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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2023-1893; Project Identifier AD-2023-00389-A; Amendment 39-22944; AD 2025-02-11]

RIN 2120-AA64

Airworthiness Directives; FS 2001 Corp, FS 2002 Corporation, FS 2003 Corporation, Piper, and Piper Aircraft, Inc. Airplanes

AGENCY:

Federal Aviation Administration (FAA), DOT.

ACTION:

Final rule.

SUMMARY:

The FAA is adopting a new airworthiness directive (AD) for certain FS 2001 Corp, FS 2002 Corporation, FS 2003 Corporation, Piper, and Piper Aircraft, Inc. (Piper) airplanes. This AD was prompted by reports of broken rudders. This AD requires replacing any rudder equipped with a rudder post made from a certain carbon steel with a rudder equipped with a rudder post made from a certain low-alloy steel. The FAA is issuing this AD to address the unsafe condition on these products.

DATES:

This AD is effective March 20, 2025.

ADDRESSES:

AD Docket: You may examine the AD docket at *regulations.gov* under Docket No. FAA-2023-1893; 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.

FOR FURTHER INFORMATION CONTACT:

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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 FS 2001 Corp, FS 2002 Corporation, FS 2003 Corporation, and Piper airplanes. The NPRM published in the **Federal Register** on October 6, 2023 (88 FR 69556). On November 20, 2023 (88 FR 80647) the FAA extended the comment period by 90 days until February 20, 2024.

The NPRM was prompted by reports of two non-fatal accidents involving airplanes designed and built by Piper that were caused by broken rudder posts that structurally failed above the upper hinge in flight. Both accidents occurred in Anchorage, Alaska. The first accident occurred on June 8, 2020, and involved an FS 2003 Model PA-12 airplane and the second accident occurred on July 23, 2021, and involved an FS 2002 Model PA-14 airplane. Both airplanes sustained substantial damage when the rudder structurally failed.

The National Transportation Safety Board (NTSB) published the report *Structural Failure of Piper Part Number 40622 Rudder Posts Made of 1025 Carbon Steel,* NTSB/AIR-22-02, dated January 10, 2022 (NTSB/AIR-22-02), which provides information regarding the NTSB's investigations of these two accidents. The NTSB accident investigation report included a recommendation (Safety Recommendation No. A-22-3) to the FAA to issue an AD addressing this unsafe condition. The NTSB report can be found on *ntsb.gov*.

The NTSB examined the rudders involved in these accidents and determined that the rudder posts fractured above the upper hinge and the top portion of the rudder folded over the upper tail brace wires. The NTSB also determined that the rudder posts were made from 1025 carbon steel and fractured due to fatigue.

Prior to the NPRM, the FAA issued an Airworthiness Concerns Sheet, dated September 4, 2020 (Airworthiness Concerns Sheet), which requested information from the aviation community regarding in-flight failure of the rudder just above the upper hinge on all Piper and FS2003 Corp (type certificate previously held by Piper) Model J-5A, J-5B, J-5C, J-5D, AE-1, HE-1, PA-12, PA-12S, PA-14, PA-16, PA-18, L-21, PA-20, and PA-22 airplanes. The responses revealed that there were five additional broken rudder posts dating as far back as 1979.

Before 1974, all rudders installed on Piper model airplanes were equipped with rudder posts manufactured from 1025 carbon steel and starting in 1974, the rudder posts were manufactured from

4130N low-alloy steel (Chromoly). Most parts manufacturer approval (PMA) rudders are equipped with rudder posts made from 4130N low-alloy steel.

The NTSB determined that the broken rudder posts resulted from the combination of fatigue loading and corrosion affecting the rudder assemblies made from 1025 carbon steel. This condition, if not addressed, could result in a broken rudder and consequent reduced ability of the flight crew to maintain the safe flight and landing of the airplane.

In the NPRM, the FAA proposed to require replacing any rudder equipped with a rudder post made from 1025 carbon steel with a rudder equipped with a rudder post made from 4130N low-alloy steel. The FAA is issuing this AD to address the unsafe condition on these products.

Discussion of Final Airworthiness Directive Changes After the NPRM Was Published

After the NPRM was published, the FAA revised Note 2 to paragraph (c) of this AD to clarify that Piper Service Bulletin 1379B, dated May 7, 2024, contains information on how to determine whether a rudder post is made from 4130N low-alloy steel and that this is not the only way to determine this, and this AD does not require the use of that service bulletin.

In addition, the FAA determined that the Airplane Model column that was included in Table 2 to paragraph (g)—Compliance Times in the proposed AD is not needed and that column has been deleted in this AD.

Comments

The FAA received comments from approximately 354 commenters. The FAA received comments from individual commenters as well as from organizations. The majority of the comments were from individuals. Organizations submitting comments included the Aircraft Owners and Pilots Association (AOPA), Experimental Aircraft Association (EAA), Light Aircraft Association (LAA), National Transportation Safety Board (NTSB), Royal Netherlands Air Force Historic Flight, The Short Wing Piper Club, and the Vintage Aircraft Association (VAA).

The following summarizes the relevant comments received on the NPRM and provides the FAA's responses.

A. Requests To Extend the Comment Period

Comment summary: Several commenters, including AOPA, The Short Wing Piper Club, and VAA, requested that the comment period for the NPRM be extended to allow more time for comments. AOPA requested an extension of 90 days to the NPRM's comment period to be able to prepare informed and meaningful comments with coordinated consensus among its members.

