



## RECORD OF CONVERSATION

**Michael J. Hodges**  
**Air Safety Investigator**  
**Central Regional Office**  
**Office of Aviation Safety**  
**National Transportation Safety Board**

---

**Date: 07/12/2021**

**Person Contacted: Louie Bettis (FAA Aviation Safety Inspector,  
Airworthiness / Principal Maintenance Inspector – FAA St. Louis FSDO)**  
**NTSB Case Number: CEN21LA312**

---

### **Narrative:**

The following is a synopsis of the information provided by Louie Bettis to the NTSB investigator-in-charge, via a telephone conversation.

- Upon examining the airframe of N110ST (Piper PA-46-350P, Mirage: serial number 4636373), a failure of the engine/nose landing gear mount was noticed. The metal was fractured. The engine mount sustained substantial damage.
- Piper issued mandatory Service Bulletin (SB) 1103F on September 1, 2015, regarding the engine/nose landing gear mount. This SB is to be accomplished each 100 hours, after the initial inspection, until the mount is replaced with an upgraded mount part number, removing the inspection requirement of SB 1103F.
- The airframe maintenance records of N110ST were reviewed and it was found that SB 1103F was accomplished on November 11, 2015 at a total airframe of 1,377.5 hours. This was the last accomplishment of SB 1103F found in the airframe maintenance records. N110ST has flown almost 500 hours since the inspection of SB 1103F occurred on November 11, 2015.
- A fracture of the upper portion of the engine mount that attaches to the nose landing gear actuator was noticed, which SB 1103F addresses.
- A fracture of the lower mount was noticed, that is not addressed in SB 1103F. Piper mandatory SB 1154C (issued on January 3, 2008) addresses engine mount cracks on the nose landing gear actuator attachment feet (where the feet are welded to tubes) and at the nose landing gear pivot (trunnion attachment).
- The FAA issued Special Airworthiness Information Bulletin (SAIB) CE-09-13R1 (on July 14, 2014), about possible cracks in the engine mount where both the nose landing gear

trunnion and the nose landing gear actuator attach for the Piper PA-46-350P series.

- Compliance with the Piper SB and the FAA SAIB are not required for 14 Code of Federal Regulations Part 91 owners/operators.
- The last inspection on the airframe, an annual inspection, occurred on October 16, 2020, and the airframe was at 1,814 hours.

**\*\*\* NOTHING FOLLOWS \*\*\***

**AIRCRAFT/INCIDENT/ACCIDENT REPORT**

**DATE:** 6.24.21

**Type Aircraft:** PA-46

**N#** N110ST

**Owner:** Tony Bright

**Pilot:** Tony Bright

**No. Pass:** 2 **No. Crew:** 1 **Type Cargo:** N/A

**Pt. of Dept:** KTRI

**Final Destination:** KSTL

**Date of Incident/Accident:** 6.24.21

**Time:** 1317

**Injuries:** 0 **Deaths:** 0 **Apparent Damage to Aircraft:** Nose gear, propeller, belly antenanna nose gear doors.

**Apparent Damage to A/P Property:** Safety area grass adjacent to Taxiway L to the West and South of Runway 12L/30R

**Nature of Incident/Accident:** Aircraft slid off the Runway

**Prevailing Weather:** Overcast. Dry Runways

**Location of Occurrence:** West of Taxiway L and South of Runway 12L/30R

**Pilot's Statement:** The pilot stated he had come in a bit high on his approach at approximately 85 knots and landed near midfield on the RWY. Once applying his brakes he felt the aircraft pull to the left immediately. As he veered left he said the nose gear collapsed but was unsure of when that occurred. He said it possibly happened when he applied the brakes or when the aircraft exited the RWY causing the prop to dig in.

**Involved Parties(Other than Pilot):** Airport Ops, ARFF, APD, AFMX, Signature FBO

**Corrective Actions Taken:** Ruts caused by the aircraft were filled and graded.

KSTL 241825Z COR 24012KT 10SM -RA FEW050 SCT070 BKN130 OVC250 27/21 A3001


RMK AO2 LTG DSNT NE TSE22 OCNL LTGIC DSNT NE-E CB DSNT NE-E MOV E P000 T02720211

**IF VERY SERIOUS ACCIDENT, GO TO EMERGENCY DISASTER NOTIFICATION LIST**

**CALL THE FOLLOWING AS NECESSARY:**  
**Field Maintenance for bus #801, 802, 803: 5350**

---

**AIRPORT AUTHORITY MANAGEMENT TO BE CONTACTED AS NECESSARY**

<b>Name</b>	<b>Home #</b>	<b>Cell #</b>	<b>Time:</b>
<b>Rhonda Hamm-Niebruegge</b>			1326
<b>Ron Stella</b>			1326
<b>Dave Kulinsky</b>			1326
<b>Jerry Beckmann</b>			1326
<b>Cole Meyer</b>			1326
<b>Elizabeth Smart</b>			1326
<b>Roger Lotz</b>			1326
<b>William Becker</b>			1326
<b>Airport Chaplin</b>			

**OUTSIDE AGENCIES: AS REQUIRED**

<b>Flight Standards District Office:</b> <b>Mon-Fri: 0730-1600L Main Office: 800-452-9202</b>		1407
<b>Signature:</b>		1340
<b>ATS Jet</b>		

**Center: Revised**

06/2021

**Aircraft Record** General Information

AIRCRAFT DESCRIPTION

Registration No. N110ST  
Model PA-46-350P Popular Name: MALIBU MIRAGE  
Type Certificate No. A2550  
Color WHITE / LIGHT BURGUNDY MET & GOLD DUST MET / BLACK MET  
Engine Manufacturer: LYCOMING Serial Numbers: Single L-12011-61A  
Engine Model: TIO-540-AE2A Left \_\_\_\_\_ Right \_\_\_\_\_  
Propeller Manufacturer: HARTZELL Hub or Serial Number: Single HK1074B  
Propeller Model: HCI 34R-1E Left \_\_\_\_\_ Right \_\_\_\_\_

Blade Numbers

Left	Right
<u>921</u>	_____
<u>928</u>	_____
<u>926</u>	_____

2005 MODEL

Alterations  
Number of  
office entries

RECORDING  
TACH  
TIME

TODAY'S  
FLIGHT

TOTAL  
TIME IN  
SERVICE

Description of Inspections, Tests, Repairs and Alterations  
Entries must be endorsed with Name, Rating and Certificate Number of  
Technician or Repair Facility. (See back pages for other specific entries.)

### CRYSTAL AVIONICS LLC

1746 Entrance Dr.  
New Braunfels, Texas 78130

FAA Repair Station YVCR493Y

N: 1105T

Date: 5-8-2019

FAR 91.411

Details of this inspection are filed under Repair Station Work Order No: 4094

System Tested To: 30,000 FT

Pilot's Altimeter: P/N: GDU700P S/N: 3MD001258 Tested To: 30,000 FT

Co-Pilot's Altimeter: P/N: 5934PAD-3A S/N: 440686 Tested To: 30,000 FT

#2 Pilot's ALT P/N: 16450-1147 S/N: 173961 Tested To: 30,000 FT

I certify that the Altimeter & Altitude reporting equipment test and inspections required by FAR 91.411 have been performed in accordance with FAR43, Appendix E. I found these systems to be in Airworthy Condition and Approve these systems for return to service.

Date: 5-8-2019 Signature: [Redacted]

FAA CERTIFIED REPAIR STATION YVCR493Y Form# CA-08 - V2.0 - 1/15/09

### CRYSTAL AVIONICS LLC

1746 Entrance Dr.  
New Braunfels, Texas 78130

FAA Repair Station YVCR493Y

N: 1105T

Date: 5-8-2019

FAR 91.413

Details of this inspection are filed under Repair Station Work Order No: 4094

Automatic Pressure Reporting System Tested To: 30,000

No. 1 Transponder: Model: GTX330E1S S/N: 84114301 Tested On: 5-8-2019

No. 2 Transponder: Model: GTX330 S/N: 84114287 Tested On: 5-8-2019

I certify that the ATC Transponder reporting equipment and inspections required by FAR 91.413 have been performed in accordance with FAR43, Appendix F. I found these systems to be in Airworthy condition and approve these systems for return to service.

Date: 5-8-2019 Signature: [Redacted]

FAA CERTIFIED REPAIR STATION YVCR493Y Form# CA-09 - V2.0 - 1/15/09



**Inspections, Tests, Repairs and Alterations**  
Inspected with Name, Rating and Certificate Number of  
Inspection Facility. (See back pages for other specific entries.)



**Airframe**

Date: 08/15/2019  
Model: PA46-350P  
Hobbs: 1687.3

Make: Piper  
S/N: 4636373

8191 N Tamiami Trail  
Sarasota, FL 34243  
www.AEROMix-srl.com

REG #: N110ST  
TTAF: 1687.3

**Inspections, Tests, Repairs and Alterations**  
Inspected with Name, Rating and Certificate Number of  
Inspection Facility. (See back pages for other specific entries.)

