD could approve certain configurations that are not compliant and safe. The concurrent requirement eliminates this possibility. The requirements of Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015, and related credit for previous actions, will remain as stated. We have not changed this AD in this regard.

Request To Use Boeing Information Notice for Completing the Requirements in the AD

ANA requested that we include Boeing Service Bulletin Information Notice 777-28-0061, IN 03, dated November 16, 2015, to this AD to allow the operators to complete the proposed requirements of the NPRM.

We partially agree with the commenter's request. We cannot include Boeing Service Bulletin Information Notice 777-28-0061, IN 03, dated November 16, 2015, as an appropriate source of service information in this AD because it is not an FAA-approved document. However, we acknowledge that for certain airplanes, Figure 22, Sheet 9, of Boeing Special Attention Service Bulletin 777-28-0061, Revision 2, dated May 4, 2015, includes an editorial error, which shows incorrect wire routing. Boeing Service Bulletin Information Notice 777-28-0061, IN 03, dated November 16, 2015, allows for a modification of Group 2 airplanes that meets the requirements of the AD without an additional burden to operators. We have included a corrected figure in paragraph (h) of this AD to address this issue.

In addition, Figure 11, Sheet 1, of Boeing Special Attention Service Bulletin 777-28-0061, Revision 2, dated May 4, 2015, is incorrect in that it shows the cap and stow of an existing wire, W4255-1002-20, which is terminated at splice SP41201. The correct wire number to be capped and

stowed is W6251-1002-20, which is terminated at splice SP41201. We have clarified this information in paragraph (h)(2) of this AD.

Request To Clarify the Terminating Action

JAL and UAL requested that we clarify the terminating action specified in the proposed rule. JAL asked that Boeing Service Bulletin 777-28A0034 be used as a terminating action for the requirements of the proposed rule. UAL stated that since AD 2013-05-03 already addressed MOV actuator P/N MA20A2027 and P/N MA30A1001, it contradicts airworthiness limitations (AWL) 28-AWL-MOV, which was mandated in AD 2015-19-01, Amendment 39-18264 (80 FR 55521, dated September 16, 2015) ("AD 2015-19-01").

We agree that clarification is necessary. We agree that certain configurations in Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015, in conjunction with previous airplane configurations, alleviate the need to do the AWL task implemented by AD 2013-05-03 because the configurations are outside the applicability of that AWL. However, we disagree with using Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015, as a terminating action because the requirement of AD 2015-19-01 is to implement the airworthiness limitations items (ALI) into an operator's maintenance program, and this must be done regardless of the configuration of the airplane. Further, certain MOV actuator part numbers can be installed that will place an airplane in the applicability of AWL 28-AWL-MOV, thus requiring periodic inspections to ensure safe operation. Each operator has the option to select a configuration best for its circumstances and can evaluate its configurations and determine if AWL 28-AWL-MOV is applicable to their fleet configuration. We have not changed this AD in this regard.

Request To Review the Design and Certification Process

Geoffrey Barrance requested that we review the design and certification process that allowed for the unsafe condition to exist, as well as a review of designs in other airplanes with similar unsafe conditions. Mr. Barrance commented that the unsafe condition indicated a failure has occurred in the design and certification process for the airplane type. Mr. Barrance also commented that a review of the airplane design is required to prevent the implementation of common mode fault exposures for redundant systems.

We acknowledge the commenter's concerns. We continuously evaluate our certification system and procedures and improve them when problems are found. If the FAA is made aware of potential design deficiencies occurring on a certificated product, we conduct an investigation, evaluate the manufacturer's root-cause analysis, and make a determination whether or not an unsafe condition exists. We then take appropriate action to mitigate the unsafe condition and to identify and incorporate certification system process improvements for future designs. Furthermore, the manufacturer performs a cross model evaluation to determine if the condition exists on other models. We agree with the manufacturer's actions in this regard. We have not changed this AD regarding this issue.