FAA response: The FAA agreed with the commenters' requests and issued an extension of the NPRM's comment period that published in the **Federal Register** on November 20, 2023 (88 FR 80647). That document extended the comment period by 90 days, until February 20, 2024.

B. Requests To Withdraw the NPRM

Comment summary: Numerous individual commenters, AOPA, EAA, LAA, and The Short Wing Piper Club requested that the NPRM be withdrawn.

1. Missing AD Docket Materials

Numerous commenters, including individuals, AOPA, The Short Wing Piper Club, and VAA requested that the NPRM be withdrawn because the FAA did not post all required documents to the AD docket as required by the Federal Aviation Administration Airworthiness Directives Manual, FAA-IR-M-8040.1C, dated May 17, 2010 (AD Manual). The commenters requested additional information that the FAA used in its decision to publish the NPRM, specifically, the information required in Chapter 11, Section 3, paragraphs (a) through (g), page 63, of the AD Manual.

FAA response: The FAA disagrees. When the NPRM was published, the AD docket contained all data required by the AD Manual. The list of requirements from Chapter 11, Section 3, paragraphs (a) through (g), page 63, of the AD Manual is listed below with data included in the AD docket, as applicable.

- *Record of technical decision making:* The NPRM was published in the **Federal Register** on October 6, 2023. Additionally, the presentation provided to the FAA by the VAA is also posted to the AD docket. The report by the VAA provides stress analysis utilized by the FAA.
- *FAA reports, summaries or lists of facts, data, or reports that support the AD action:* NTSB report NTSB/AIR-22-02 was referenced in the NPRM and provides a summary of the five airplanes that the NTSB considered in its evaluation. It provides additional information for each airplane (airplane model, engine horsepower, landing gear configuration, etc.). In the rulemaking process the FAA considered all five rudders that the NTSB evaluated. The FAA also considered two additional rudder post failures that were identified through responses to the Airworthiness Concerns Sheet. The NPRM identifies the two accidents that occurred in 2020 and 2021, which prompted the NTSB's safety investigation. The NPRM also identifies five additional rudder post failures that are considered in the AD action.
- *ADs or other similar documents issued by an international civil aviation authority:* No other ADs or similar documents issued by an international civil aviation authority are known, so none were published to the AD docket.
- *Regulatory Evaluation Form:* The Regulatory Evaluation Form is no longer required per FAA Deviation Memorandum AIR600-19-6D0-DM003, dated December 16, 2019.
- *Records of each ex parte contact or series of contacts:* One ex parte contact was posted to the AD docket—the presentation from the VAA to the FAA (a one-way presentation).
- *Comments received on the proposed rulemaking:* All comments received during the initial comment period that ended November 20, 2023, and the extended comment period that ended February 20, 2024, are published to the AD docket.
- *Records of approval of documents approved for incorporation by reference (IBR):* Records of approval of IBR documents are no longer published to the AD docket per FAA Deviation Memorandum AIR100-14-140-DM08, dated April 17, 2014. Piper Service Bulletin 1379, dated December 2, 2022, is referenced in the NPRM, but it is not required to do the actions required by this AD and will not have IBR approval.

The FAA has not changed this AD as a result of these comments.

2. Airworthiness Concerns Sheet

Many commenters, including individuals, AOPA, and The Short Wing Piper Club, requested that the NPRM be withdrawn due to the lack of availability of data to interested parties. The commenters stated that the Airworthiness Concerns Sheet was not communicated to all interested parties. Some commenters also stated that they were not notified or were unaware of the Airworthiness Concerns Sheet posted to the FAA website.

FAA response: The FAA disagrees. The Airworthiness Concerns Sheet is intended as a means for FAA Aviation Safety Engineers to coordinate airworthiness concerns with airplane owners/operators through associations and type clubs before the decision to do an AD and before the establishment of an AD docket. At the time of an Airworthiness Concerns Sheet, the FAA has not made a determination on what type of corrective action (if any) should be taken. The resolution of an airworthiness concern could involve an AD or a special airworthiness information bulletin (SAIB), or the FAA could determine that no action is needed at that time. The FAA's final determination depends in part on the information received in response to the Airworthiness Concerns Sheet. The FAA endorses dissemination of this technical information to all manufacturers and requests association and type club comments. The FAA received feedback from several type clubs and individuals through the Airworthiness Concerns Sheet that helped determine the need for an AD. The FAA received comments through the NPRM process from 354 different commenters. Based on this, the FAA has determined that ample opportunity was provided for public input on this rulemaking action. The Airworthiness Concerns sheet was posted to the docket for NTSB Report ANC20LA059 and is available to the public.

The FAA has not changed this AD as a result of these comments.

3. Improper Engine Installation

Several commenters, including individuals and LAA, suggested that the NPRM be withdrawn because the cause of the rudder posts failing is that higher horsepower engines are being installed and are not compliant with FAA regulations. Several of the commenters further stated that the FAA should correct the illegal engine installations rather than impose an unneeded rudder replacement on the remaining fleet that does not have higher horsepower engines installed.

