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## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **14 CFR Part 39**

**[Docket No. FAA-2023-2403; Project Identifier AD-2023-00888-T; Amendment 39-22893; AD 2024-24-03]**

**RIN 2120-AA64**

### **Airworthiness Directives; The Boeing Company Airplanes**

#### **AGENCY:**

Federal Aviation Administration (FAA), DOT.

#### **ACTION:**

Final rule.

#### **SUMMARY:**

The FAA is adopting a new airworthiness directive (AD) for certain The Boeing Company Model MD-11 and MD-11F airplanes. This AD was prompted by a report of a Model MD-11F airplane experiencing an uncommanded deployment of a thrust reverser in flight at low altitude. This AD requires initial and repetitive detailed inspections and repetitive wire integrity tests of the engine pylon thrust reverser control system wire harnesses, junction box assembly and junction box cover, left-side and right-side thrust reverser electrical harnesses, core (engine compartment) miscellaneous wire harness assembly, and 30-degree bulkhead wire harness assembly; and applicable on-condition actions. This AD also requires reporting inspection results. The FAA is issuing this AD to address the unsafe condition on these products.

#### **DATES:**

This AD is effective January 13, 2025.

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in this AD as of January 13, 2025

#### **ADDRESSES:**

*AD Docket:* You may examine the AD docket at *regulations.gov* under Docket No. FAA-2023-2403; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other information. The address for Docket Operations is U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

*Material Incorporated by Reference:*

- For Boeing material identified in this AD, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminister Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; website [myboeingfleet.com](http://myboeingfleet.com).
- You may view this material at the FAA, Airworthiness Products Section, Operational Safety Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195. It is also available at *regulations.gov* under Docket No. FAA-2023-2403.

**FOR FURTHER INFORMATION CONTACT:**

Tak Kobayashi, Aviation Safety Engineer, FAA, 2200 South 216th St., Des Moines, WA 98198; telephone 206-231-3553; email [takahisa.kobayashi@faa.gov](mailto:takahisa.kobayashi@faa.gov).

**SUPPLEMENTARY INFORMATION:**

**Background**

The FAA 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 MD-11 and MD-11F airplanes equipped with General Electric (GE) CF6-80C2D1F high-bypass turbofan engines. The NPRM published in the **Federal Register** on December 29, 2023 ([88 FR 90134](#)). The NPRM was prompted by a report of a Model MD-11F airplane equipped with three GE CF6-80C2D1F high-bypass turbofan engines experiencing an uncommanded deployment of a thrust reverser in flight at low altitude. In the NPRM, the FAA proposed to require a one-time detailed inspection of the engine pylon thrust reverser control system wire harnesses; repetitive detailed inspections and wire integrity tests of the engine pylon thrust reverser control system wire harnesses, junction box assembly and junction box cover, left-side and right-side thrust reverser electrical harnesses, core (engine compartment) miscellaneous wire harness assembly, and 30-degree bulkhead wire harness assembly; and applicable on-condition actions. The FAA also proposed to require reporting inspection results. The FAA is issuing this AD to address uncommanded deployment of a thrust reverser in flight at low altitude, which could result in loss of flight control of the airplane and loss of continued safe flight and landing.

**Discussion of Final Airworthiness Directive**

**Comments**

The FAA received a comment from the Air Line Pilots Association, International (ALPA), who supported the NPRM without change.

The FAA received additional comments from five commenters, including Boeing, FedEx Express (FedEx), United Parcel Service (UPS), and two individuals. The following presents the comments received on the NPRM and the FAA's response to each comment.

### **Request To Delete an Incorrect Location**

Boeing requested that the FAA delete the text “(in the pylon)” in the Summary and Material Incorporated by Reference under [1 CFR part 51](#) section of the NPRM. Boeing explained that the text “(in the pylon)” implies that the wire integrity tests shall be applied only to the pylon wiring as part of the repetitive wire integrity tests. Boeing stated that these tests also apply to the engine pylon thrust reverser control system wiring from the nose of the airplane.

The FAA agrees with the request. While a detailed inspection is performed on the wire harnesses in the pylon, the location for performing the wire integrity tests of the engine pylon thrust reverser control system wire harnesses is not limited to the pylon. The FAA has deleted the text “(in the pylon)” in this final rule accordingly.