**Performed Annual Inspection.**

Aircraft Interior and Exterior Panels removed, cable/pulleys inspected and lubricated. Cable tensions within limits. Landing gear inspected. Fuel, Fuselage, Cockpit, Wings, Empennage, Retractable Landing Gear, Electrical and Radio Groups inspected per Checklist. Tested ELT per FAR 91.207(d) with next Battery replacement due 11/2021. Aircraft cleaned.

I certify that this aircraft has been inspected in accordance with a Annual inspection as per the scope and detail of FAR 43 appendix D and was determined to be in airworthy condition.

Nicholas J. Rinaldo IA# [REDACTED]

**Airframe**

Date: 08/06/2019  
Model: PA46-350P  
Hobbs: 1687.3

8191 N Tamiami Trail  
Sarasota, FL 34243  
www.AEROMix-srl.com

REG #: N110ST  
TTAF: 1687.3

Removed and replaced Brake Linings and Shims on LH and RH Main  
Wheels with (8) eight NEW Rapco P/N#RA66-62 and (2)  
Rapco P/N#RA068-01100 IAW Piper PA-46-350P Maintenance  
Chapter 32, Section 32-40-00, Pages 5 and 6, Paragraphs 12(b-

Check OK with no faults found.

Rinaldo A&P# [REDACTED]




**Airframe**

Make: Piper  
S/N: 4636373

Date: 08/19/2019  
Model: PA46-350P  
Hobbs: 1687.3

8191 N Tamiami Trail  
Sarasota, FL 34243  
www.AEROMix-srl.com

REG #: N110ST  
TTAF: 1687.3

Removed and replaced Oxygen Generators under Copilot Seat and Copi-  
lot Side Passenger Seat with New AVOX Systems P/N#801386-22; S/N#  
A19050354(Copilot), S/N#A19050408(Fwd PAX), S/N#A19050338(Aft  
PAX).  
All work performed IAW Piper PA-46-350P Maintenance Manual Task 35-  
10-00, Page 3K13, Paragraphs 3(a-c) and 4(a-g).

Operational Check OK with no faults found.

Daniel E. Hamilton A&P# [REDACTED]





ions  
er of  
ties

YEAR  
20  
DATE

RECORDING  
TACH  
TIME

TODAY'S  
FLIGHT

TOTAL  
TIME IN  
SERVICE

**Description of Inspections, Tests, Repairs and Alterations**

Entries must be endorsed with Name, Rating and Certificate Number of Technician or Repair Facility. (See back pages for other specific entries.)

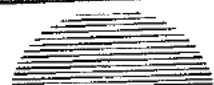
3/2020  
8/2021

Time

Extended

Date: 5/18/21  
Tach: —  
HM: 1867.7

Reg. No: N110ST  
Ser. No: 4636373



**Horizon Avionics, Inc.**

2445 E. General Aviation Drive, Suite C, Alcoa, TN 37701. Tel: [Redacted] Fax: [Redacted]

Removed dual Garmin GNS530W 011-01064-40 # 78413678/78413378 and installed slide-in replacement #1 Avidyne IFD550 p/n 700-00182-020 s/n M210793486 and #2 Avidyne IFD540 p/n 700-00182-000 s/n M204385704 in accordance with manufacturer's installation manual 600-00299-000 Rev.23 dated 4/2/2021 and AML STC SA00343B0 and utilizing the existing approved mounting wiring and antenna provisions from the previous GNS530W installation. Placed the Avidyne IFD5XX FAA Approved Flight Manual Supplement 600-00298-000 Rev. 09 dated 2/17/21 with the the aircraft's POH/AFM. Reference Avidyne IFD5XX Document AVIFD-315 Rev. 09 dated 4/17/2019, or later appropriate revision. For Instructions For Continued Airworthiness, the ICA is now part of the aircraft's maintenance/inspection requirements.

**MAINTENANCE RELEASE**

The Airframe Or Appliance Identified Above Was Repaired And Inspected In Accordance With Current Maintenance Rules Of The Federal Aviation Regulations And Is Approved For Return To Service. Pertinent Details Of This Repair Are On File At This Repair Station Under WO 8143.

Signed: [Redacted] Cert. No: [Redacted] Date: 5/18/21  
For Horizon Avionics, Inc. FAA CRS F3OR150X

YEAR 20 _____ DATE	RECORDING TACH TIME	TODAY'S FLIGHT	TOTAL TIME IN SERVICE
--------------------------	---------------------------	-------------------	-----------------------------

**Description of Inspections, Tests, Repairs and Alterations**  
 Entries must be endorsed with Name, Rating and Certificate Number of Technician or Repair Facility. (See back pages for other specific entries.)



**Autopilot Central, Inc.**  
 3112 North 74th East Avenue  
 Hangar 23, Tulsa International Airport - Tulsa, OK 74115

FAA CRS CM2R747K  
 Logbook Entry

Sold To: Tony Brink  
 Limestone, TN 37681

Work Order: MA20-06363  
 Acct Number: 423426-5528

Opened: 11/19/2020  
 Close Date: 11/15/2020

Aircraft Number: N110ST      Type: PA-46-350P MIRAGE      S/N: 4636373

Eng# Type      S/N      Time Cycles Prop Type      Prop S/N      Prop Type

Discrepancy: 1  
 Problem:  
 Left hand main brake failed.  
 Action Taken:  
 Removed left hand brake caliper and installed new springs. Reinstalled caliper and bled brake. Operational check OK.

Part Number	Description	Credit	Quantity	Units	Unit Price	Extended
MS28775-222	Packing		2.00	Each		\$

Miscellaneous Charges: \_\_\_\_\_  
 Misc Supplies: \$ \_\_\_\_\_

Totals: \_\_\_\_\_  
 SubTotal: \_\_\_\_\_ \$  
 Charges: \_\_\_\_\_ \$

The articles and/or work hereon described are certified as worthy, (unless otherwise specified).  
 Autopilot Central, Inc. FAA CRS CM2R747K

Authorized Signature: Kevin J. Brink

NEW RECIPROCATING ENGINE CERTIFICATE

This is to certify that the engine as described hereinafter has been manufactured  
run-in and tested as prescribed by LYCOMING specifications and Federal  
Aviation Regulations. No further run-in is required. All applicable Federal  
Aviation Airworthiness Directives and Lycoming Service Bulletins have been  
complied with at time of Manufacture.

MODEL T10-540-AE2A

SERIAL NO. L-12011-61A

DATE 4/21/65

[REDACTED]  
(AUTHORIZED REPRESENTATIVE)

**LYCOMING**

**LYCOMING ENGINES**

652 Oliver Street

Williamsport, PA 17761 U.S.A.

Form No. 777-B (Rev. 3-63)



YEAR 20 _____ DATE	RECORDING TACH TIME	TODAY'S FLIGHT	TOTAL TIME IN SERVICE	Description of Inspections, Tests, Repairs and Alterations Entries must be endorsed with Name, Rating and Certificate Number of Technician or Repair Facility. (See back pages for other specific entries.)
--------------------------	---------------------------	-------------------	-----------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Engine Log Entry**

Date: 4-8-20, HM: 1762.0, ENGTT: 1762.0, N110ST, Model: Piper PA-46-350P, S/N: 4636373,  
ENG Model: Lycoming TSIO-540-AE2A, ENG S/N: L-12011-61A

- Removed and replaced sparks plugs for all cylinders on the engine with p/n: RHB-36S.
- Performed engine ground run; opps check good.
- All work complied with I.A.W. current FAA regulations and standards.

END

Christopher L. Buckner

A&P:

**Engine Log Entry**

Date: 10-6-20, HM: 1814.6, ENGTT: 1814.6, N110ST, Model: Piper PA-46-350P, S/N: 4636373,  
ENG Model: Lycoming TSIO-540-AE2A, ENG S/N: L-12011-61A

- Performed compression check: # 1 79/80, # 2 79/80, # 3 79/80, # 4 79/80, # 5 79/80, # 6 77/80.
- Removed and replaced # 2 cylinder fuel injector hose joint with p/n: LW-1874.
- Drained and serviced oil with 10qts. of SAE 50 W100 Aeroshell piston engine oil.
- No oil sample taken.
- Removed and replaced oil filter with p/n: CH48103-1.
- Disassembled oil filter; no contaminates found.
- Performed engine wash and run; no leaks noted at this time.
- A.D. 15-19-07 C/W by inspection. **Next due ENGTT: 1924.6 or anytime that a external fuel injector line or line clamp is loosened or removed.**
- All work complied with I.A.W. current FAA regulations and standards.