FAA response: The FAA disagrees. These airplanes utilize higher horsepower engines through FAA-approved supplemental type certificates (STCs). The FAA has no data to show that any of the airplanes involved in the referenced accidents had incorrect engine installations. The FAA's analysis shows that the unsafe condition will occur on both the higher and lower horsepower engine. The FAA has added an additional category in table 2 to paragraph (g)(1)—Compliance Times, of this AD, for airplanes with lower horsepower engines (100-horsepower or below) that do not have a rudder post mounted beacon light, and the compliance time for the rudder replacement is within 10 years after the effective date of this AD. The FAA has no evidence that engines are being installed in a non-compliant manner.

The FAA has not changed this AD as a result of these comments.

4. Risk Level

Many commenters, including individuals, AOPA, EAA, LAA, The Short Wing Piper Club, and VAA, suggested that two reported incidents (referred to as accidents in the NPRM) does not justify an NPRM, therefore, it should be withdrawn. The commenters stated that two incidents out of over

31,000 airplanes does not represent a risk level that warrants an AD. Some of these individual commenters suggested that the NPRM be replaced by an SAIB.

FAA response: The FAA disagrees. An SAIB contains non-mandatory information and guidance for certain safety issues. The SAIB is an information tool to alert, educate, and make recommendations to the aviation community about ways to improve the safety of a product. An SAIB is generally not issued where there is an unsafe condition. The FAA has data supporting its determination that an unsafe condition exists with the specified parts.

The FAA evaluated two accidents and five rudder post failures to determine that an unsafe condition exists:

- Two separate accident investigations, referenced as ANC20LA059 and ANC21LA064, detailed in NTSB report NTSB/AIR-22-02.
- NTSB investigators obtained three additional previously broken rudders and included these broken rudders in their evaluation.
- Two additional rudder post failures that occurred in 1979 and 1990 were reported to the FAA and the broken rudders were not available for the NTSB's examination. These rudder post failures were reported to the FAA in response to the Airworthiness Concerns Sheet. The 1979 airplane was a Model PA-18 with standard wheel landing gear and a 180-horsepower engine. The 1990 airplane was a Model PA-12 with ski landing gear and a 160-horsepower engine.
- The FAA also received comments from repair facilities indicating that this failure has happened on multiple other occasions over the years, although no specifics were available.

The FAA determined that corrosion and fatigue will accelerate the failures over time as the strength of the rudder is continually compromised due to the combined effects of corrosion and fatigue. Furthermore, many of the approximately 31,000 airplanes are not currently in service (currently there are about 13,000 active airplanes in the fleet)—and many of these airplanes already have rudder assemblies made from 4130N low-alloy steel installed. Therefore, as the rudder post failures have accumulated over time, the number of active airplanes with rudder assemblies made from 1025 carbon steel has decreased. Given that more rudder post failures are occurring within a shrinking fleet size indicates that the failure is occurring more frequently as corrosion progresses and fatigue cycles accumulate.

The FAA has not changed this AD as a result of these comments.

5. NPRM Not Warranted Due to No Crashes or Injury From Rudder Failure and Inaccuracy of the NTSB Report

Several commenters, including individuals, AOPA, EAA, and The Short Wing Piper Club, suggested that the NPRM is not warranted and should be withdrawn. The commenters stated that there have never been any crashes or injuries from rudder failure. Some of the commenters further stated that the two reported accidents did not rise to the level of being called an accident and that they should be classified as “incidents” making the NPRM unnecessary.

In addition, The Short Wing Piper Club stated that the NTSB report results were problematic. The Short Wing Piper Club stated that the NTSB report used an incorrect testing methodology to an

extremely small sample. In addition, The Short Wing Piper Club claimed that there was evidence that at least one person believed the material was 4130N low-alloy steel.

FAA response: The FAA disagrees. The FAA issues an AD once an unsafe condition has been identified and the unsafe condition is likely to exist or develop in other products of the same type design; there does not need to be loss of life or significant damage to an airplane. Because it is a critical component, failure of a rudder could result in loss of control of the airplane.

As indicated in NTSB report NTSB/AIR-22-02, the Piper Model PA-12 and Model PA-14 airplanes that were investigated by the NTSB were both referred to as "accidents." The FAA is adopting the same terminology as the NTSB. In the two accidents and five rudder post failures where a crash did not occur, although the airplane may have retained a limited amount of rudder control, it may not have been sufficient for control and landing in all flight conditions. In some cases, it caused a permanent rudder input that the pilot could not override, and it also caused a pitch-up condition that the pilot had to compensate for with nose down elevator inputs. Even though many of the affected airplanes landed safely, had the weather or terrain conditions at the time of the flight been different, a crash could have occurred, and injuries could have resulted. Therefore, the FAA has determined that an unsafe condition exists and is likely to exist or develop in other products of the same type design and needs to be corrected.

The FAA also does not agree that the NTSB reports are incorrect and determined that they are both technically and factually accurate. The hardness tests were initially performed to determine the material in the failed rudder posts. There is a correction used in the hardness tests to account for a curved surface. The failed rudder posts were oblong (not round) due to the failure. However, the NTSB concluded that the hardness tests were accurate enough to determine the material. In addition, the NTSB also had metallurgical tests performed on the failed rudders and these tests confirmed that the failed rudders were made from 1025 carbon steel. In addition, the FAA does not agree that a small sample size is inadequate or flawed. The FAA determined that the NTSB investigation, and the sample size, is adequate to draw a conclusion to the nature of the unsafe condition.

