Safety Directive

Civil Aviation Authority

PROPOSED AIRWORTHINESS DIRECTIVE

Number: 1977

Issue date: 12 March 2021

In accordance with the CAA Continuing Airworthiness Procedures, the CAA is proposing the issuance of a CAA Airworthiness Directive (AD), applicable to the aeronautical product(s) identified below. All interested persons may send their comments, referencing the PAD Number above, to the e-mail address specified in the 'Remarks' section, prior to the consultation date indicated.	
Design Approval Holder's Name: **Piper Aircraft Inc.**	Type/Model Designation(s): **PA-28 and PA-32 aeroplanes**
TCDS:	**EASA.IM.A.234 and USA (FAA TCDS) 2A13 for PA-28; EASA.IM.A.239 and (FAA TCDS) A3SO for PA-32**
Foreign AD:	**Federal Aviation Administration (FAA) AD 2020-26-16 dated 15 January 2021.**
Supersedure:	For affected aeroplanes operated on the UK Registry, this AD supersedes the State of Design AD, FAA AD 2020-26-16.
ATA 57	**Wings – Lower Main Wing Spar Caps – Inspection**
Manufacturer(s):	Piper Aircraft, Inc. (Piper), formerly The New Piper Aircraft, Inc., Piper Aircraft Corporation.

Applicability:

This AD applies to the following aeroplanes, identified by model, commercial name(s) and serial numbers (s/n):

Model (commercial name)	**S/No.**
PA-28-151 (Warrior)	*All*
PA-28-161 (Warrior II)	*All*
PA-28-161 (Warrior III)	*All, except s/n 2842006*
PA-28-161 (Cadet)	*All*
PA-28-181 (Archer II and Archer III)	*All*
PA-28-235 (Cherokee Pathfinder)	*All*
PA-28R-180 (Arrow)	*All*
PA-28R-200 (Arrow)	*All*
PA-28R-200 (Arrow II)	*All, except s/n 28R-7235151*
PA-28R-201 (Arrow III)	*All, except s/n 2844029, 2844030, 2844081, 2844125, 2844136, 2844147 to 2844151 inclusive, 28R-7737078, 28R-7737142, 28R 7837108, 28R-7837125 and 28R-7837257*
PA-28R-201T (Turbo Arrow)	*All*
PA-28RT-201 (Arrow IV)	*All*
PA-28RT-201T (Turbo Arrow IV)	*All*
PA-32-260 (Cherokee Six 260)	*All*
PA-32-300 (Cherokee Six 300)	*All*
PA-32R-300 (Lance)	*All*
PA-32RT-300 (Lance II)	*All, except s/n 32R-7985004*
PA-32RT-300T (Turbo Lance II)	*All*

Definitions:

For the purpose of this AD, the following definitions apply:

FH: Flight hours (FH) is the accumulated time between the moments when an aeroplane moved under its own power for the purpose of flight and the moments when the aeroplane came to a full stop after landing (total FH of all flights).

EFSH: EASA factored service hours (EFSH) are those calculated in accordance with the formula specified in Figure 1 of this AD.

TIS: With respect to maintenance time records, time-in-service (TIS) means the accumulated time between the moments an aeroplane took off and the moments it touched down (total TIS of all flights). In the case TIS records are unreliable or not available, e.g. because maintenance records have been kept with reference to FH, the use of FH is acceptable for the calculation of the average annual aeroplane usage and EFSH.

AAU: Average annual utilisation (AAU) of an aeroplane is the TIS of that aeroplane, divided by the number of calendar years after the aeroplane's year of manufacture (data plate).

The SB: Piper Service Bulletin (SB) No. 1345.

The FAA AD: Federal Aviation Administration (FAA) AD2020-26-16 dated 15 January 2021.