### **Concern for the Workability of the Service Bulletin**

FedEx expressed their concern regarding the workability of Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023. FedEx stated that a prime example of complexity in Work Package 2 of Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, is Part 19, which requires actions to be concurrently performed on the left and right thrust reverser halves, instead of having two separate PARTs to perform required actions on each thrust reverser half independently from the other thrust reverser half. This results in the need to evaluate four possible conditions of the wire harnesses on the left and right thrust reverser halves. The commenter stated that due to complexity of the service bulletin as well as the sheer scope of the work being performed, a significant risk exists for introducing human errors during the accomplishment of the required work.

The FAA recognizes that the work instructions provided in this service bulletin are extensive and complex. Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, was revised to Revision 1, dated June 4, 2024, to correct errors and improve clarity. The FAA reviewed Revision 1 of the service bulletin and determined it provides adequate information. Although the work instructions provided in the original and revised service bulletins are extensive and complex, the actions specified in the service bulletin that is required by this AD are necessary to address the unsafe condition. This AD mandates Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024, and provides credit for actions accomplished before the effective date of this AD using Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023. In addition, the exception in paragraph (h)(2) of the proposed AD was addressed and corrected in Revision 1 of the service bulletin; therefore, paragraph (h)(2) of the proposed AD was removed from this AD. The current instructions in Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, and Revision 1, dated June 4, 2024, can be followed without any major issue that would prevent accomplishment of the required actions. Further, additional actions in the revised service bulletin are intended for best maintenance practice and not necessary to address the unsafe condition. Those additional actions include the detailed inspection of the junction box assembly for any loose electrical connection in Step 1, Part 10, and application of torque to any loose electrical connection in Step 2, Part 11 of the revised service bulletin. Therefore, those parts in either the original or Revision 1 of the service bulletin are acceptable for compliance with

the AD. For clarity, the FAA added a new exception to paragraph (h) of this AD specifying the added steps in Revision 1 of the service bulletin are not required for compliance with the AD.

## **Request To Remove Work Package 2**

FedEx stated that Work Package 2 in Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, is too broad in scope, and not supported or warranted by the results of the investigation. FedEx stated that a third protection feature to prevent in-flight thrust reverser deployment is not required for Model MD-11 airplanes since it was predicted that the airplane will be controllable with the thrust reverser deployed in air. FedEx stated that the outcome of the service event has served to validate this prediction. FedEx further stated that damaged wire bundles and grounds in the pylon discovered on the event airplane could have allowed energization of the pressure regulator shutoff valve (PRSOV) and directional pilot valve (DPV), which could result in in-flight thrust reverser deployment. No other element that could have contributed to the event was found by the investigation. Finally, FedEx stated that the actions in Work Package 2 will disturb the areas that are not routinely disturbed and therefore could introduce unintended consequences. FedEx added that to properly accomplish Work Package 2, it is necessary to expend significant resources to deal with the complexity and extent of the requirements, including training of personnel.

The FAA does not agree with the request. The FAA infers that FedEx is requesting that Work Package 2 be removed from the requirements of the AD. Although the event airplane was safely brought back to the ground after in-flight uncommanded thrust reverser deployment, this does not suggest that Model MD-11 airplanes will be controllable under any anticipated operating condition with the thrust reverser deployed in air. Model MD-11 airplanes have not been demonstrated for their controllability when the deployment of single or dual thrust reverser halves is encountered on any single engine at low altitudes under anticipated operating conditions. The wiring damage discovered in the pylon of the event airplane was for the PRSOV and DPV circuits, and the manufacturer concluded that this damage was a contributing factor to the event. However, it is unclear what conditions resulted in power-to-power short—instead of power-to-ground [\[1\]](#) (shield), which would not result in uncommanded thrust reverser deployment. Based on available data, it is likely that a combination of conditions needs to be encountered to result in uncommanded thrust reverser deployment. Considering the age of the affected fleet, undetected degradation in wiring installation could have contributed to the event. Such a latent wiring anomaly could make an airplane vulnerable to a single failure that would impose a significant risk. Work Package 1 requires inspections of wiring in the pylon to detect any damage, and this action is intended to eliminate any similar condition discovered on the event airplane in a quick and practical manner. Work Package 2 requires wire integrity tests in addition to inspections of various wiring harnesses, and those actions are necessary to prevent and detect a potential latent anomalous condition of wiring installation. The FAA agrees that those actions are extensive, and the areas affected by the required actions are not routinely disturbed. However, in the FAA's assessment, Work Package 2 (which specifies the same substantive requirements in both the original issue and Revision 1 of Boeing Alert Service Bulletin MD11-78A017) is appropriate and necessary to understand and eliminate the root cause of the event, and the cost of any additional “significant resources” necessary to accomplish those actions would be outweighed by the safety benefits of the AD. This AD has not been changed regarding this request.