The FAA has not changed this AD as a result of these comments.

6. Affected Airplanes on U.S. Registered Fleet

Several commenters, including individuals, AOPA, EAA, LAA, The Short Wing Piper Club, and VAA, stated that the NPRM would be burdensome based on the sheer number of affected airplanes. The FAA infers that the commenters requested that the NPRM be withdrawn. The commenters stated that the NPRM was an overreach by the FAA based on only two incidents out of 31,000 airplanes in the U.S. general aviation fleet.

FAA response: The FAA disagrees. Although approximately 31,000 of the affected airplanes were originally registered in the United States, about 13,000 of these airplanes are currently active. The FAA estimates that around half of the remaining 13,000 active airplanes already have a rudder assembly made from 4130N low-alloy steel. This brings the number of airplanes needing a new rudder down to roughly 6,500 airplanes. Regardless of the final number of affected airplanes, the FAA issues ADs on airplane fleets of varying sizes to address an unsafe condition. As discussed above in paragraph B4, this AD was not based only on two accidents, but on these two accidents and five rudder post failures.

In evaluating this information, the FAA determined that the unsafe condition is likely to exist on other airplanes with similar or the same type design.

The FAA has not changed this AD as a result of these comments.

7. Rudder Post Failed, Not the Rudder

Many commenters, including individuals and The Short Wing Piper Club, stated that the NPRM should be withdrawn or further limited in scope because the rudder post failed, not the rudder. The commenters also stated that the incident airplanes landed safely, therefore no unsafe condition exists.

FAA response: The FAA disagrees. The FAA reviewed the photographs shown in NTSB report NTSB/AIR-22-02 and determined that the rudder had failed. Although the airplanes may have retained a limited amount of rudder control, it may not have been sufficient for controlling and landing those airplanes in all conditions. Additionally, just because airplanes have been able to land safely does not mean that rudder post failure would not present an unsafe condition. If the rudder post fails, the top of the rudder folds over in-flight, which leads to diminished control of the airplane and loss of control of the airplane.

The FAA has not changed this AD as a result of these comments.

8. Rudder Availability

Several commenters, including individuals, The Short Wing Piper Club, and VAA, stated that the NPRM should be withdrawn due to lack of rudder availability. The commenters stated that the PMA manufacturers will not be able to produce 31,000 new rudders to comply with the AD within the AD compliance times.

FAA response: The FAA disagrees. Many of the 31,000 airplanes are not currently in service. There are an estimated 13,000 active airplanes in the U.S. fleet, and the FAA estimates that approximately half of those airplanes already have rudder assemblies with 4130N low-alloy steel installed. This reduces the number of rudders needed to approximately 6,500. The FAA also anticipates that many operators will reinforce their rudders by using the alternative method of compliance (AMOC) process rather than replacing them. The FAA estimates that this will reduce the number of new rudder assemblies needed from the PMA manufacturers even further. In addition, the FAA anticipates that the PMA manufacturers can produce the necessary rudder assemblies within the compliance times 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 airplanes, the FAA must address the unsafe condition.

The FAA has not changed this AD as a result of these comments.

C. Requests Regarding Applicability

Comment summary: Numerous individual commenters, AOPA, EAA, LAA, NTSB, The Short Wing Piper Club, and VAA, requested applicability changes to the proposed AD.

1. Add Other Airplane Models to Applicability

Several commenters, including individuals and the NTSB stated that other airplane models should be added to the applicability of the proposed AD. The commenters stated that other airplane models use the same rudder type.

FAA response: The FAA partially agrees. The FAA received a letter from the NTSB dated November 14, 2023, which identified the Model PA-25 airplane as a missing model in the applicability of the proposed AD. Piper sold the Model PA-25 airplane type certificate to a company located in Argentina. Therefore, the state of design for the Model PA-25 airplane is Argentina. The FAA has transmitted the NTSB's letter to the National Civil Aviation Administration of Argentina, which is the civil aviation authority for Argentina. The FAA will work with the National Civil Aviation Administration of Argentina to assure that this condition is addressed on the Model PA-25 airplanes.

The FAA has not changed this AD as a result of these comments.

2. Remove Model J-3 and Model PA-11 Airplanes From Applicability

Several commenters, including individuals, LAA, The Short Wing Piper Club, and VAA, stated that the Model J-3 and Model PA-11 airplanes should be removed from the applicability. The FAA infers that, by Model J-3 and Model PA-11 airplanes, the commenters are referring to all models that begin with "J3" and "PA-11." The commenters stated that the rudder assembly part number for the Model "J3" and Model "PA-11" airplanes is a different rudder assembly part number compared with the rudder assembly part number for the incident airplanes. The commenters also stated that these models have never been involved in an incident where the rudder has failed.

FAA response: The FAA disagrees. The rudder assembly part number for the Model "J3" and Model "PA-11" airplanes is different than the rudder assembly part number for other affected models. However, the part number of the rudder post itself is the same for both rudder assemblies. Given that the part number for the rudder post is the same for both rudder assemblies, the FAA disagrees with removing these models from this AD and has determined that the Model "J3" and Model "PA-11" airplanes are applicable for this AD. Although stresses on the Model "J3"and Model "PA-11" airplanes are somewhat lower than the rest of the fleet, the NTSB determined in NTSB report NTSB/AIR-22-02 that the failure is a combination of fatigue and corrosion. Given the contribution of corrosion to the failure the FAA has determined that the same failure can also occur on the Model "J3" and Model "PA-11" airplanes. The compliance times required by this AD are different based on category type as defined in Table 2 to paragraph (g)—Compliance Times of this AD.