END

Christopher L. Buckner

A&P:

**Engine Log Entry**

Date: 10-6-20, HM: 1814.6, ENGTT: 1814.6, N110ST, Model: Piper PA-46-350P, S/N: 4636373,  
ENG Model: Lycoming TSIO-540-AE2A, ENG S/N: L-12011-61A

- AD's checked thru BW 20-19.
- All work done I.A.W. current FAA regulations. Work on file at Tri-City Aviation under W.O.#28877.
- **I certify this powerplant has been inspection IAW an Annual Inspection per FAR 43 Appendix D and found in airworthy condition at this time and returned to service.**

END

Michael C. Lloyd

IA:

**Engine Log Entry**

Date: 12-18-20, HM: 1849.1, ENGTT: 1849.1, N110ST, Model: Piper PA-46-350P, S/N: 4636373,  
ENG Model: Lycoming TSIO-540-AE2A, ENG S/N: L-12011-61A

- Drained and serviced oil with 10qts. of SAE 50 W100 Aeroshell piston engine oil.
- No oil sample taken.
- Removed and replaced oil filter with p/n: CH48103-1.
- Disassembled oil filter; no contaminates found.
- Performed engine wash and run; no leaks noted at this time.
- All work complied with I.A.W. current FAA regulations and standards.

END

Christopher L. Buckner

A&P:

YEAR  
20 \_\_\_\_  
DATE


N110ST

**Propeller Record** General Information

Propeller Manufacturer Hartzell

Model HC-I3YR-1E Type \_\_\_\_\_

Hub Series # HK1074B Blade # \_\_\_\_\_

Date of Manufacture \_\_\_\_\_

Aircraft Installed On: Piper PA46-350P Make/Model Serial # 4636373





**Propeller**

8191 N Tamiami Trail  
Sarasota, FL 34243  
[www.AEROMX-srg.com](http://www.AEROMX-srg.com)

Date: 08/15/2019

Make: Hartzell  
S/N: HK1074B

Model: HC-13YR-1E  
Hobbs: 1687.3

REG #: N110ST  
TTAF: 1687.3  
TSN: 1687.3

[Blank form area with horizontal lines]

Date: 1  
Prop N  
•  
•  
•  
•

**Performed 100 Hr Inspection.**

I certify that this propeller has been inspected in accordance with a 100 hour inspection and was determined to be in airworthy condition.

Daniel E. Hamilton     A&P# [Redacted]

[Redacted signature block]

Next Inspec  
Due:

Year: \_\_\_\_\_

Date: \_\_\_\_\_

Next Inspec  
Due:

Mech. Cert. # or Repair Station # \_\_\_\_\_

**Propeller Log Entry**

Date: 10-6-20, HM: 1814.6, PTT: 1814.6, N110ST, Model: Piper PA-46-350P, S/N: 4636373,  
Prop Model: Hartzell, HC-13YR-1E, S/N: HK1074B

- Dressed prop blades as required.
- AD's checked thru **BW 20-19**.
- All work done I.A.W. current FAA regulations. Work on file at Tri-City Aviation under W.O.#28877.
- I certify this propeller has been inspected IAW an Annual Inspection per FAR 43 Appendix D and found in airworthy condition at this time and returned to service.

-----END-----

Michael C. Lloyd

IA: [Redacted]

Next Inspection Due:	Time Since Overhaul	Mech. Cert. # or Repair Station #
Year: _____	Total Time in Service	Description
Date:		
Next Inspection Due:	Time Since Overhaul	Mech. Cert. # or Repair Station #



**Piper Aircraft, Inc.**  
2926 Piper Drive  
Vero Beach, FL, U.S.A. 32960

# SERVICE *NO. 1103F* BULLETIN

**PIPER CONSIDERS  
COMPLIANCE MANDATORY**

Date: September 1, 2015

(S)

Service Bulletin (SB) 1103F supersedes SB 1103E in its entirety. Aircraft that have previously complied with SB 1103E are in compliance with SB 1103F.

**SUBJECT:**

**ENGINE MOUNT INSPECTION**

**REASON FOR REVISION:**

SB 1103F adds a note specifying which personnel are qualified to do the fluorescent penetrant inspection, in accordance with FAA requirements.

**MODELS AFFECTED:**

PA-46-310P Malibu

PA-46-350P Mirage

PA-46R-350T Matrix

**SERIAL NUMBERS AFFECTED:**

46-8408001 through 46-8408087;

46-8508001 through 46-8508109;

46-8608001 through 46-8608067;

4608001 through 4608140

4622001 through 4622200; 4636001 through 4636620

4692001 through 4692207

ATA: 7120

(OVER)

**COMPLIANCE TIME:****Part I. Inspection**

- For all PA-46-310P Malibu airplanes:  
Upon reaching 850 hours time in service on the engine mount, initial inspection is to coincide with the next regularly scheduled maintenance event. Thereafter, compliance is accomplished with a recurring inspection not to exceed 100 hours time in service.
- For PA-46-350P Mirage and PA-46R-350T Matrix airplanes with engine mount P/N 89137-002, 89137-041 or 89137-042 installed:  
Upon reaching 200 hours time in service on the engine mount, initial inspection is to coincide with the next regularly scheduled maintenance event. Thereafter, compliance is accomplished with a recurring inspection not to exceed each 100 hours time in service.

**NOTE:** For PA-46-350P Mirage and PA-46R-350T Matrix models only, Piper has developed a corrective action to eliminate the recurring inspection requirement, whether or not a crack has been discovered. If the engine mount on an affected PA-46-350P or PA-46R-350T model is replaced with P/N 89137-043 (Part II), the repetitive inspection requirement is eliminated.

**Part II. Replacement**

If cracks are found during the Inspection in Part I, the cracked engine mount is to be replaced.

**APPROVAL:**

The engineering aspects of this service document have been shown to comply with the applicable Federal Aviation Regulations and are FAA approved.

**PURPOSE:**

Cracks may develop in the area of the nose gear actuator attach feet on the engine mount (see Figure 1). This condition can occur when the nose landing gear is subjected to excessive loads due to hard landings, rough field operations, excessive speed turns, improper airplane towing (sudden, aggressive starts and stops), or other improper operations.

**NOTE:** If an airplane is subjected to the improper operations described above at any time, the inspection described in this service bulletin must be performed prior to next flight.

**Part I** of this service bulletin requires a repetitive inspection of the engine mount.

**Part II** of this service bulletin requires replacement of the engine mount.

**INSTRUCTIONS:**

**NOTE:** This service bulletin does not cancel or alter any Unscheduled Maintenance Checks in section 5-50-00 of applicable airplane maintenance manuals.

**Part I. Inspection**

**NOTE:** This fluorescent penetrant inspection shall be performed only by personnel with "Level I Special" qualification or higher, as described in Advisory Circular 65-31B, "Training, Qualification, and Certification of Nondestructive Inspection Personnel."

1. Clean the engine mount actuator attach feet area.
2. Completely remove all of the paint or Dinitrol AV8 and AV30, if the paint was previously removed and covered with Dinitrol AV8 and AV30, from the inspection area (refer to Figure 1).

**NOTE:** Paint must be removed using chemical processes only. The use of abrasives or other mechanical methods to remove the paint will hide the existence of any cracks, making an accurate inspection impossible. Use isopropyl alcohol to wipe clean the area of the engine mount where paint was removed.

3. Perform fluorescent penetrant inspection of the nose gear actuator attach feet for cracks per AC 43.13-1B, Chapter 5, Section 5. Inspect the surfaces identified in Figure 1, with specific emphasis on welded areas.
4. If a crack is discovered, the engine mount must be replaced prior to further flight (refer to Table 1).
5. If no cracks are found, continue the repetitive inspection per the compliance time above.
6. Clean the feet and apply a two-coat corrosion prevention compound (CPC) to the area where the paint was removed. This two-coat CPC consists of Dinitrol/Ardrox AV8 as a primer coating and (after the AV8 has dried) Dinitrol/Ardrox AV30 as a top coating.
7. Make an appropriate logbook entry of compliance with this service bulletin for each repetitive inspection.

**Part II. Replacement**

1. If cracks are found on the engine mount, order the appropriate replacement engine mount found in Table 1, and hardware, as required.
2. Install the new engine mount according to procedures in the applicable Piper airplane maintenance manual. For PA-46-350P Mirage or PA-46R-350T Matrix model airplanes only: fasten the aft end of the nose gear actuator to the engine mount using the hardware arrangement shown in Figure 2. Torque nut according to requirements in section 91-10-00 of the applicable Piper airplane maintenance manual. At all other locations, hardware in serviceable condition may be reused.
3. Reinstall nose gear according to instructions in the applicable Piper airplane maintenance manual. Confirm that the nose gear conforms to the following requirements:
  - Adjust length of nose gear actuator according to maintenance manual instructions.
  - With the landing gear in the down and locked position and airplane weight on the wheels, verify that the clearance between the steering rollers and the steering arm is between 0.010 and 0.030 inches. This clearance requirement applies to both rollers at the same time.