## **Request To Remove the Inspection Requirement for the Junction Box Assembly in Work Package 2**

FedEx requested that the FAA remove the inspection requirement for the junction box assembly included in Work Package 2 in Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023. FedEx stated that no chafed or burnt wires were found inside the junction box assembly of the event airplane or on numerous units examined as part of investigations. FedEx stated that removal of the junction box assembly for inspection will increase the risk of damage to the junction box assembly and surrounding wire harnesses.

The FAA does not agree with the request. Although the event airplane did not reveal any evidence directly linked to the PRSOV and DPV system wiring inside the junction box assembly, damage to those wires inside the junction box assembly could result in the same outcome encountered on the event airplane. The junction box assembly is a high-density area of wire routing, where wires with power are routed with the thrust reverser control wires. The inspection of the junction box assembly is intended to detect and eliminate any riding condition of wires since such condition could damage the thrust reverser control wires. The FAA does not have any data regarding the other units investigated. These units are subject to the same unsafe condition because of their similar design and installation. This AD has not been changed regarding this request.

### **Request To Remove the Required Actions on Engine 2**

FedEx requested that the required actions on engine 2 (tail-mounted engine) be removed from the proposed AD. The commenter stated that in-flight deployment of a thrust reverser of engine 2 will have considerably less impact on controllability of the airplane than the wing-mounted engine 1 and engine 3. The commenter stated that wiring running through the wings and attaching structures are far more exposed to vibration and variable loading than those in the more stable tail structure. Because of the less harsh operating environment for engine 2, combined with the historical reliability and a lack of wire damage findings in the tail thrust reverser, FedEx concluded that the required actions on the engine are not justified.

The FAA does not agree with the request. As discussed earlier, Model MD-11 airplanes have not been demonstrated for their controllability when the deployment of single or dual thrust reverser halves is encountered on any single engine at low altitudes under anticipated operating conditions. Therefore, prevention of in-flight thrust reverser deployment is as critical for the tail-mounted engines as the wing-mounted engines. Also, routing of wire harnesses is not the same for the tail-mounted engines and wing-mounted engines as the wire routing is restricted by available space. Vibration is a factor that could contribute to wire chafing damage, but that is not the only factor. Available gaps between wire harnesses and surrounding structure as well as the types of wire support could also contribute to wire chafing damage. Therefore, an inspection of all engines, including engine 2, is critical and necessary. This AD has not been changed regarding this request.

### **Concern for Economic Impact**

FedEx stated that the FAA considerably underestimated the economic impact to operators. FedEx claimed that the estimated costs in the NPRM completely ignored the expense of acquiring contingency material. Even if the inspections do not identify any out-of-limit conditions, operators must still be prepared for the eventuality of findings to prevent the possibility of extended grounding of airplanes. Preliminary attempts to acquire necessary spare materials have revealed little or no global supply. Boeing has not provided firm timelines for making spare materials available and pricing for

this commitment. FedEx concluded that, because pricing has not been provided, it has not been correctly incorporated in the cost estimate of the NPRM.

The FAA acknowledges FedEx's concern but does not agree with the request. As explained in the NPRM, the FAA did not receive definitive data that would enable the FAA to provide a labor and parts cost estimate for the on-condition repairs or replacements. With regards to necessary parts, the manufacturer has been addressing this issue, and the FAA has concluded that the necessary spare materials would be available. To the extent spare parts may not exist to replace parts that fail the inspection requirements of this AD, the FAA cannot base its AD action on whether spare parts are available or can be produced. While every effort is made to avoid grounding aircraft, the FAA must address the unsafe condition. However, if parts availability becomes a problem during compliance with the AD requirements, operators may request approval of an extension of the compliance time as an alternative method of compliance (AMOC) in accordance with the procedures specified in paragraph (k) of this AD, if the operator submits sufficient data to substantiate that an acceptable level of safety would be provided with such an extension. This AD has not been changed regarding this request.

### **Request for More Economical Solution**

One individual requested that the FAA consider alternatives that could reduce the operational/economic burden on operators.

The commenter did not propose any alternative approach to addressing the unsafe condition. In developing the most appropriate solution, the FAA considered the recommendations of the manufacturer, the urgency associated with the unsafe condition, the availability of required parts, and the practical aspect of accomplishing the required actions within a period of time that corresponds to the normal scheduled maintenance for most affected operators. The FAA has determined that the cost to operators to comply with this AD, as proposed, is outweighed by the safety benefits.