Reason:	An occurrence was reported of a wing separation on a PA-28R-201 aeroplane. Subsequent investigation results determined that the event was caused by fatigue cracking in a visually inaccessible area of the lower main wing spar cap. This condition, if not detected and corrected, could lead to similar accidents. Prompted by these findings, Piper issued the SB, providing instructions to inspect the main wing spar caps and, if cracks are found, to replace the main wing spar. Consequently, the FAA issued AD 2020-26-16, applicable to aeroplanes that have accumulated 5 000 hours' TIS or more; or have a main wing spar replaced with a used (instead of new) main wing spar; or for which maintenance records are missing or incomplete, and requiring calculation of 'factored service hours', determined by the number of 100 hours inspections or annual inspections that have been accomplished on a main wing spar since new. Based on the outcome of the factored service hours, that AD requires a one-time Eddy-Current (EC) inspection of the inner surface of the two lower outboard bolt holes on the lower main wing spar cap for cracks and, depending on findings, replacement of the main wing spar with a new main wing spar, or a used main wing spar that has passed (no cracks found) an EC inspection in accordance with steps 1 to 3 (inclusive) of the instructions of the SB. Following a joint CAA/EASA review of the FAA AD, it was determined that, since in Europe there is no legal distinction and documentation requirement between the accomplishment of 100-hours inspections and annual inspections, depending on the operation of the aeroplane, the FAA calculation method for FSH is inappropriate for the affected aeroplanes operated under EU regulations. Based on this determination, EASA/CAA have decided not to adopt the FAA AD. For the reasons described above, this AD requires repetitive calculations of AAU and EFSH, as defined in this AD and, depending on the results, an eddy current (EC) inspection of the main wing spar caps for cracks and, depending on findings, replacement of the affected main wing spar. This AD also requires reporting the inspection results to CAA, the FAA and Piper. Appendix 2 of this AD includes a flowchart to assist operators to determine which action is required and when, and also provides some examples of calculation. This AD is considered to be an interim action and further AD action may follow.
Effective Date:	**[TBD - standard: 14 days after AD issue date]**

Required Action(s) and Compliance Time(s):	Required as indicated, unless accomplished previously: **Review of Maintenance Records and Calculation(s):** (1) Within 30 days after the effective date of this AD, and, thereafter, during each 100-hours or annual inspection, as applicable, review the aeroplane maintenance records for completeness and determine whether a wing or wing spar has been replaced with a wing or wing spar that had more than zero hours TIS at the time of installation. (2) If, as result of any review as required by paragraph (1|) of this AD, it is determined that the a wing spar has accumulated or exceeded 5000 hours' TIS , or in case the hours TIS are unknown, within 30 days after the effective date of this AD, or after that review, whichever occurs later, calculate the AAU, as defined in this AD. (3) If the result of the calculation as required by paragraph (2) of this AD is 100 (TIS/year) or more, before further flight, calculate the EFSH by using the formula specified in Figure 1 of this AD. Figure 1 – EFSH Calculation EFSH = [TIS – (100 x Years)] + (100 x Years) / 15 **Inspection:** (4) If, as a result of the calculation as required by paragraph (3) of this AD, the EFSH are determined to be 5 000 or more, within 100 hours after accumulating 5 000 EFSH, or within 100 hours after the effective date of this AD, whichever occurs later, accomplish an EC inspection of the inner surface of the two lower outboard bolt holes on the lower main wing spar cap for cracks. If the wing is installed, use steps 1 to 3 (inclusive) of the instructions of the SB or, if the wing is not installed, use step 3 of the instructions of the SB. (5) If, as result of the first review as required by paragraph (1) of this AD, maintenance records are found to be incomplete (i.e. unknown whether a wing spar has been installed with more than zero hours' TIS), or spar/aeroplane TIS or FH are unknown, within 100 hours after the effective date of this AD, accomplish an EC inspection of the inner surface of the two lower outboard bolt holes on the lower main wing spar cap for cracks. If the wing is installed, use steps 1 to 3 (inclusive) of the instructions of the SB or, if the wing is not installed, use step 3 of the instructions of the SB. **Wing Spar Replacement:** (6) If, during the EC inspection as required by paragraph (4) or (5) of this AD, as applicable, any crack is detected that exceeds the acceptance criteria of the SB, before next flight, replace the main wing spar with a new (zero TIS) main wing spar, or with a serviceable (more than zero TIS) main wing spar that, before installation, has passed an EC inspection (no cracks detected) in accordance with steps 1 to 3 (inclusive) of the instructions of the SB. Replacement of a main wing spar can be accomplished in accordance with the instructions of Piper SL 997. **Bolt Replacement:** (7) Before next flight after the EC inspection as required by paragraph (4) or (5) of this AD, as applicable, or during the main wing spar replacement as required by paragraph (6) of this AD, as applicable, install new bolts in accordance with step 6 of the instructions of the SB.