**NOTE:** As the engine may have been removed for a number of reasons, it is the responsibility of the installation agent to assure the proper re-installation, functional checks and operational suitability of the engine prior to returning the airplane to service. Refer to the applicable engine manufacturer's maintenance manual and Piper airplane maintenance manual in the appropriate chapters.

4. For PA-46-350P Mirage or PA-46R-350T Matrix model airplanes only; in the weight and balance record of the Pilot's Operating Handbook, revise the "weight and balance" as follows:

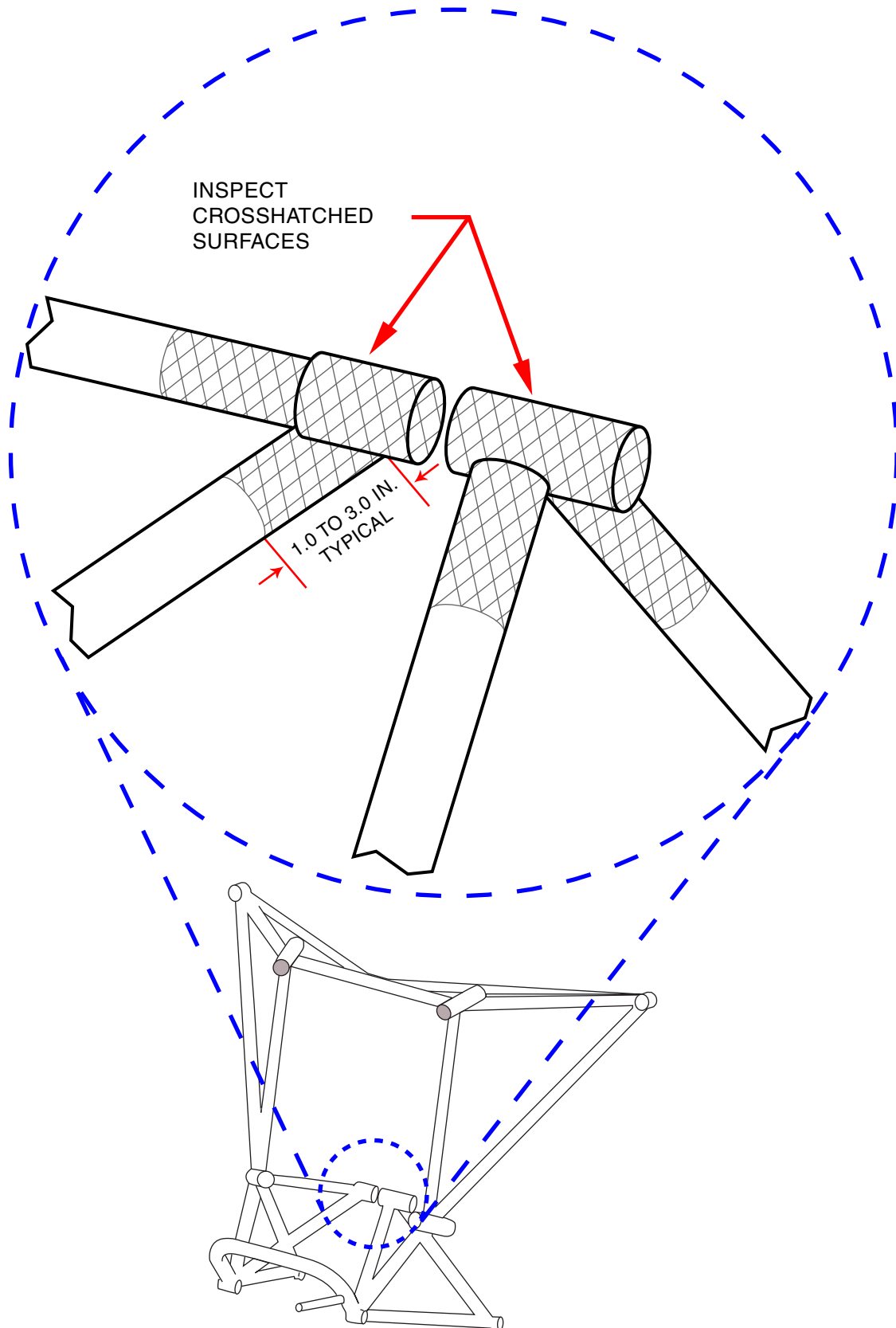
ADD 1.25 LBS AT ARM 78.00.

5. Make a logbook entry documenting compliance with Part II of this service bulletin.

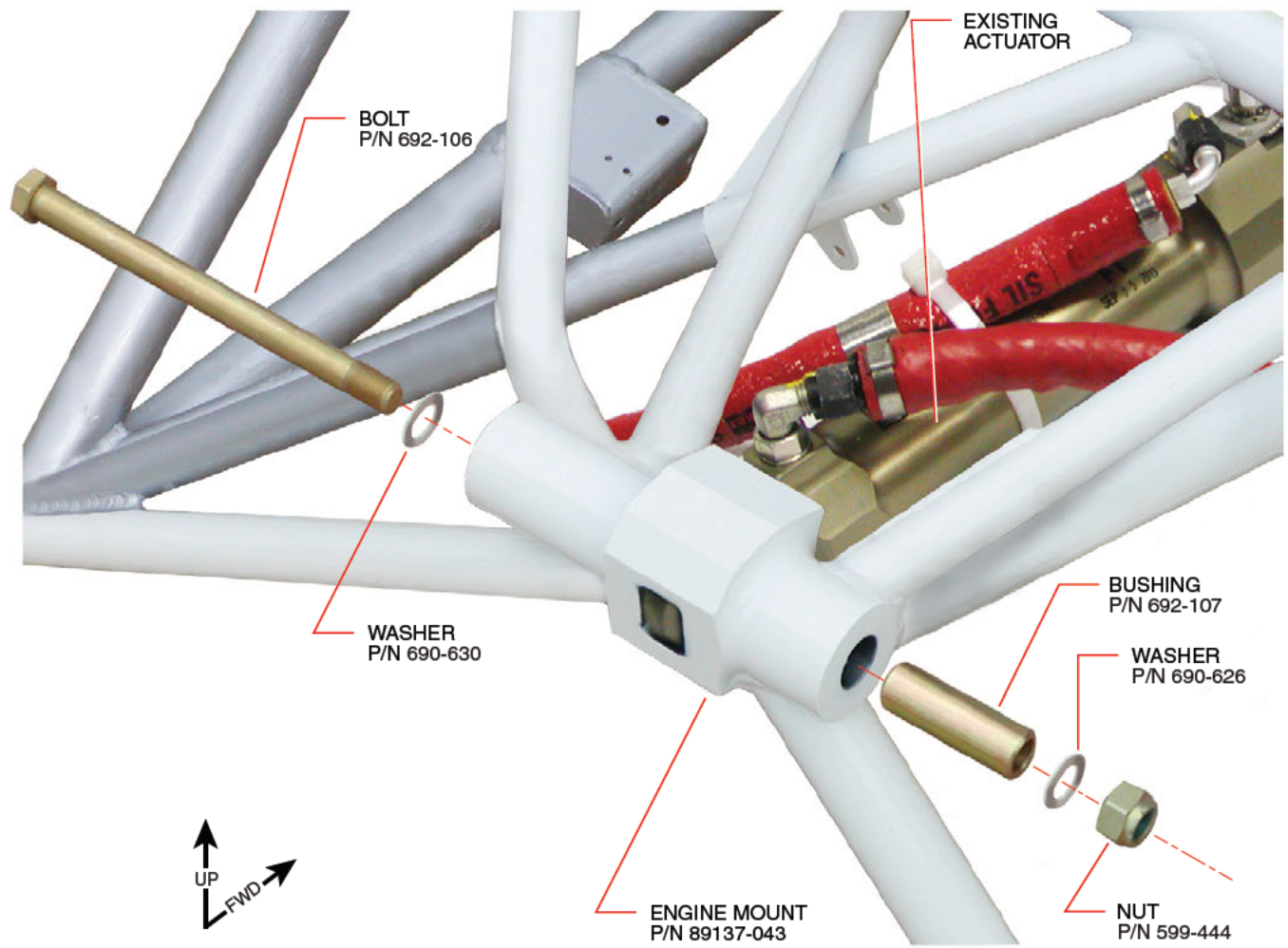
**TABLE 1  
REPLACEMENT ENGINE MOUNTS**

Aircraft Model	Engine Mount P/N	Recurring Inspection Required?
PA-46-310P	84010-002	YES
PA-46-350P	89137-043	NO
PA-46R-350T	89137-043	NO





**Figure 1**  
Engine Mount Inspection Areas



**Figure 2**  
Engine Mount Hardware Installation - P/N 89137-043 Only

**MATERIAL REQUIRED:**

One (1) each engine mount, per aircraft, on condition. For P/N 84010-002, existing hardware in serviceable condition may be used on replacement engine mount.