### **Requests To Change Parts Necessary for Each Airplane Section in Service Bulletin**

FedEx requested revision of the parts necessary for each airplane section in Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, to make it workable. The commenter stated that the information provided in Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, regarding parts necessary for each airplane is incomplete and insufficient for operators to effectively plan for the execution of the service bulletin requirements. The commenter stated that determining part numbers necessary for accomplishing the required action by researching Boeing documents should not fall under the operator's responsibility. The service bulletin provides an option of repair, but it will still require identification and availability of specific wire and related electrical components. The commenter stated that all part numbers of potentially affected assemblies and components would need to be identified in the service bulletin, or the materials necessary for repair would need to be available for procurement.

Similarly, UPS requested a comprehensive parts list in Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, as well as a source of suitable available spares, prior to the implementation of the AD. UPS added that the components such as wiring and connectors are out of production, and available parts are limited. UPS requested that the AD be delayed until a suitable parts list and spare source are determined.



The FAA does not agree with the requests. Regarding the parts information provided in the service bulletin, the manufacturer anticipated that new replacement parts for full wire harnesses or junction box assemblies would not be available from suppliers. Therefore, a repair would be the only available option to address damaged or failed parts, unless serviceable parts removed from an airplane are installed as replacement parts for an affected airplane. As stated previously, if parts availability becomes a problem during compliance with the AD requirements, an operator may request approval of an extension of the compliance time as an AMOC in accordance with the procedures specified in paragraph (k) of this AD, if the operator submits sufficient data to substantiate that an acceptable level of safety would be provided with such an extension. The intent of the service bulletin was to provide sufficient information necessary to accomplish required actions instead of providing full details of all parts since providing such information for all wiring configurations would require a substantial amount of time for this urgent issue and may further complicate the service bulletin. Based on the information provided in the service bulletin and available documents, such as wiring diagrams, the illustrated parts catalog, and drawings, the operators should be able to determine the necessary parts for repairs. The manufacturer confirmed that they would support operators to confirm the necessary parts for accomplishing the required actions. This AD has not been changed regarding this request.

### **Request To Add an Instruction for a Condition With Multiple Options**

FedEx requested that an instruction be added in the AD regarding how a required condition should be handled when the condition provides multiple options. The commenter stated that instructions identified as required for compliance (RC) are also identified as an option that is contingent on certain conditions being met and a choice being made by the operator. The commenter expressed a concern that if this is not directly addressed in the language of the AD, it is anticipated that these RC options will be difficult to deal with when maintenance work cards are generated, putting the technicians in the position of making a choice to sign off an AD-required step as not applicable for the option not taken.

The FAA does not agree with the comment. In addition to Section 1.E., Compliance, of Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, or Revision 1, dated June 4, 2024, Note 13 in Section 3.A. of the service bulletin provides the instruction on how to handle a required condition when multiple options are provided under that condition. This instruction provided by a general note has been used in numerous service bulletins and is not unique to this specific service bulletin. Therefore, it is unnecessary to repeat this instruction in the AD. No further changes have been made to this AD regarding this request.

### **Request To Provide Instructions for Insulation Resistance Test**

FedEx stated that Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, does not provide sufficient detail to ensure that wire harness insulation resistance checks in Parts 6 through 8 in the service bulletin are performed properly. The commenter recommended including a statement that each of the checks should be measured against ground. The commenter also stated that unless precautionary or explanatory statements are included to indicate application of 500V between the pins and each of the other contacts on the same connector may damage other components on the circuit, uncertainty around validating the test may result.

The FAA does not agree with the request. The insulation resistance check is a standard practice. The operators are expected to follow applicable instructions in the standard wiring practice manual to perform the test for the connectors specified in the service bulletin. The test requirement is to measure between every pin and ground (shielding) and between all two adjacent pins. This AD has not been changed regarding this request.

#### **Request for Additional Details in Part 19 in the Service Bulletin**

FedEx stated that the instructions for Part 19 in Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, are too vague since the specific connectors and pins are not identified. FedEx added that Boeing does not have adequate data to specify the detail since the harnesses to be tested are not controlled by Boeing. This lack of detail places the burden onto the operators to ensure that the tests are performed as intended. The commenter does not believe the instructions in the service bulletin are adequate to ensure successful compliance.

The FAA does not agree with the request. As the commenter stated, the manufacturer does not have the details of the pins or connectors, as the data for the wire harnesses is not controlled by Boeing. Further, due to the urgency of the unsafe condition, the FAA cannot delay issuance of this final rule further for Boeing to identify the connectors or pins. This will place the burden on the operators, but the operators should utilize available data and ensure that the tests are performed adequately based on input provided by the manufacturer. This AD has not been changed regarding this request.