Conclusion

We reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting this AD with the changes described previously and minor editorial changes. We have determined that these minor changes:

- Are consistent with the intent that was proposed in the NPRM for correcting the unsafe condition; and
- Do not add any additional burden upon the public than was already proposed in the NPRM.

We also determined that these changes will not increase the economic burden on any operator or increase the scope of this AD.

Related Service Information Under 1 CFR Part 51

We reviewed Boeing Special Attention Service Bulletin 777-28-0061, Revision 2, dated May 4, 2015. The service information describes procedures for modifying the wiring, and installing a new relay bracket and new location for the relay on the left and right engine fuel spar valves.

We have also reviewed Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015. The service information describes procedures for an inspection of the MOV actuators of the left and right engine fuel spar valves for (P/N) MA20A1001-1, replacement of MOV actuators, measurement of the electrical resistance of the bond from the adapter plate to the airplane structure, and applicable corrective actions.

This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in the ADDRESSES section.

Costs of Compliance

We estimate that this AD affects 133 airplanes of U.S. registry.

We estimate the following costs to comply with this AD:

Estimated Costs

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Installation and modification	119 work-hours × \$85 per hour = \$10,115	Up to \$3,780 depending on airplane configuration	Up to \$13,895 depending on airplane configuration	Up to \$1,848,035 depending on airplane configuration.
Inspection of MOV actuators [concurrent requirements]	1 work-hour × \$85 per hour = \$85	\$0	\$85	\$11,305.

We estimate the following costs to do any necessary replacements and bonding resistance measurements that would be required based on the results of the inspection. We have no way of determining the number of aircraft that might need these replacements:

On-Condition Costs

Action	Labor cost	Parts cost	Cost per product
Replacement of MOV actuators for the left and right engine fuel spar valves	Up to 105 work-hours × \$85 per hour = \$8,925	Up to \$10,954	Up to \$19,879.
Bonding resistance measurements	1 work-hour × \$85 per hour = \$85	\$0	\$85.

We have received no definitive data on the costs of the corrective actions for the bonding resistance measurement in this AD.

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

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),
- (3) Will not affect intrastate aviation in Alaska, and
- (4) 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.

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 FAA amends § 39.13 by adding the following new airworthiness directive (AD):



2016-21-05 The Boeing Company: Amendment 39-18686; Docket No. FAA-2015-7527; Directorate Identifier 2015-NM-094-AD.

(a) Effective Date

This AD is effective December 19, 2016.

(b) Affected ADs

None.

(c) Applicability

This AD applies to The Boeing Company Model 777-200, -200LR, -300, and -300ER series airplanes, certificated in any category, as identified in Boeing Special Attention Service Bulletin 777-28-0061, Revision 2, dated May 4, 2015.

(d) Subject

Air Transport Association (ATA) of America Code 2822, Fuel Boost Pump.

(e) Unsafe Condition

This AD was prompted by a report indicating that the manufacturer discovered locations where the control components and wiring of the left and right engine fuel spar valves do not have adequate physical separation to meet the redundant system separation requirements. We are issuing this AD to prevent loss of control of both the left and right engine fuel spar valves during a single event, such as local wire bundle damage or a wire bundle fire, which could cause both engines to shut down or result in the inability to control an engine fire.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Modification