84010-002 PA-46-310P Malibu

89137-043 PA-46-350P Mirage and PA-46R-350T Matrix

**Hardware for 84010-002 (PA-46-310P)**

Piper P/N	Part	Nomenclature
401-509	Bolt	AN7-15A
599-444	Nut	MS21044N7
690-630	Washer	NAS1149F0763P

**Hardware for 89137-043 (PA-46-350P/PA-46R-350T)**

Piper P/N	Part	Nomenclature
692-106	Bolt	AN7-55A
692-107	Bushing	NAS73-7E114
599-444	Nut	MS21044N7
690-626	Washer	NAS1149F0732P
690-630	Washer	NAS1149F0763P

**AVAILABILITY OF PARTS:**

Your Factory Authorized Piper Service Facility

**EFFECTIVITY DATE:**

This service bulletin is effective upon receipt.

**SUMMARY:**

Applicable factory participation is limited to new aircraft in warranty as of the release date of this service bulletin.

Please contact your Factory Authorized Piper Service Facility to make arrangements for compliance with this service bulletin in accordance with the compliance time indicated.

**NOTE:**

Please notify the factory of any address/ownership corrections. Changes should include aircraft model, serial number, and current owner's name and address.

Corrections and/or changes should be directed to:

PIPER AIRCRAFT, INC.  
 Attn: Customer Service  
 2926 Piper Drive  
 Vero Beach, FL 32960



**FAA**  
**Aviation Safety**

## **SPECIAL AIRWORTHINESS INFORMATION BULLETIN**

**SUBJ:** POWERPLANT - ENGINE MOUNT – Cracking at nose landing gear attachment and trunnion attachment      **SAIB:** CE-09-13R1  
**Date:** July 14, 2014

---

*This is information only. Recommendations aren't mandatory.*

### **Introduction**

This Special Airworthiness Information Bulletin (SAIB) alerts you, an owner or operator, of certain **Piper Models PA-46-310P, PA-46-350P, PA-46R-350T, and PA-46-500TP** airplanes, of an airworthiness concern, specifically possible cracks in the engine mount where both the nose landing gear (NLG) trunnion and the NLG actuator attach. This condition is addressed in Piper Service Bulletins (SB) 1103 and 1154 and Piper Service Letter (SL) 1001. This SAIB emphasizes the importance of compliance with Piper service information.

Note: The information provided below is for reference only. See the latest version of the Piper service information for current information. Also, this SAIB does not address PA-46-310P and PA-46-350P aircraft modified by STC ST00541SE, conversion from piston to turboprop propulsion.

At this time, the airworthiness concern is not an unsafe condition that would warrant airworthiness directive (AD) action under Title 14 of the Code of Federal Regulations (14 CFR) part 39.

This revision to this SAIB provides:

- updated service information;
- a revised recommendation to incorporate a new engine mount that relieves the repetitive inspections;
- a change to the point of contact information; and
- other changes that address format and editorial content.

### **Background**

This SAIB is a result of reported cracks being found in the engine mount, both where the actuator for the nose landing gear attaches and at the pivot where the NLG trunnion attaches. Figures 1a and 1b below show the general area.

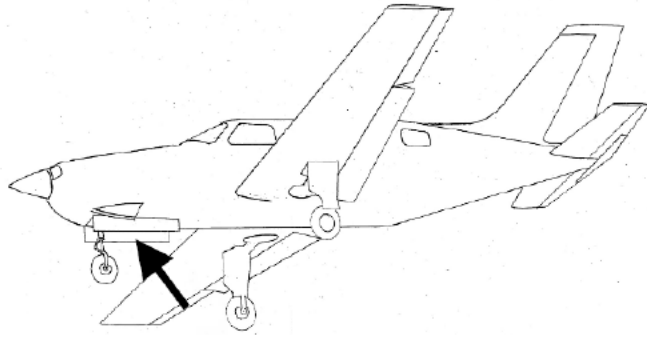


Figure 1a. General location of engine mount

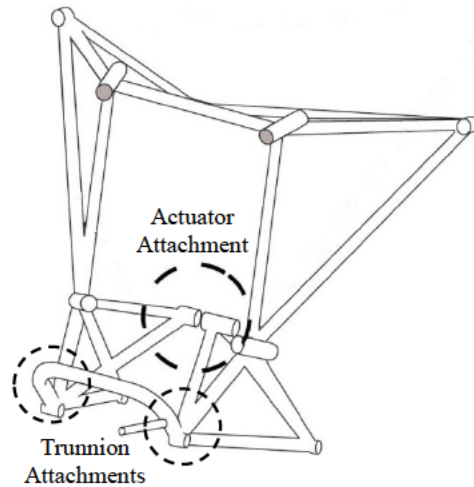


Figure 1b. Typical engine mount crack locations

Below are descriptions of the areas where problems occur, what service information is available, and a summary of reported problems.

***NLG actuator attachment***

There are two types of cracking to be aware of at the NLG actuator attachment.

***Attachment foot***

The first type, and the subject of SB 1103, is cracking around the circumference of the “foot” (the metal tube where the actuator bolt attaches). The “foot” cracks occur on some early engine mounts where the “foot” is made up of two parts; a metal disk welded to a metal tube. The cracks have been found in the welded area between the disk and tube. Some aircraft have a one-piece machined foot and have not experienced this problem. See Figures 2a and 2b below (from SB 1103C) showing pictures of both welded and machined configurations.

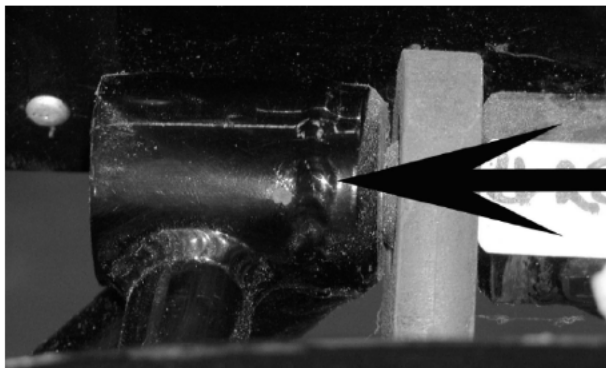


Figure 2a. Original Engine Mount Weld Indicates Two (2) Piece Foot

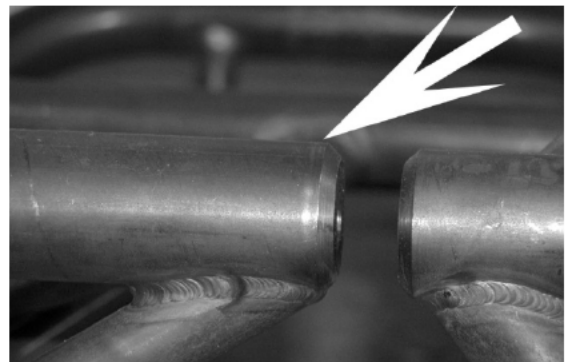


Figure 2b. Interim redesign Engine Mount One (1) Piece Machined Foot

*Attachment Cluster*

The second type of cracking is in the actuator cluster weld, which attaches the “foot” to the engine mount tubing, and is the subject of service bulletins 1103 and 1154. This second type of cracking occurs in the welded joints where the foot attaches to the engine mount tubes (cluster weld). See Figure 3 below. This type of cracking is independent of whether the foot is welded or machined.

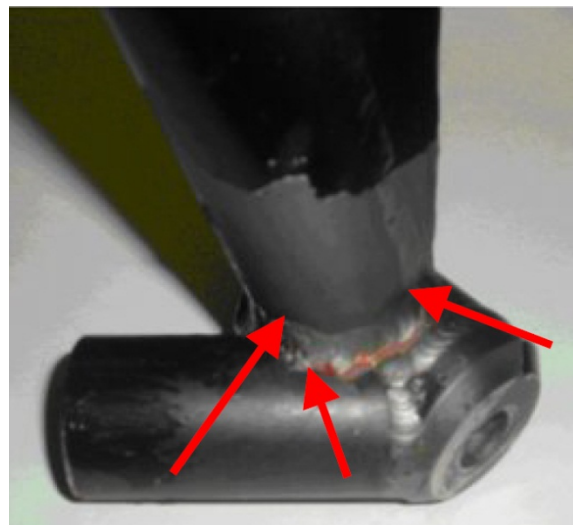


Figure 3. Cracks around Tube Cluster  
(Note: crack extends into tube)

***NLG trunnion attachment (pivot)***

Piper Service Bulletin 1154 and Service Letter 1001 both address cracking in the engine mount where the NLG trunnion attaches. See the appropriate bulletin for your aircraft.