As previously stated, the FAA revised table 2 to paragraph (g)(1)—Compliance Times of this AD to include a Category IV for airplanes that do not have a rudder post mounted beacon light and have an engine of 100 hp or below installed. The compliance time for Category IV airplanes is within 10 years after the effective date of this AD. The Model "J3" and Model "PA-11" airplanes would fall into this category provided they do not have a post mounted beacon light and do not have an engine installed with more than 100 hp. VAA calculated loads and stresses on the rudder post for all affected airplane models and the results are posted to the AD docket.

The FAA has not changed this AD as a result of these comments.

3. Limit to Airplanes With Floats

Numerous commenters, including individuals, EAA, LAA, and The Short Wing Piper Club, requested that the applicability be limited to airplanes with floats installed. The commenters stated that the incidents occurred on airplanes that were on floats operating in a marine environment in Alaska. The commenters further stated that airplanes with floats installed require the installation of a ventral fin that reduces required rudder input.

FAA response: The FAA disagrees. The FAA evaluated two accidents and five rudder post failures, and of the airplanes involved in those rudder post failures, only two airplanes were equipped with floats and those airplanes did not have a ventral fin installed, three airplanes had standard wheel landing gear, one airplane had ski landing gear, and one airplane had a wheel/ski landing gear configuration. Therefore, this failure has occurred on airplanes without floats more times than airplanes with floats installed. One of the affected airplanes based in Colorado had a standard wheel landing gear installed and was not operating in a marine environment; therefore, this failure mode cannot be attributed solely to float-equipped airplanes. Also, not all float configurations require a ventral fin to be installed so it cannot be presumed that if a ventral fin is not installed then the installation is incorrect. Although the ventral fin may be required for some float installations, it is not the only contributing factor, as this failure has also occurred on non-float airplanes.

The FAA has not changed this AD as a result of these comments.

4. Limit Applicability to Model PA-12 and Model PA-14 Airplanes

Many commenters, including individuals, AOPA, EAA, VAA, and LAA, suggested that the NPRM be limited to airplane configurations matching those of the incident airplanes (*i.e.,* Model PA-12 and Model PA-14 airplanes). The commenters stated that including other airplane models is an FAA overreach and those airplane models are not applicable to the unsafe condition.

FAA response: The FAA disagrees. In addition to the airplane models identified by the commenters, the FAA identified a Model PA-18 airplane that experienced an in-flight rudder post failure. NTSB report NTSB/AIR-22-02 also provides information on a failed rudder from a Model PA-18 airplane. The FAA also reviewed the loads calculations in NTSB report NTSB/AIR-22-02 and determined that loads on other airplane models would not differ significantly, therefore other airplane models could also be susceptible to the rudder failure. This assumption is supported by the analysis that the VAA performed on all affected airplane models showing that the stresses on the rudders from both maneuver loads and gust loads are similar in magnitude across these airplane models. The VAA's analysis is posted to the AD docket. Based on the seven known rudder post failures on three different airplane models (Model PA-12, Model PA-14, and Model PA-18) and the analysis conducted by the NTSB and the VAA for all affected airplane models, the FAA has determined that issuing an AD is necessary. In accordance with 14 CFR 39.5, the FAA issues an AD addressing a product when the FAA finds that an unsafe condition exists in the product and the condition is likely to exist or develop in other products of the same type design. Lastly, these rudder assemblies are rotable and can be salvaged from one airplane model and reinstalled on a different airplane model. Therefore, restricting the applicability of this AD to only include the airplane models referenced in NTSB/AIR-22-02 would not completely address the unsafe condition when considering the rotability of the rudder from one model to another.

The FAA has not changed this AD as a result of these comments.

5. Limit to Airplanes With a Rudder-Mounted Beacon Light

Numerous commenters, including individuals, EAA, LAA, The Short Wing Piper Club, and VAA, requested that the NPRM be limited to airplanes with a rudder-mounted beacon light installed. The commenters stated that the additional load due to the beacon light was the cause of the rudder post failure.

FAA response: The FAA disagrees. Although the installation of the beacon light would contribute to the rudder post failure, the standard in-service rudder post loads and stresses likely exceed the endurance limit of the rudder post when corrosion, scratches, or surface roughness are present on the rudder post. Additionally, the propeller blade pass frequency is significantly higher than the natural frequency of the upper rudder post and would not significantly affect the bending stress on the rudder post. If the propeller blade pass frequency is in the same range as the natural frequency of the rudder post when there is a beacon light installed on the top of the rudder, then the stress on the rudder post would amplify significantly due to the propeller blade pass frequency. In addition, since the rudder assembly is rotable from one airplane to another, a rudder assembly that had the beacon light installed on top of the rudder could have the beacon light removed to avoid having to comply with this AD. Furthermore, the rudder assembly could be removed from one airplane, and then reinstalled on a different airplane without the beacon light installed. However, the compliance times in this AD do account for the presence of a beacon light as it is a contributing factor and even if an operator removed the beacon light to get a different compliance time, the rudder would still eventually need to be replaced.