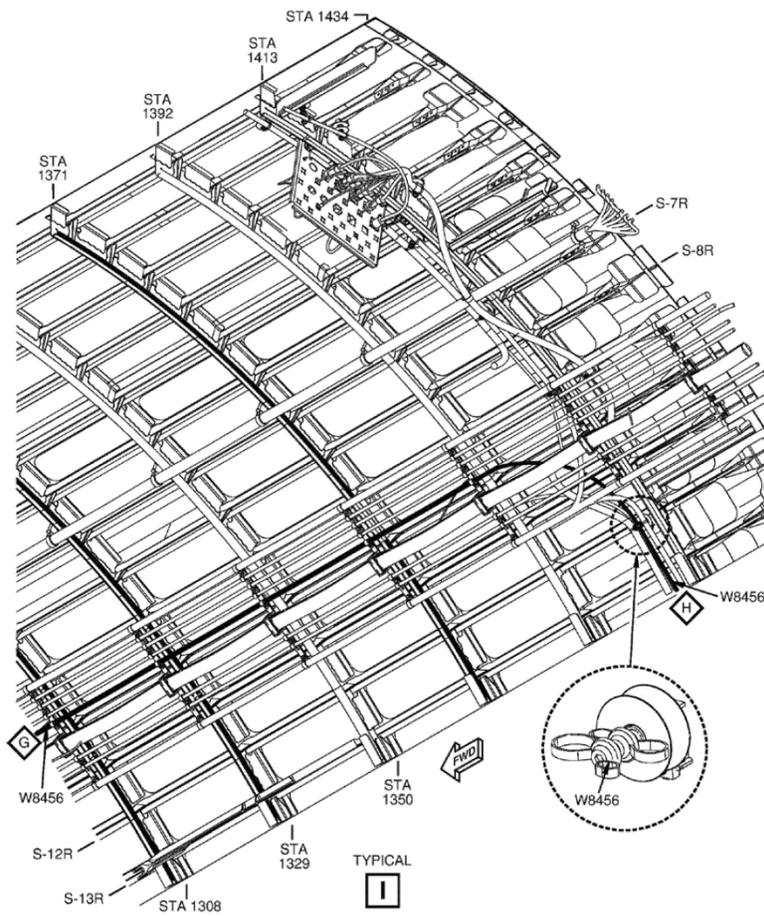
Within 60 months after the effective date of this AD, modify the wiring and install new relay brackets in new locations to allow installation of new relays for the left and right engine fuel spar valves, in accordance with the Accomplishment Instructions of Boeing Special Attention Service Bulletin 777-28-0061, Revision 2, dated May 4, 2015, except as required by paragraph (h) of this AD.

(h) Exceptions to the Service Information

(1) Where Boeing Special Attention Service Bulletin 777-28-0061, Revision 2, dated May 4, 2015, specifies to use Figure 22, Sheet 9, for the wiring installation of the right engine fuel spar valve, this AD requires using figure 1 to paragraph (h) of this AD.

(2) Boeing Special Attention Service Bulletin 777-28-0061, Revision 2, dated May 4, 2015, specifies to use Figure 11, Sheet 1, for the wiring change at E2-6–Shelf to Disconnect Panel and Splice Area. The figure shows the capping and stowing of an existing wire, W4255-1002-20, which is terminated at splice SP41201. The wire number is incorrect. The correct wire number to cap and stow is W6251-1002-20, which is terminated at splice SP41201.

Figure 1 to paragraph (h) of this AD: Wiring Installation - Right Engine Fuel Spar Valve



(i) Concurrent Requirements

(1) Prior to or concurrently with accomplishing the requirements of paragraph (g) of this AD: Do an inspection of the motor operated valve (MOV) actuators of the left and right engine fuel spar valves for part number (P/N) MA20A1001-1, in accordance with the Accomplishment Instructions of Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015. A review of airplane maintenance records is acceptable in lieu of this inspection if the part number can be conclusively determined from that review.

(2) If any MOV actuator having P/N MA20A1001-1 is found during the inspection required by paragraph (i)(1) of this AD, prior to or concurrently with accomplishing the requirements of paragraph (g) of this AD, replace the MOV actuator with either a new or serviceable MOV actuator having P/N MA30A1001, MA30A1017, MA20A2027, or an MOV actuator that meets the criteria

specified in paragraphs (i)(2)(i) and (i)(2)(ii) of this AD; and, as applicable, measure the electrical resistance of the bond from the adapter plate to the airplane structure and, before further flight, do all applicable corrective actions. All actions specified in this paragraph for the left and right engine fuel spar valves must be done in accordance with the Accomplishment Instructions of Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015.