***Piper Service Information***

Below is a list of current Piper Service information and applicability to specific model and serial numbers.

Service Information	Date	Model(s)/Serial Numbers	Description
Service Letter 1001	12/09/1987	PA-46-310P: 46-8408001 - 46-8608067 4608001-4608094	
Service Bulletin 1103E	06/05/2014	PA-46-310P: 46-8408001 through 46-8408087; 46-8508001 through 46-8508109; 46-8608001 through 46-8608067; 4608001 through 4608140  PA-46-350P: 4622001 through 4622200; 4636001 through 4636620  PA-46R-350T: 4692001 through 4692207	SB 1103 addresses engine mount cracks at NLG actuator attachment feet. SB 1103A supersedes SB 1103 in its entirety. Initial Inspection time and criteria added. Additionally, total time to accomplish engine mount replacement revised, aircraft warranty coverage expanded and revised aircraft effectivity. SB 1103B adds the requirement of inspecting the nose gear actuator mounting bolt to ensure sufficient thread engagement with the lock nut after the engine mount has been replaced. This inspection and bolt replacement is only required if the engine mount was found cracked and is being replaced or has been replaced with the engine mounts listed in Table 1 for your aircraft. SB 1103C removes the PA-46-500TP from the models affected (now covered under SB 1154C) and eliminates factory participation. SB 1103 D adds aircraft models and serial



			numbers. In addition, it mandates a recurring inspection for all affected aircraft, regardless of engine mount part number. Also, inspection intervals are changed, an inspection is added prior to further flight for improper operations, and a new replacement mount P/N is added. SB 1103E supersedes SB 1103D in its entirety. A new replacement mount P/N is added that relieves the repetitive inspection on PA-46-350P and PA-46R-350T models. Also, S/N ranges and inspection intervals are changed.
Service Bulletin 1154C	01/03/2008	PA-46-500TP: 4697001-4697240, 4697242-4697244	SB 1154 addresses engine mount cracks at NLG actuator attachment feet (where feet are welded to tubes) and at NLG pivot (trunnion attachment). Replace with existing type engine mount (P/N 102460-002). SB 1154A provides a new engine mount, when installed will relieve the repetitive inspection of the engine mount. SB 1154B shortens the repetitive inspection requirement for the engine mount from 100 hours to 50 hours and deleted previous references to "New" Piper. SB 1154C Add timeline for engine mount replacement and warranty information.

***Service Difficulty and Accident Incident Data***

Forty -nine reports of damaged engine mounts and/or collapsed nose landing gear were identified as of late 2007. These reports came from the National Transportation Safety Board’s accident database and the Federal Aviation Administration’s Service Difficulty and Accident-Incident databases.

Of these, twelve (12) appeared to be associated with damage in the area of the NLG actuator attachment and nine (9) in the area of the trunnion pivot. Twenty-four contained insufficient information to determine any relationship to this SAIB, and the remainder did not apply.

***Engine Mount Part Numbers***

Model	Engine Mount P/N		Comments
	Original	New	
PA-46-310P	84010-002	84010-002 (modified)	See Note 1)
PA-46-350P	89137-02, 89137-041, or 89137-042	89137-043	See Note 2)
PA-46R-350T	89137-041, 89137-042	89137-043	See Note 2)
PA-46-500TP	102460-002	102460-036	See Note 3)

- 1) 84010-002 engine mounts may have either machined or welded feet. Visual verification is required. SL 1001 modifies the mount.
- 2) 89137-041 engine mounts may have either machined or welded feet. Visual verification is required. 89137-042 has machined feet and is otherwise visually identical to the -041. 89137-043 may be identified by a one-piece machined NLG actuator attachment fitting (reference SB 1103E) and relieves the repetitive inspection requirements.
- 3) 102460-036 may be identified by a one-piece machined NLG actuator attachment fitting. The 102460-002 has separate tubular feet.

## **Recommendation**

After reviewing the above data, we recommend that you inspect the engine mount where the nose landing gear trunnion and actuator attach. We also recommend that you replace the mount with a new mount that relieves the repetitive inspection, where applicable. You should perform the inspection and replacement following the appropriate Piper service information SL 1001, SB 1103, and/or SB 1154 for the model and serial number of your aircraft and the configuration of your engine mount.

Note: As part of its ongoing analysis, the FAA routinely uses information that the public voluntarily enters into the Service Difficulty Report (SDR)/Malfunction/Defect Report (MDR) database. Refer to website <http://av-info.faa.gov/sdrx/> for how to submit or search/review Service Difficulty and Malfunction/Defect reports electronically.

## **References**

Piper Service Bulletins

<http://www.piper.com/technical-publications/>

FAA MDR/SDR Reporting Site

<http://av-info.faa.gov/sdrx/>

## **For Further Information Contact**

Gregory K. (“Keith”) Noles, Aerospace Engineer, Atlanta ACO, 1701 Columbia Ave., College Park, GA 30337; phone: [REDACTED]; fax: [REDACTED]; email: [REDACTED]



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

---

**Date:** April 8, 2010

**In reply refer to:** A-10-44 and -45

The Honorable J. Randolph Babbitt  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

---

The National Transportation Safety Board (NTSB) has investigated two accidents involving Piper PA-46-350P airplanes that resulted from fatigue cracking in the attachment between the nose landing gear (NLG) actuator and the engine mount. Such fatigue cracks can lead to the collapse of the NLG, which could cause a serious or catastrophic accident if the separation occurred at a critical point during takeoff or landing or if the aircraft collided with parked aircraft or aircraft waiting at taxiways.

On August 16, 2009, about 1130 eastern daylight time,<sup>1</sup> a Piper PA-46-350P, N548C, experienced an NLG collapse during landing at the Orlando-Sanford International Airport, Sanford, Florida.<sup>2</sup> The private pilot and passenger were uninjured, and the airplane sustained substantial damage. No flight plan was filed for the 14 *Code of Federal Regulations* (CFR) Part 91 personal flight, nor was one required to be filed by the Federal Aviation Administration (FAA). Visual meteorological conditions (VMC) prevailed at the time of the accident.

On May 19, 2007, about 1305, a Piper PA-46-350P, N411MD, experienced an NLG collapse during landing at the Indianapolis Metropolitan Airport near Fishers, Indiana.<sup>3</sup> The pilot and passenger were uninjured, and the airplane sustained substantial damage. No flight plan was filed for the 14 CFR Part 91 personal flight, nor was one required to be filed by the FAA. VMC prevailed at the time of the accident.

The NLG actuator on Piper PA-46-350P airplanes is bolted via two attachment feet to the lower aft engine mount, which is constructed of welded tubes (see figure 1). The NLG actuator extends down and forward from the attachment feet and attaches to the NLG. During taxi,

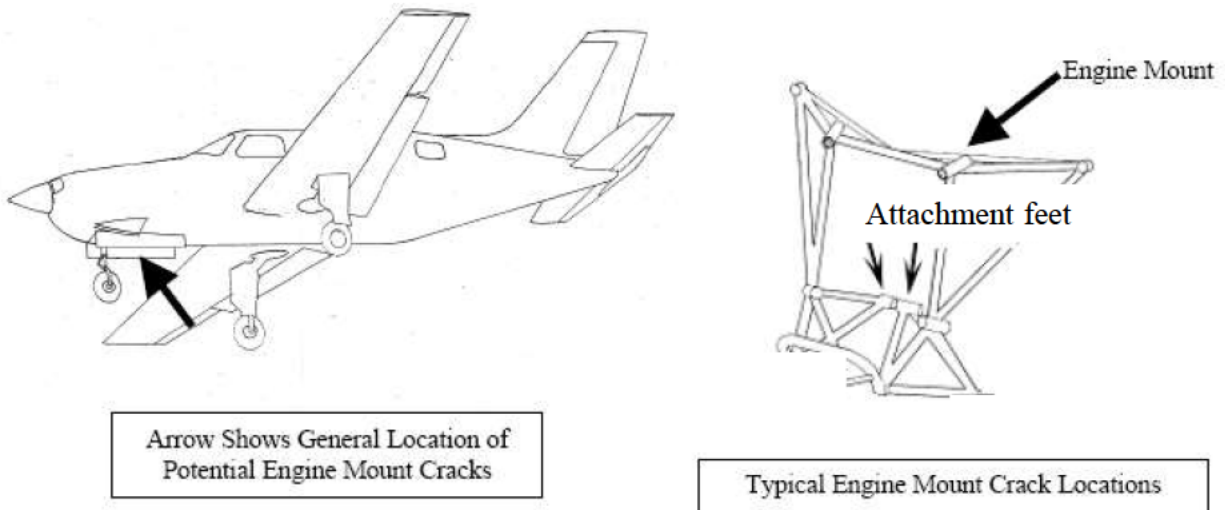
---

<sup>1</sup> All times in this letter are eastern daylight time, based on a 24-hour clock.