Required Action(s) and Compliance Time(s):	**Reporting:** (8) Within 30 days after the EC inspection as required by paragraph (4) or (5) of this AD, as applicable, report the inspection results to CAA, the FAA and to Piper Aircraft. This can be accomplished by using Appendix 1 (Inspection Results Form) of this AD and the contact information found on that Form.
Reference Publications:	Piper SB 1345 dated 27 March 2020. Piper SL 997 dated 14 May 1987.
Remarks:	1. This Proposed AD will be closed for consultation on 9 April 2021. 2. Enquiries regarding this PAD should be referred to the CAA General Aviation Unit. E-mail: GA@caa.co.uk 3. Information about any failures, malfunctions, defects or other occurrences, which may be similar to the unsafe condition addressed by this PAD, and which may occur, or have occurred on a product, part or appliance not affected by this PAD, can be reported to the *EU aviation safety reporting system*. This may include reporting on the same or similar components, other than those covered by the design to which this PAD applies, if the same unsafe condition can exist or may develop on an aircraft with those components installed. Such components may be installed under an FAA Parts Manufacturer Approval (PMA), Supplemental Type Certificate (STC) or other modification. 4. For any question concerning the technical content of the requirements in this PAD, please contact: Piper Aircraft, Inc., 2926 Piper Drive, Vero Beach, Florida 32960, United States of America; Telephone: +1 772-299-2141; E-mail: CustomerService@piper.com; Website: https://www.piper.com/contact-us/ or https://www.piper.com/technical-publications.

Appendix 1

Inspection Results Form

E-mail completed from to:
9-ASO-ATLCOS-Reporting@faa.gov
and
customer.service@piper.com
and
GA@caa.co.uk