(i) The replacement MOV actuator must be a Boeing part that is approved after the issuance of Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015, by the Manager, Seattle Aircraft Certification Office (ACO), FAA; or the Boeing Commercial Airplanes Organization Designation Authorization (ODA) that has been authorized by the Manager, Seattle ACO, to approve the part.

(ii) The replacement MOV actuator must be fully interchangeable with the part specified in Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015.

(j) Credit for Previous Actions

(1) This paragraph provides credit for the requirements of paragraph (g) of this AD, if those actions were performed before the effective date of this AD using Boeing Special Attention Service Bulletin 777-28-0061, dated October 25, 2010; or Boeing Special Attention Service Bulletin 777-28-0061, Revision 1, dated January 26, 2012; as applicable. These documents are not incorporated by reference in this AD.

(2) This paragraph provides credit for the requirements of paragraph (i) of this AD, if those actions were performed before April 25, 2013 (the effective date of AD 2013-05-03, Amendment 39-17375 (78 FR 17290, March 21, 2013), "AD 2013-05-03"), using Boeing Alert Service Bulletin 777-28A0034, dated August 2, 2007; or Boeing Alert Service Bulletin 777-28A0034, Revision 1, dated May 20, 2010; except that the replacement of MOV actuators of the left and right engine fuel spar valves must also include cap sealing the bonding jumper, as described in Boeing Service Bulletin 777-28A0034, Revision 2, dated September 20, 2010; and provided that the replacement is an MOV actuator identified in paragraph (j)(2)(i) or (j)(2)(ii) of this AD. Boeing Alert Service Bulletin 777-28A0034, dated August 2, 2007, and Boeing Alert Service Bulletin 777-28A0034, Revision 1, dated May 20, 2010, are not incorporated by reference in this AD. Boeing Service Bulletin 777-28A0034, Revision 2, dated September 20, 2010, is incorporated by reference in AD 2013-05-03.

(i) An MOV actuator that has P/N MA30A1001, MA30A1017, or MA20A2027.

(ii) An MOV actuator that has a part number other than P/N MA20A1001-1 and meets the criteria specified in paragraphs (i)(2)(i) and (i)(2)(ii) of this AD.

(3) This paragraph provides credit for the requirements of paragraph (i) of this AD, if those actions were performed before the effective date of this AD using Boeing Service Bulletin 777-28A0034, Revision 2, dated September 20, 2010, which was incorporated by reference in AD 2013-05-03.

(k) Alternative Methods of Compliance (AMOCs)

(1) The Manager, Seattle ACO, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the ACO, send it to the attention of the person identified in paragraph (l)(1) of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(3) An AMOC that provides an acceptable level of safety may be used for any repair, modification, or alteration required by this AD if it is approved by the Boeing Commercial Airplanes

ODA that has been authorized by the Manager, Seattle ACO, to make those findings. To be approved, the repair method, modification deviation, or alteration deviation must meet the certification basis of the airplane and the approval must specifically refer to this AD.

(l) Related Information

(1) For more information about this AD, contact Brendan Shanley, Aerospace Engineer, Systems and Equipment Branch, ANM-130S, FAA, Seattle Aircraft Certification Office, 1601 Lind Avenue SW., Renton, WA 98057-3356; telephone: 425-917-6492; fax: 425-917-6590; email: brendan.shanley@faa.gov.

(2) Service information identified in this AD that is not incorporated by reference is available at the addresses specified in paragraphs (m)(3) and (m)(4) of this AD.

(m) Material Incorporated by Reference

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Boeing Special Attention Service Bulletin 777-28-0061, Revision 2, dated May 4, 2015.

(ii) Boeing Service Bulletin 777-28A0034, Revision 3, dated September 25, 2015.

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

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

(5) You may view this 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/cfr/ibr-locations.html>.

Issued in Renton, Washington, on October 7, 2016.

Michael Kaszycki,
Acting Manager, Transport Airplane Directorate,
Aircraft Certification Service.