<sup>2</sup> Preliminary information regarding this accident, NTSB case number ERA09LA471, is available online at <http://www.nts.gov/ntsb/query.asp>.

<sup>3</sup> The report for this accident, NTSB case number CHI07LA151, is available online at <http://www.nts.gov/ntsb/query.asp>.

takeoff, and landing, the attachment feet transmit loads from the NLG to the engine mount, thus creating repetitive tensile stress in the engine mount attachment feet areas and, in some cases, leading to fatigue cracking.<sup>4</sup>



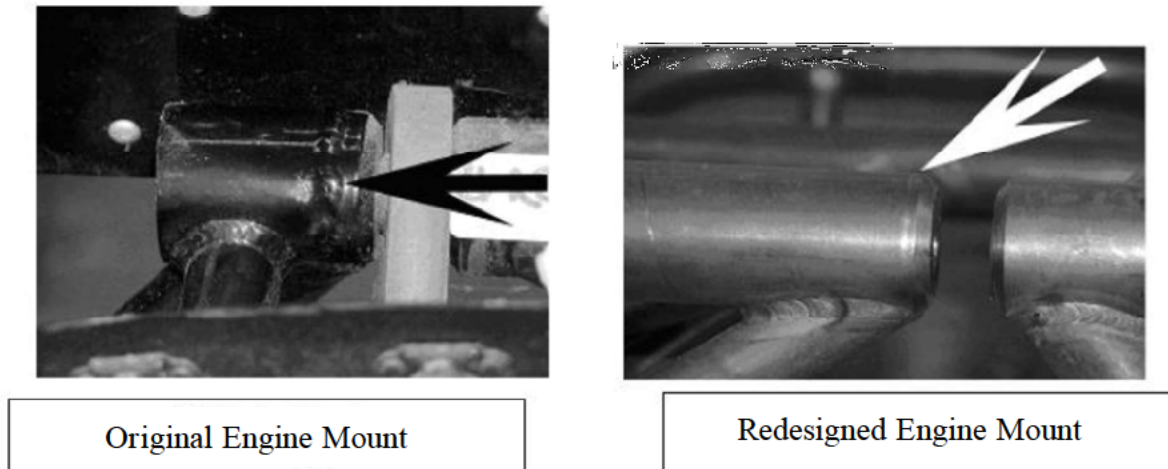
**Figure 1.** Piper PA-46-350P crack locations on engine mount

Piper PA-46-310 and -350P airplanes have either an original engine mount or a redesigned engine mount (see figure 2).<sup>5</sup> In the original design, each attachment foot is a two-piece part consisting of a metal disk welded to the end of a metal tube, which is then welded to the engine mount support tubes. In the redesigned engine mount, each attachment foot is a one-piece machined part made from a single piece of steel, eliminating the welding within the feet themselves. However, on both the original and redesigned engine mounts, the attachment feet are welded to the engine mount support tubes, which is where fatigue cracking has been identified by the NTSB.

The airplane in the Sanford, Florida, accident was equipped with a redesigned engine mount that was installed at the time of manufacture. The NTSB's postaccident examination of N548C revealed that the right attachment foot had fractured at the engine mount support tube. The NTSB materials laboratory's examination of the fractured foot revealed a fatigue crack emanating from multiple origins at the exterior of the joint where the attachment foot was welded to the support tube. At the time of the accident, the airplane was 8 years old and had accumulated 711 flight hours with 878 cycles since new (CSN).

<sup>4</sup> The onset and propagation of fatigue cracks vary from aircraft to aircraft because the tensile stresses in the engine mount will vary with airport conditions and the severity of maneuvers.

<sup>5</sup> Although the NTSB has only investigated accidents involving the PA-46-350P, the NTSB notes that the PA-46-310 has the same original and redesigned engine mounts and therefore may be susceptible to the same fatigue cracking.



**Figure 2.** Original engine mount with two-piece foot and redesigned engine mount with one-piece machined foot

The airplane in the Fishers, Indiana, accident had a redesigned engine mount that was installed on March 21, 2003. The airplane had accumulated 542 flight hours and an estimated 1,400 cycles since then. At the time of the accident, the airplane was 7 years old and had accumulated a total of 772 flight hours.<sup>6</sup> The NTSB's postaccident examination of N411MD revealed that the right attachment foot had separated from the rest of the engine mount due to fatigue cracking<sup>7</sup> where the attachment foot was welded to the support tube.

The NTSB also notes that a similar incident of fatigue cracking of an NLG attachment foot was found on September 29, 2009, during a routine inspection of a Piper PA-46-350P airplane. The airplane was 5 years old and had accumulated a total of 678 flight hours with 600 CSN and was equipped with the redesigned engine mount.

On April 22, 2002, Piper issued mandatory Service Bulletin (SB) 1103, recommending that operators of PA-46-310P, -350P, and -500TP<sup>8</sup> airplanes inspect the NLG actuator attachment foot area of the original engine mounts for evidence of fatigue cracking. The SB indicated that such cracking had been found in this area of some original engine mounts. The inspection included visual and liquid penetrant inspection at the next regular scheduled maintenance event and each 100 hours in service or at the annual inspection, whichever occurred first. If cracks were found, the original engine mounts were to be replaced with the redesigned engine mounts before returning to service. SB 1103 does not subject the airplanes with redesigned engine mounts to repetitive inspections, and replacing the original engine mount with the redesigned engine mount relieves the need for repetitive inspections. Piper issued several

<sup>6</sup> The airplane's annual inspection was conducted 5 months prior to the accident, and no discrepancies with the engine mount were noted.

<sup>7</sup> The NTSB determined that the probable cause of this accident was the fatigue separation of the engine mount's nose gear actuator attachment foot during landing.

<sup>8</sup> The PA-46-500TP airplane has a differently redesigned engine mount than the PA-46-310 and -350P.

updates of SB 1103, none of which subjected the redesigned engine mounts to repetitive inspections.<sup>9</sup>

The NTSB is concerned that the redesigned engine mounts on Piper PA-46-310 and -350P model airplanes have attachment foot areas susceptible to fatigue cracking similar to the fatigue cracks identified by Piper on the original engine mounts. The NTSB concludes that the tensile stresses applied to the redesigned engine mounts could lead to fatigue fractures in the NLG actuator attachment foot areas. However, redesigned engine mounts are not currently subject to the inspection provisions of SB 1103, nor is compliance with SB 1103 required.<sup>10</sup> Although the NTSB is not aware of incidents or accidents involving original engine mounts that have not been inspected, the NTSB believes that inspections of the original engine mounts should also be mandatory in order to detect fatigue cracking. Therefore, the NTSB recommends that the FAA require repetitive inspections for fatigue cracking of the NLG actuator attachment foot areas on all Piper PA-46-310 and -350P engine mounts and require replacement, if necessary.

As previously noted, Piper redesigned the engine mounts on the PA-46-310 and -350P in an effort to prevent fatigue cracking at the attachment foot areas. However, based on the accidents discussed above, this redesign does not appear to have been successful since fatigue cracking has also occurred in the redesigned engine mounts. Therefore, the NTSB recommends that the FAA require Piper to redesign the PA-46-310 and -350P engine mounts so that they are not susceptible to fatigue cracking in the attachment foot areas.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Require repetitive inspections for fatigue cracking of the nose landing gear actuator attachment foot areas on all Piper PA-46-310 and -350P engine mounts and require replacement, if necessary. (A-10-44)

Require Piper to redesign the PA-46-310 and -350P engine mounts so that they are not susceptible to fatigue cracking in the attachment foot areas. (A-10-45)

In response to the recommendations in this letter, please refer to Safety Recommendations A-10-44 and -45. If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: [correspondence@ntsb.gov](mailto:correspondence@ntsb.gov). If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our secure mailbox. To avoid confusion,

---

<sup>9</sup> On January 27, 2003, Piper issued SB 1103A, which superseded SB 1103 and added initial inspection time and criteria for inspection. On November 15, 2003, Piper issued SB 1103B to require inspection of the NLG actuator mounting bolt to ensure that sufficient threads engaged with the lock nut after engine mount replacement. On February 11, 2009, Piper issued SB 1103C to remove the PA-46-500TP models affected because those models have differently redesigned engine mounts.

<sup>10</sup> Although the FAA emphasized the importance of compliance with Piper's service information, it determined that the airworthiness concern associated with this cracking was not an unsafe condition warranting issuance of an airworthiness directive. (See [http://rgl.faa.gov/Regulatory\\_and\\_Guidance\\_Library/rgSAIB.nsf/\(LookupSAIBs\)/CE-09-13?OpenDocument](http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgSAIB.nsf/(LookupSAIBs)/CE-09-13?OpenDocument).)



please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

Chairman HERSMAN, Vice Chairman HART, and Member SUMWALT concurred in these recommendations.