The FAA has not changed this AD as a result of these comments.

6. Limit to Airplanes With Higher Horsepower Engines

Numerous commenters, including individuals, EAA, LAA, The Short Wing Piper Club, and VAA, requested that the NPRM be limited to airplanes with higher horsepower engines than what is listed on the type certificate data sheet for those airplane models. The commenters stated that the cause of the rudder post failure was the installation of engines with higher horsepower than specified on the applicable type certificate data sheet for those airplanes. The commenters suggested that higher horsepower engines increase p-factor (asymmetric blade effect), which increases rudder loading.

FAA response: The FAA disagrees. Installation of a higher horsepower engine does not necessarily cause higher loads on the rudder if the modification did not include expanding the flight envelope of the airplane. Rudder inputs are common during regular flight of the affected fleet regardless of engine horsepower and are the primary source of the cyclical loading environment on the rudder post. Calculation of the rudder loads does not directly include the engine horsepower. Therefore, the rudder loads should remain largely unchanged for airplanes that have a higher horsepower engine installed. Although the p-factor would change, the FAA has no data or evidence that a higher p-factor contributes significantly to normal rudder loading during flight.

The NTSB and VAA calculated loads and stresses on the rudder post that approach the endurance limit based on the maneuvering and gust loads prescribed in Civil Air Regulations (CAR 03), which is the predecessor to 14 CFR part 23, and is the original certification basis for the affected airplanes. With the presence of corrosion, pitting, or scratches, the strength of the rudder post is reduced, and the

increased fatigue stress can exceed the endurance limit of 1025 carbon steel. The NTSB concluded that this is the primary mechanism that caused the rudder post failures.

The FAA acknowledges that the rudders on the airplanes with lower horsepower engines may not need replacement as often as other models. As previously stated, the FAA revised Table 2 to paragraph (g)—Compliance Times of this AD to include a Category IV for airplanes that do not have a rudder post mounted beacon light and have an engine of 100 hp or below installed. The compliance time for Category IV airplanes is within 10 years after the effective date of this AD.

7. AD Applicability Match Piper Service Bulletin 1379

Several individual commenters requested that the applicable serial numbers for various airplane models match Piper Service Bulletin 1379, dated December 2, 2022 (Piper Service Bulletin 1379). The commenters stated that the NPRM lists all serial numbers for the affected models whereas Piper Service Bulletin 1379 lists specific serial numbers for most of the affected airplane models. The commenters also stated that for some airplane models, Piper Service Bulletin 1379 does not call out all produced airplanes. The commenters further stated that matching the effectivity in Piper Service Bulletin 1379 would reduce the scope of the NPRM.

FAA response: The FAA disagrees. Piper Aircraft, Inc. recently released Piper Service Bulletin 1379B, dated May 7, 2024, which includes all produced airplanes for each airplane model that has a type certificate owned by Piper. Because some of the affected airplane models' type certificates and design authority are now owned by FS 2001 Corp, FS 2002 Corporation, and FS 2003 Corporation, those airplane models are not included in Piper Service Bulletin 1379 and that is why the applicability of this AD specifies all of the affected airplane models instead of referring to the Piper service bulletin.

The FAA has not changed this AD as a result of these comments.

D. Requests Regarding Repetitive Inspections

Comment summary: Many commenters, including individuals, AOPA, EAA, The Short Wing Piper Club, and VAA, requested an option to inspect the rudder post or perform strength testing on the rudder post on a regular basis instead of replacing the entire rudder. The commenters stated that corrosion is a contributor to the rudder failure, therefore, requiring inspections or performing strength tests would be a more logical and more cost-effective means to ensure the strength of the rudder post is adequate for flight.

FAA response: The FAA disagrees. It would be impractical to repetitively inspect the rudder for cracks, corrosion, and other damage. The operators could inspect the inside of the rudder post tube with a borescope; however, they would not be able to inspect the outer surface of the tube without removing the fabric. An inspection interval that adequately monitors the rudder post condition may be too costly because it will require frequent removal of the covering. Furthermore, many of the existing 1025 carbon steel rudders have been in service for over 70 years, have endured multiple corrosion removal processes, and have been painted or powder coated several times, making accurate inspections more challenging.

In addition, a load test as an inspection to determine airworthiness is problematic because the load test could further damage the rudder and contribute to an accident. It would be very difficult to

determine an acceptable load test that would in all cases determine a suspect rudder and not unknowingly damage a rudder. Strength testing the rudder post up to approximately yield stress is also problematic. If the strength of the rudder has been degraded over the years due to corrosion and fatigue, a test load could cause permanent, but unnoticed, damage to the rudder and could be the cause of a rudder failure in a subsequent flight.

If an owner/operator would like to implement an inspection program on its airplane to monitor the strength of the rudder in lieu of replacement, the FAA will consider the proposal upon submission of an AMOC request following the procedures in paragraph (h) of this AD.

The FAA has not changed this AD as a result of these comments.

E. Requests Regarding Rudder Post Reinforcement

Comment summary: Several commenters, including individuals, AOPA, EAA, LAA, The Short Wing Piper Club, and VAA, requested an option to reinforce the rudder post instead of replacing the entire rudder. The commenters stated that offering an option to reinforce the rudder post would be easier to accomplish and more cost-effective on the owner/operator than replacing the entire rudder.