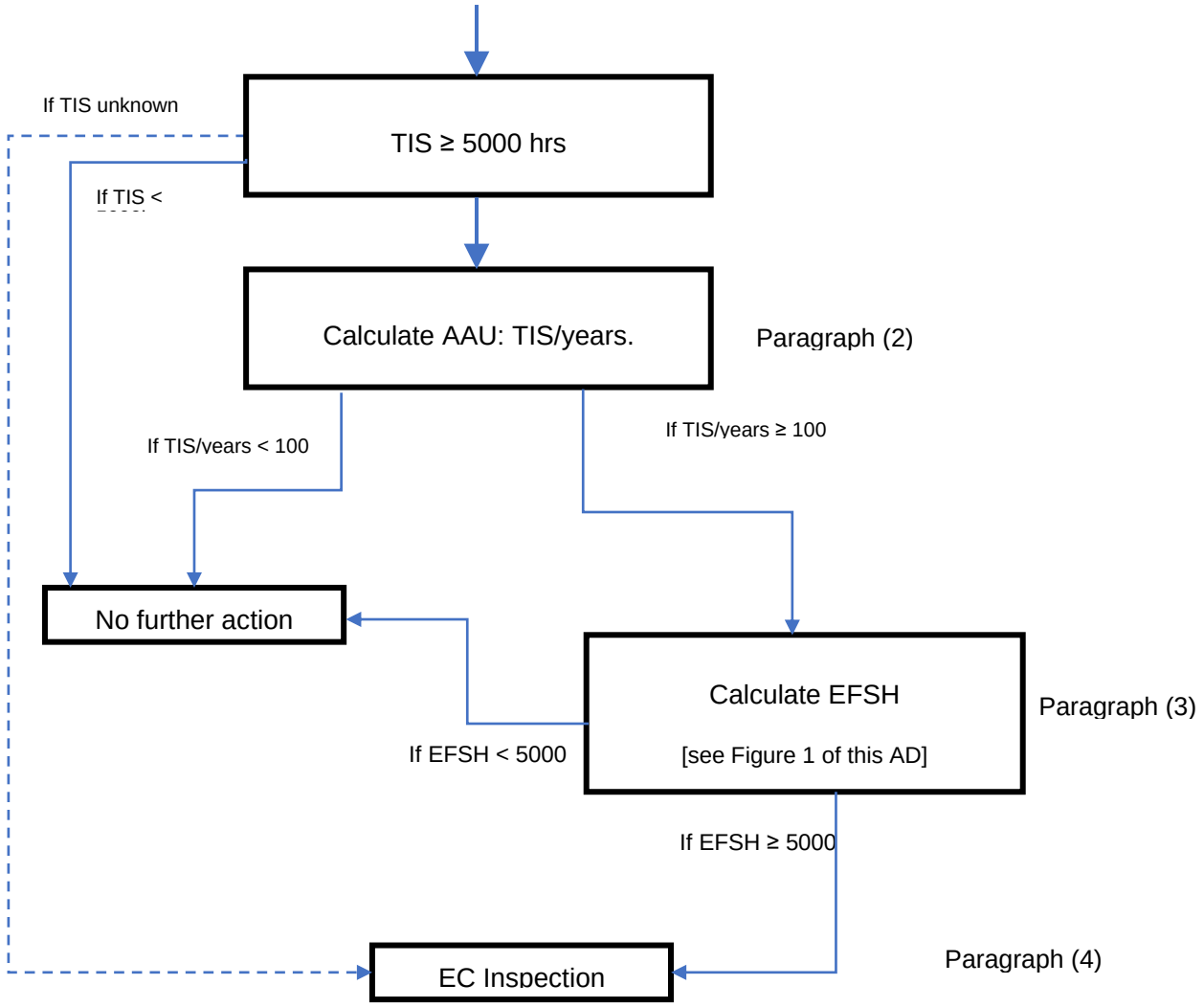
SUBJECT LINE: Docket No. FAA-2018-1046

Or mail to: Federal Aviation Administration
Atlanta ACO Brach, AIR-7A1
1701 Columbia Avenue
College Park, GA 30337
and
Piper Certification Office
2926 Piper Drive
Vero Beach, FL 32960

Include Photos, if applicable

Aircraft Model: PA-	Serial Number:
Aircraft Total TIS: or FH:	Registration:
EASA FSH – LH Wing:	RH Wing:
(if both wings are factory installed original, these numbers should be the same)	
Inspection Results	
LH Wings Spar FWD: Accepted ☐ Rejected ☐	RH Wings Spar FWD: Accepted ☐ Rejected ☐
LH Wing Spar AFT: Accepted ☐ Rejected ☐	RH Wing Spar AFT: Accepted ☐ Rejected ☐
Inspector Comments (observed damage, condition of hole, etc.)	
Inspector Information:	
Name (print):	Signature:
Certificate No.:	Date:

Appendix 2 - Flowchart / Examples of Calculation



Example 1:
For an a/c with 8 years in service and 700 hours TIS (TIS=700), the results would be:

1. Paragraph (2): TIS/years = 700/8 = 87,5 <100 → no action required.

Example 2:
For an a/c with 8 years in service and 3000 hours TIS Hours (TIS=3000), the results would be:

1. Paragraph (2): TIS/years= 3 000/8 = 375 >100 → go to paragraph (3);
2. Paragraph (3): EFSH = (3000-100x8) + (100x8) / 15= 2 253 < 5000 → no further action

Example 3:
For an a/c with 8 years in service and 6000 hours TIS (TIS=6000), the results would be:

1. Paragraph (2): TIS/Age= 750 >100 → go to paragraph (3);
2. Paragraph (3): EFSH = (6000-100x8) + (100x8)/15=5253 → go to paragraph (4).

Example of calendar years: For an aeroplane that was manufactured in 1989, 1990 is the first calendar year to be counted, and the full year <u>before</u> calculation would be the last, so (at this time, in 2021) the number would be 31.