#### **Request To Revise the Work Instructions for Part 13 in the Service Bulletin**

FedEx requested revision of the work instructions in Part 13 of Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, which requires an inspection of the internal surface of the junction box cover per Figure 13 for burn marks, signs of arcing, and fretting. The commenter stated that many inspected junction boxes' covers exhibited smudges and discoloration that can be misinterpreted as soot and burn residual, rather than the dust from the harness lacings rubbing against the cover. The instructions as currently written may result in many false findings. The commenter requested that a note be added to the service bulletin to call attention to the possibility of the benign discoloration and allow for the presence of such residue.

The FAA partially agrees with the request. The FAA agrees that the work instructions in Part 13 of Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, may result in false findings. However, this AD will require Revision 1 of the service bulletin. The work instructions in Part 13 of Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024, have been updated to eliminate the potential misinterpretation of the conditions found on the junction box cover during the inspection. No change to this AD has been made as a result of this comment.

#### **Request To Revise Figures 14 and 15 in the Service Bulletin**

FedEx requested that Figures 14 and 15 of Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, be revised to remove the minimum clearance requirement between the wire harnesses and the junction box cover or to add a clarification stating that contact between the junction box cover and lacing material is acceptable. In the alternative, FedEx asked that the language of the proposed AD be revised to add an exemption to the minimum clearance requirement in paragraph (h) of the proposed AD. The commenter noted that Parts 14 and 15 of the service bulletin require a



minimum clearance of 0.20 inch between the junction box cover and the wire bundles inside the junction box assembly. However, there is no instruction to confirm that this minimum clearance is maintained when the junction box cover is closed. The commenter stated that the wire harnesses inside the junction box assembly are very stiff and rigid and generally cannot be appreciably compacted. Although this condition may result in minor interference of the lacings with the cover, the commenter has not found any evidence of wire damage resulting from this contact.

The FAA partially agrees with the request. The FAA agrees that the instructions to achieve the required minimum clearance were unclear in Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023. The work instructions have been revised in Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024, for clarification. However, Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, or Revision 1, dated June 4, 2024, does not allow contact between the junction box cover and lacing material since such a condition may eventually result in wire damage. No change has been made to this AD as a result of this comment.

### **Request To Correct Typographical Errors**

FedEx noted multiple errors and typographical errors in Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, and requested revision of the service bulletin to correct these errors and typographical errors.

The errors and typographical errors identified by the commenter have been corrected in Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024, which is the primary source of service information in this AD. No change has been made to this AD as a result of this comment.

### **Request To Revise the Compliance Time of the Reporting Requirement**

FedEx requested revision of the compliance time of the reporting requirement in paragraph (i) of the proposed AD. The commenter stated that the proposed compliance time of 30 days is inadequate to prepare the data package and submit the reports. The commenter stated they do not understand the urgency of the reporting requirement considering the overall compliance span of the AD.

The FAA agrees that the proposed compliance time of 30 days for the reporting requirement is unnecessarily short considering the burden on the operators and the intent that those reports will be used for root cause assessment while managing the potential risk by the inspections. The FAA has revised the compliance time of paragraph (i) of this AD to 90 days accordingly.

### **Request To Change Reporting Requirements**

FedEx requested that the FAA eliminate the reporting requirement of paragraph (i) of the proposed AD or revise the requirements to clarify what must be reported to meet the compliance criteria. The commenter was concerned that the reporting criteria in the service bulletin are open-ended and could be misinterpreted as to what qualifies as reportable and what level of detail is required. The commenter stated that because of the breadth of the reporting criteria involved, it would be extremely hard to definitively comply with the reporting requirement. Also, the commenter stated that the relationship between Boeing and the operators should be sufficient to ensure that findings will be provided to Boeing without a mandatory reporting requirement.

The FAA partially agrees with the request.

The FAA agrees to revise the reporting criteria for clarification so that the results of the inspections or tests are reported in a consistent manner. The reporting form in Appendix C of the original service bulletin was updated in Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024. The updated reporting forms in Appendixes C through E of Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024, provide clear instructions to address the concern expressed by the commenter.

The FAA disagrees, however, with the request to remove the reporting requirement in paragraph (i) of this AD. The findings provided by the reports will be used for the root cause assessment and the development of a final corrective action. Therefore, the reporting requirement is a critical piece of this interim action AD.

### **Request To Use Boeing Service Bulletin as an Optional Inspection**

UPS requested that the actions specified in Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, remain as an optional inspection until the root cause can be determined.