FAA response: The FAA disagrees. Reinforcement could strengthen the critical location on the rudder post; however, many airplanes are over 70 years old, which makes it difficult to design a repair that will work for all airplanes and provide that repair as an option in the final rule. With so many affected airplane types to consider and with differing in-service history, the FAA determined that the AMOC process would be more effective in allowing owner/operators to propose a reinforcement design of their choice. If an owner/operator would like to reinforce the rudder post in lieu of replacement, the FAA will consider the proposal upon submission of an AMOC request following the procedures in paragraph (h) of this AD.

The FAA has not changed this AD as a result of these comments.

F. Requests Regarding Estimated Costs

Comment summary: Many commenters, including individuals, AOPA, The Short Wing Piper Club, and VAA, requested that the FAA increase the cost per work-hour specified in the NPRM. The commenters stated that $85 per work-hour is too low and does not reflect the current labor rate. The commenters also stated that most mechanics would not be able to perform the rudder replacement within 8 hours. Some of these commenters also stated that there should be an allowance for inflation over the compliance time.

FAA response: The FAA disagrees. The FAA notes that the current wage rate for aviation mechanics as provided by the Bureau of Labor Statistics, found at *bls.gov/oes/2023/may/oes493011.htm,* after accounting for fringe benefits that are valued at roughly 50 percent of the nominal wage, is lower than the estimated fully burdened labor rate of $85 per hour. Therefore, the FAA is unable to justify increasing the labor rate from $85 per hour. The FAA's estimate that it would take 8 work-hours to perform the rudder replacement was based on available data. The cost analysis in AD rulemaking actions typically includes only the costs associated with complying with the AD and does not include an allowance for inflation over the compliance time.

The FAA has not changed this AD as a result of these comments.

G. Requests Regarding Compliance Times

Comment summary: Several commenters, including individuals, the Royal Netherlands Airforce Historic Flight, and VAA, requested that the FAA use hours in service rather than years in service to establish compliance times. The commenters stated that hours in service should be the criteria that establishes when compliance action should be taken as it would be the causal factor in the rudder failure.

FAA response: The FAA disagrees. The FAA determined that fatigue and corrosion were the contributing factors to the rudder failure. Hours in service may not directly correlate to the effects of corrosion depending on the storage conditions of the airplane. Since many of these airplanes are over 70 years old, and based on the unknown effects of corrosion, determining airplane categories based on hours in service would not accurately address the unsafe condition.

The FAA has not changed this AD as a result of these comments.

H. Impact on Intrastate Aviation in Alaska and Small Entities

Comment summary: Many commenters, including individuals and The Short Wing Piper Club, stated that the impact on intrastate aviation in Alaska was not properly assessed in the NPRM, since a significant number of affected airplanes are operated in Alaska and used to transport supplies. In addition, commenters also stated that the FAA did not properly assess whether there was a significant impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. Some commenters stated that a significant number of small businesses and charitable operations would be impacted by this AD.

FAA response: The FAA disagrees. Based on the PMA manufacturers' abilities to positively meet the fleet demand for parts, combined with the addition of the new Category IV airplane compliance time previously mentioned (airplanes with lower horsepower and no beacon light) that provides a 10-year compliance time, the FAA does not agree that this AD will negatively affect intrastate commerce in Alaska. In light of the heavy reliance on aviation for intrastate transportation in Alaska, the FAA has fully considered the effects of this final rule (including costs to be borne by affected operators) from the earliest possible stages of AD development. As previously stated, 14 CFR part 39 requires operators to correct an unsafe condition identified on an airplane to ensure operation of that airplane in an airworthy condition. The FAA has determined that the need to address fatigue loading and corrosion of rudder posts made from 1025 carbon steel which, if not addressed, could result in a broken rudder and consequent reduced ability of the flight crew to maintain the safe flight and landing of the airplane, outweighs any impact on aviation in Alaska.

As far as this AD affecting a substantial number of small businesses, the FAA does not agree. The commenters did not provide any evidence or data to substantiate that this would affect a substantial number of small businesses. Based on the estimated cost impact of $3,000 (labor and parts cost) per each airplane affected by this final rule and that operators should be able to find replacement rudders without difficulty, the FAA has determined that this rule will not significantly impact a substantial number of small entities.

The FAA has not changed this AD as a result of these comments.

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 the changes described previously, this AD is adopted as proposed in the NPRM. None of the changes will increase the economic burden on any operator.

Costs of Compliance

The FAA estimates that this AD affects 30,992 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
Replace rudder	8 work-hours × $85 per hour = $680	$2,320	$3,000	$92,976,000

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 airplane 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
- Airplane
- 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:

2025-02-11 FS 2001 Corp, FS 2002 Corporation, FS 2003 Corporation, Piper, and Piper Aircraft, Inc.: Amendment 39-22944; Docket No. FAA-2023-1893; Project Identifier AD-2023-00389-A.

(a) Effective Date

This airworthiness directive (AD) is effective March 20, 2025.

(b) Affected ADs

None.

(c) Applicability

This AD applies to all airplane models specified in table 1 to paragraph (c) of this AD, certificated in any category, that are not equipped with a rudder having a rudder post made from 4130N low-alloy steel.

Note 1 to paragraph (c):

Most parts manufacturer approval (PMA) rudders are equipped with a rudder post made from 4130N low-alloy steel. This can be verified by reviewing the individual PMA.

Note 2 to paragraph (c):

Piper Service Bulletin 1379B, dated May 7, 2024, contains information on how to determine whether a rudder post is made from 4130N low-alloy steel. This is not the only way to determine this and this AD does not require the use of this service bulletin.

Table 1 to Paragraph (c)—Applicable Airplane Models

Type certificate holder	Airplane model
FS 2001 Corp	J5A (Army L-4F), J5A-80, J5B (Army L-4G), J5C, AE-1, HE-1.
FS 2002 Corporation	PA-14.
FS 2003 Corporation	PA-12, PA-12S.
Piper Aircraft, Inc	J3C-40, J3C-50, J3C-50S, J3C-65, J3C-65S, PA-11, PA-11S.
Piper Aircraft, Inc	J3F-50, J3F-50S, J3F-60, J3F-60S, (Army L-4D) J3F-65, J3F-65S.
Piper Aircraft, Inc	J3L, J3L-S, J3L-65 (ARMY L-4C), J3L-65S.
Piper Aircraft, Inc	J4, J4A, J4A-S.
Piper Aircraft, Inc	J4E (ARMY L-4E).
Piper	J4F.
Piper Aircraft, Inc	PA-15.
Piper Aircraft, Inc	PA-16, PA-16S.
Piper Aircraft, Inc	PA-17.
Piper Aircraft, Inc	PA-18, PA-18S, PA-18 “105” (Special), PA-18S “105” (Special), PA-18A, PA-18 “125” (Army L-21A), PA-18S “125”, PA-18AS “125”, PA-18 “135” (Army L-21B), PA-18A “135”, PA-18S “135”, PA-18AS “135”, PA-18 “150”, PA-18A “150”, PA-18S “150”, PA-18AS “150”, PA-19 (Army L-18C), PA-19S.
Piper Aircraft, Inc	PA-18A (Restricted), PA-18A “135” (Restricted), PA-18A “150” (Restricted).

Type certificate holder	Airplane model
Piper Aircraft, Inc	PA-20, PA-20S, PA-20 “115”, PA-20S “115”, PA-20 “135”, PA-20S “135”.
Piper Aircraft, Inc	PA-22, PA-22-108, PA-22-135, PA-22S-135, PA-22-150, PA-22S-150, PA-22-160, PA-22S-160.

(d) Subject

Joint Airplane System Component (JASC) Code 5540, Rudder Structure.

(e) Unsafe Condition

This AD was prompted by reports of broken rudders. The FAA is issuing this AD to address fatigue loading and corrosion of rudder posts made from 1025 carbon steel which, if not addressed, could result in a broken rudder and consequent reduced ability of the flight crew to maintain the safe flight and landing of the airplane.

(f) Compliance

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

(g) Required Actions

(1) At the applicable compliance time for the category type for your airplane specified in table 2 to paragraph (g)(1) of this AD, replace the rudder with a rudder that is equipped with a rudder post made from 4130N low-alloy steel.

Table 2 to Paragraph (g)(1)—Compliance Times

Category type	Compliance time
Category I Airplanes: Airplanes having both a rudder post mounted beacon light and a 150 or greater horsepower (hp) engine installed	Within 2 years after the effective date of this AD.
Category II Airplanes: Airplanes having either a rudder post mounted beacon light or a 150 or greater hp engine installed	Within 3 years after the effective date of this AD.
Category III Airplanes: All airplanes not in Category I or Category II that do not have a rudder post mounted beacon light and have an engine less than 150 hp and greater than 100 hp installed	Within 5 years after the effective date of this AD.
Category IV Airplanes: All airplanes not in Category I, II, or III that do not have a rudder post mounted beacon light and have an engine of 100 hp or below installed	Within 10 years after the effective date of this AD.

(2) As of the effective date of this AD, do not install any rudder that is equipped with a rudder post made from 1025 carbon steel on any airplane.

(h) Alternative Methods of Compliance (AMOCs)

(1) The Manager, West Certification 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 local Flight Standards District Office, as appropriate. If sending information directly to the manager of the West Certification Branch, send it to the attention of the person identified in paragraph (i)(1) of this AD. Information may be emailed to: *AMOC@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.

(i) Additional Information

(1) For more information about this AD, contact Joseph Zuklic, Aviation Safety Engineer, FAA, 2200 South 216th Street, Des Moines, WA 98198; phone: (206) 231-3858; email: *joseph.r.zuklic@faa.gov*.

(2) For material identified in this AD that is not incorporated by reference, contact Piper Aircraft, Inc., 2926 Piper Drive, Vero Beach, FL 32960; phone: (772) 299-2141; website: *piper.com*. You may view this material at the FAA, Airworthiness Products Section, Operational Safety Branch, 901 Locust, Kansas City, MO 64106. For information on the availability of this material at the FAA, call (817) 222-5110.

(j) Material Incorporated by Reference

None.

Issued on January 31, 2025.

Steven W. Thompson,

Acting Deputy Director, Compliance & Airworthiness Division, Airplane Certification Service.

[FR Doc. 2025-02528 Filed 2-12-25; 8:45 am]

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