The FAA does not agree with the request. As discussed in the preamble of the NPRM, wiring damage was found in the engine pylon of the event airplane. The root cause of uncommanded thrust reverser deployment has not been determined yet, but the manufacturer concluded that wiring damage was a contributing factor of the event based on the assessment of on-wing data and laboratory inspection. The FAA considers this AD to be an interim action. The FAA issues an interim action AD when, for example, an unsafe condition that requires a mitigating action relatively quickly is identified on airplanes, but the root cause leading to the unsafe condition is still undetermined due to limited available data. In this case, the interim mitigating action is needed to address the overall risk of the unsafe condition. Based on the FAA's assessment, the actions required by this AD would mitigate the unsafe condition in the interim period while additional inspection data would allow the manufacturer to determine the root cause and develop an adequate corrective action. This AD has not been changed regarding this request.

### **Request To Delay Issuance of Final Rule**

UPS requested that the effective date of the AD be extended until Boeing Alert Service Bulletin MD11-78A017 is revised. UPS stated that Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, identified in the NPRM is unworkable due to discrepancies and disagreements between the configurations specified in the instructions and the actual installation.

Because this AD has been changed to mandate Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024, which clarifies these instructions, no further change is necessary to this AD as a result of this comment. The manufacturer also worked with the operators to ensure that the work instructions in Revision 1 can be accomplished. This AD has not been changed regarding this request.

### **Request To Extend the Compliance Time for Work Package 1 and Increase Labor Hours**

UPS requested that the FAA revise paragraph (h) of the proposed AD to extend the compliance time of Work Package 1 of Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, to 27 months

from the current proposal of 12 months. UPS stated that the labor estimate provided in the service bulletin underestimates the tasks involved in Work Package 1. UPS estimated that about 700 work-hours would be involved, while Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, estimated 134.25 hours. Considering extensive work-hours and limited parts availability, UPS stated that the proposed compliance time of 12 months does not provide sufficient time to accomplish the required actions for the affected fleet.

The FAA does not agree with the request. The FAA infers that the labor estimates provided by UPS include the labor necessary for repairs. The labor estimates provided in the service bulletin do not include the labor necessary for repairs since a repair is an on-condition action that would be affected by the extent of the damage discovered on the affected parts. The FAA recognizes that a gap would exist between the estimates provided in the service bulletin and the actual labor needed for each airplane because of those on-condition actions. The FAA established the compliance time so that operators can accomplish this interim mitigation action in a quick and practical manner, considering the potential effect of the unsafe condition. The FAA also assessed parts availability and necessary labor and determined that the compliance time of 12 months would be appropriate for Work Package 1. Operators can request approval of an extension of the compliance time in accordance with paragraph (k) of this AD if operators can provide the evidence that would make the required compliance time impractical and justification for maintaining an acceptable level safety with such an extension. This AD has not been changed regarding these requests.

### **Request To Include Spare Engines and Thrust Reversers in Applicability**

UPS requested that paragraph (c) of the proposed AD be revised to include spare engines and thrust reversers in the AD applicability. Although Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, requires inspections and repair of the components for the engines and thrust reversers, an engine or thrust reverser on which the actions of Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, were accomplished may be replaced with an engine or thrust reverser on which the actions specified in Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, have not been accomplished.

The FAA disagrees with the request. The FAA understands the concern of an AD-compliant engine or thrust reverser being inadvertently replaced with a non-AD-compliant engine or thrust reverser. However, the AD is issued to address the unsafe condition identified at the airplane level. The affected airplanes must be maintained in the AD-compliant configuration once each airplane is demonstrated to be compliant with the AD. Installing an engine or thrust reverser that has not been inspected or tested as required by this AD on an airplane that was demonstrated to be compliant with the AD is not allowed since such an action will bring the airplane back to a non-AD-compliant configuration, unless the engine or thrust reverser is inspected or tested as required by the AD prior to returning the airplane back to service. It is the operator's responsibility to maintain each airplane in the AD-compliant configuration. This AD has not been changed regarding this request.

### **Request for a Specific Interval Inspection**

An individual commenter recommended that the FAA analyze the frequency of the occurrence of uncommanded thrust reverser deployment in air and determine a specific interval for this inspection.

Although the FAA agrees with the intent behind this request, it is not necessary to change the AD based on this request. The FAA already assessed the aspect the commenter raised. The FAA has assessed the risk of in-flight thrust reverser deployment, considering the frequency of occurrence based on available data, and determined that the compliance times for the initial and repetitive inspections are adequate. As discussed in the preamble of the NPRM, the actions required by this AD are considered an interim action. Additional data to be provided by the operators through the reporting requirement of this AD will enable the manufacturer to obtain better insight into the potential conditions that led to the event. Based on the information provided by those reports, the FAA may consider further rulemaking.

## **Conclusion**

The FAA reviewed the relevant data, considered any comments received, and determined that air safety requires adopting this AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. Except for minor editorial changes, and any other changes described previously, this AD is adopted as proposed in the NPRM. None of the changes will increase the economic burden on any operator.

## **Material Incorporated by Reference Under [1 CFR Part 51](#)**

The FAA reviewed Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024. This material specifies Work Package 1 inspection procedures to do an initial detailed inspection of the engine 1, engine 2, and engine 3 pylon thrust reverser control system wire harnesses. The material also specifies Work Package 2 procedures to do repetitive detailed inspections and wire integrity tests at the following locations: engine 1, engine 2, and engine 3 thrust reverser control system wire harnesses; junction box assembly and junction box cover (only detailed inspection); left side and right side thrust reverser electrical harnesses; core (engine compartment) miscellaneous wire harness assembly; and 30-degree bulkhead wire harness assembly. The material also specifies applicable on-condition actions (including repairs, replacements, installations, post-replacement inspections and tests, and return to service tests). The material also specifies that accomplishing the initial inspections and tests by doing Action 1 through Action 3 in Work Package 2 terminates the need to do the inspection in accordance with Part 2 as required in Work Package 1. However, this substitution of actions does not change the compliance time of Work Package 1 as specified in Table 1 of paragraph 1.E., “Compliance,” of Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024.

This material 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.

## **Interim Action**

The FAA considers this AD to be an interim action. The reports that are required by this AD will enable the manufacturer to obtain better insight into the nature, cause, and extent of the unsafe condition, and eventually to develop final action to address the unsafe condition. If final action is later identified, the FAA might consider further rulemaking.

## **Costs of Compliance**

The FAA estimates that this AD affects 79 airplanes of U.S. registry. The FAA estimates the following costs to comply with this AD:

### Estimated Costs

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Inspections and Tests	Up to 78 work-hours × \$85 per hour = Up to \$6,630 per inspection/test cycle	\$0	Up to \$6,630 per inspection/test cycle	Up to \$523,770 per inspection/test cycle.
Reporting	1 work-hour × \$85 per hour = \$85 per inspection/test cycle	0	\$85 per inspection/test cycle	\$6,715 per inspection/test cycle.

The FAA estimates the following costs to do any on-condition actions that would be required based on the results of the inspections and tests. The agency has no way of determining the number of aircraft that might need these repairs/replacements:

### On-Condition Costs

Action	Labor cost	Parts cost	Cost per product
Repairs/Replacements/Tests	Up to 120 work-hours × \$85 per hour = Up to \$10,200	* \$0	Up to \$10,200.

*\* The FAA has received no definitive data that would enable the FAA to provide a parts cost estimate for the on-condition repairs/replacements specified in this AD.*

### Paperwork Reduction Act

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a currently valid OMB Control Number. The OMB Control Number for this information collection is 2120-0056. Public reporting for this collection of information is estimated to take approximately 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, Federal Aviation Administration, 10101 Hillwood Parkway, Fort Worth, TX 76177-1524.

### 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.

The FAA is 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) Will not affect intrastate aviation in Alaska, 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.

## List of Subjects in [14 CFR Part 39](#)

- Air transportation
- Aircraft
- Aviation safety
- Incorporation by reference
- Safety

## 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:

**2024-24-03 The Boeing Company:**



**(a) Effective Date**

This airworthiness directive (AD) is effective January 13, 2025.

**(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to The Boeing Company Model MD-11 and MD-11F airplanes, certificated in any category, equipped with General Electric (GE) CF6-80C2D1F high-bypass turbofan engines.

**(d) Subject**

Air Transport Association (ATA) of America Code 78, Engine Exhaust.

**(e) Unsafe Condition**

This AD was prompted by a report of a Model MD-11F airplane experiencing an uncommanded deployment of a thrust reverser at approximately 500 feet above ground level. The FAA is issuing this AD to address uncommanded deployment of a thrust reverser in-flight at low altitude, which could result in loss of flight control of the airplane and loss of continued safe flight and landing.

**(f) Compliance**

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

**(g) Required Actions**

Except as specified in paragraph (h) of this AD: At the applicable times specified in paragraph 1.E., “Compliance,” of Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024, do all applicable actions identified as “RC” (required for compliance) in, and in accordance with, the Accomplishment Instructions of Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024.

**(h) Exceptions to Service Bulletin Specifications**

(1) Where the Compliance Time columns of the tables in the “Compliance” paragraph of Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024, use the phrase “the original issue date of this service bulletin,” this AD requires using the effective date of this AD.

(2) Where Step 1, Part 10 of Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024, specifies doing a detailed inspection of the junction box assembly for any loose electrical connection and Step 2, Part 11 of Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4,

2024, specifies applying applicable torque to any loose electrical connection, those actions are not required for compliance with this AD.

### **(i) Reporting**

At the applicable time specified in paragraph (i)(1) or (2) of this AD, submit a report to The Boeing Company via the Boeing Communication System (BCS) and include the information specified in Appendixes C, D, and E of Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024.

(1) If the inspection or test was done on or after the effective date of this AD: Submit the report within 90 days after the inspection or test.

(2) If the inspection or test was done before the effective date of this AD: Submit the report within 90 days after the effective date of this AD.

### **(j) Credit for Previous Actions**

This paragraph provides credit for the actions specified in paragraphs (g) and (i) of this AD, if those actions were performed before the effective date of this AD using Boeing Alert Service Bulletin MD11-78A017, dated December 4, 2023, except where step 6.c.(2)(a), “CONDITON 14 OPTION 1 (ACTION 1),” and step 6.c.(2)(b)4d), “CONDITION 14.4 OPTION 2 (ACTION 1),” of the Accomplishment Instructions of Boeing Service Bulletin MD11-78017, dated December 4, 2023, specify to replace the junction box, that replacement must be accomplished in accordance with “PART 12: JUNCTION BOX REPLACEMENT” of the Accomplishment Instructions of Boeing Service Bulletin MD11-78017, dated December 4, 2023.

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

(1) The Manager, AIR-520, Continued Operational Safety Branch, 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 responsible Flight Standards Office, as appropriate. If sending information directly to the manager of AIR-520, Continued Operational Safety Branch, send it to the attention of the person identified in paragraph (l)(1) of this AD. Information may be emailed to: [AMOC@faa.gov](mailto:AMOC@faa.gov).

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the responsible Flight Standards 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 Company Organization Designation Authorization (ODA) that has been authorized by the Manager, AIR-520, Continued Operational Safety Branch, FAA, 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.

(4) Except as specified by paragraph (h)(2) of this AD: For Boeing service bulletin that contains steps that are labeled as Required for Compliance (RC), the provisions of paragraphs (k)(4)(i) and (ii) of this AD apply.

(i) The steps labeled as RC, including substeps under an RC step and any figures identified in an RC step, must be done to comply with the AD. If a step or substep is labeled “RC Exempt,” then the RC requirement is removed from that step or substep. An AMOC is required for any deviations to RC steps, including substeps and identified figures.

(ii) Steps not labeled as RC may be deviated from using accepted methods in accordance with the operator's maintenance or inspection program without obtaining approval of an AMOC, provided the RC steps, including substeps and identified figures, can still be done as specified, and the airplane can be put back in an airworthy condition.

## **(l) Related Information**

(1) For more information about this AD, contact Tak Kobayashi, Aviation Safety Engineer, FAA, 2200 South 216th St., Des Moines, WA 98198; telephone 206-231-3553; email [takahisa.kobayashi@faa.gov](mailto:takahisa.kobayashi@faa.gov).

(2) Material identified in this AD that is not incorporated by reference is available at the address specified in paragraph (m)(3) of this AD.

## **(m) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference of the material listed in this paragraph under [5 U.S.C. 552\(a\)](#) and [1 CFR part 51](#).

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

(i) Boeing Alert Service Bulletin MD11-78A017, Revision 1, dated June 4, 2024.

(ii) [Reserved]

(3) For Boeing material identified in this AD, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminister Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; website [myboeingfleet.com](http://myboeingfleet.com).

(4) You may view this material at the FAA, Airworthiness Products Section, Operational Safety Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195.

(5) You may view this material at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, visit [www.archives.gov/federal-register/cfr/ibr-locations](http://www.archives.gov/federal-register/cfr/ibr-locations) or email [fr.inspection@nara.gov](mailto:fr.inspection@nara.gov).

Issued on November 19, 2024.

Peter A. White,

Deputy Director, Integrated Certificate Management Division, Aircraft Certification Service.

## Footnotes

1. *The words “ground” and “shield” may be used interchangeably in Boeing's documents.*

[Back to Citation](#)

[[FR Doc. 2024-28780](#) Filed 12-6-24; 8:45 am]

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