*[Original Signed]*



By: Deborah A.P. Hersman  
Chairman

## Safety Recommendation A-10-044

TO THE FEDERAL AVIATION ADMINISTRATION: Require repetitive inspections for fatigue cracking of the nose landing gear actuator attachment foot areas on all Piper PA-46-310 and -350P engine mounts and require replacement, if necessary.

### Recommendation Details

 [Original recommendation transmittal letter](#)

Overall status	 Closed - Unacceptable Action
Mode	 Aviation
On Most Wanted List	No
Priority level	Non-urgent
Times reiterated	0
Is hazmat	No
Is NPRM	No
SR coding	
Date issued	04/08/2010
Overall date closed	12/22/2011

### Event Details - ERA09LA471

The National Transportation Safety Board (NTSB) has investigated two accidents involving Piper PA-46-350P airplanes that resulted from fatigue cracking in the attachment between the nose landing gear (NLG) actuator and the engine mount. Such fatigue cracks can lead to the collapse of the NLG, which could cause a serious or catastrophic accident if the separation occurred at a critical point during takeoff or landing or if the aircraft collided with parked aircraft or aircraft waiting at taxiways.

On August 16, 2009, about 1130 eastern daylight time,<sup>1</sup> a Piper PA-46-350P, N548C, experienced an NLG collapse during landing at the Orlando-Sanford International Airport, Sanford, Florida.<sup>2</sup> The private pilot and passenger were uninjured, and the airplane sustained substantial damage. No flight plan was filed for the 14 Code of Federal Regulations (CFR) Part 91 personal flight, nor was one required to be filed by the Federal Aviation Administration (FAA). Visual meteorological conditions (VMC) prevailed at the time of the accident.

On May 19, 2007, about 1305, a Piper PA-46-350P, N411MD, experienced an NLG collapse during landing at the Indianapolis Metropolitan Airport near Fishers, Indiana.<sup>3</sup> The pilot

and passenger were uninjured, and the airplane sustained substantial damage. No flight plan was filed for the 14 CFR Part 91 personal flight, nor was one required to be filed by the FAA. VMC prevailed at the time of the accident.

Location Sanford, USA  
 Accident date 08/16/2009  
 Accident # ERA09LA471  
 Report #

## Addressee Details

 FAA - Closed - Unacceptable Action - 12/22/2011 

Name FAA  
 Acronym FAA  
 Category Federal Government  
 Addressee status Closed - Unacceptable Action

From NTSB  
 To FAA  
 Date 12/22/2011  
 Type Official Correspondence  
 Response We note that, on February 2, 2011, Piper released Service Bulletin (SB) 1103 revision D, which provides the information necessary to conduct the recommended inspections. However, we are aware that compliance with an SB is not required. The FAA reviewed the relevant service data, and determined that the safety risk is not sufficient to warrant issuance of an airworthiness directive (AD) to require the repetitive inspections recommended. We disagree with the FAA that the safety intent of this recommendation has been satisfied without the issuance of an AD. Consequently, Safety Recommendation A-10-44 is classified CLOSED—UNACCEPTABLE ACTION.

From FAA  
 To NTSB  
 Date 10/04/2011  
 Type Official Correspondence  
 Response From J. Randolph Babbitt, Administrator: The FAA agrees with this recommendation to implement inspections on all Piper PA-46-31 OP and -350P engine mounts. Piper released Service Bulletin (SB) li 03 revision 0 on

February 2, 2011, to include repetitive inspections on all engine mounts installed on PA-46-310P and -350P Models. As the PA-46-350T uses the same part number engine mount (89137) as the -350P, the revision includes inspections for that Model as well. Piper made the SB available to all owners and operators on their Web site at: <http://www.piper.com!Company/Publications/SB%201103D.pdf>. The FAA compiled and analyzed service data, and determined that the safety risk is not sufficient to warrant airworthiness directive (AD) action at this time. Therefore, the FAA considers the safety intent of this recommendation satisfied without an AD mandate.

From NTSB  
To FAA  
Date 01/10/2011  
Type Official Correspondence  
Response The NTSB notes that Piper Aircraft Company is revising Piper Service Bulletin (SB) 1103 to include the recommended inspections and that it plans to make the revised SB available to all owners and operators of these aircraft. After the revised SB is issued, the FAA will need to mandate the inspections through an airworthiness directive (AD) or similar mandate. Pending the FAA's issuance of such an AD, Safety Recommendation A-10-44 is classified OPEN -- ACCEPTABLE RESPONSE.

From FAA  
To NTSB  
Date 06/24/2010  
Type Official Correspondence  
Response MC# 2100237 - From J. Randolph Babbitt, Administrator: FAA agrees with this recommendation and has a commitment from Piper Aircraft Company to revise Piper Service Bulletin (SB) 1103 to include repetitive inspections on all engine mounts installed on Piper-46-310P and -350P. Piper will make the revised SB 1103 available to all owners and operators of these aircraft by July 30, 2010.



## Safety Recommendation A-10-045

TO THE FEDERAL AVIATION ADMINISTRATION: Require Piper to redesign the PA-46-310 and -350P engine mounts so that they are not susceptible to fatigue cracking in the attachment foot areas.

### Recommendation Details

 [Original recommendation transmittal letter](#)

Overall status	 Closed - Acceptable Action
Mode	 Aviation
On Most Wanted List	No
Priority level	Non-urgent
Times reiterated	0
Is hazmat	No
Is NPRM	No
SR coding	
Date issued	04/08/2010
Overall date closed	03/06/2014

### Event Details - ERA09LA471

The National Transportation Safety Board (NTSB) has investigated two accidents involving Piper PA-46-350P airplanes that resulted from fatigue cracking in the attachment between the nose landing gear (NLG) actuator and the engine mount. Such fatigue cracks can lead to the collapse of the NLG, which could cause a serious or catastrophic accident if the separation occurred at a critical point during takeoff or landing or if the aircraft collided with parked aircraft or aircraft waiting at taxiways.

On August 16, 2009, about 1130 eastern daylight time,<sup>1</sup> a Piper PA-46-350P, N548C, experienced an NLG collapse during landing at the Orlando-Sanford International Airport, Sanford, Florida.<sup>2</sup> The private pilot and passenger were uninjured, and the airplane sustained substantial damage. No flight plan was filed for the 14 Code of Federal Regulations (CFR) Part 91 personal flight, nor was one required to be filed by the Federal Aviation Administration (FAA). Visual meteorological conditions (VMC) prevailed at the time of the accident.

On May 19, 2007, about 1305, a Piper PA-46-350P, N411MD, experienced an NLG collapse during landing at the Indianapolis Metropolitan Airport near Fishers, Indiana.<sup>3</sup> The pilot

and passenger were uninjured, and the airplane sustained substantial damage. No flight plan was filed for the 14 CFR Part 91 personal flight, nor was one required to be filed by the FAA. VMC prevailed at the time of the accident.

Location Sanford, USA  
 Accident date 08/16/2009  
 Accident # ERA09LA471  
 Report #

## Addressee Details

 FAA - Closed - Acceptable Action - 03/06/2014 ^

Name FAA  
 Acronym FAA  
 Category Federal Government  
 Addressee status Closed - Acceptable Action

From NTSB  
 To FAA  
 Date 03/06/2014  
 Type Official Correspondence  
 Response On December 22, 2011, we agreed with your determination that only the PA 46 350P engine mount requires a redesign, because of its heavier engine, and that a redesign for the PA 46 310 would be unnecessary. We appreciate learning that Piper has completed the redesign of the engine mount, and that field service kits with the new design will be available by May 2014. With Piper's completion of the redesign, action to satisfy Safety Recommendation A 10 45 is complete; accordingly, the recommendation is classified CLOSED —ACCEPTABLE ACTION.

From FAA  
 To NTSB  
 Date 01/07/2014  
 Type Official Correspondence  
 Response -From Michael P. Huerta, Administrator: As mentioned in previous Correspondence the FAA has been coordinating with Piper on the PA-46-350P redesign effort for over a Year. On September 24, 2013, Piper informed the FAA that the first manufactured engine mounts did not conform to the design data. As a result, Piper manufactured a new mount and conformed it



to the design data on October 15, 2013. Piper expects conformity of the engine mount test setup and testing of the new engine mount configuration to be complete by the end of 2013. Piper engineers are confident that the new engine mount redesign will pass testing and meet new engine design specifications.

After successful testing, we anticipate that Piper will require 3 additional months to incorporate the new design in production and make the field service kit available. We project that Piper will implement the necessary production changes by February 2014. This new design would eliminate the recurring inspection requirement on all future PA-46-350P airplanes. I will keep the Board informed of the FAA's progress on this safety recommendation and provide an update by April 30, 2014.

From NTSB  
To FAA  
Date 10/16/2012  
Type Official Correspondence  
Response We appreciate being notified that Piper has completed the preliminary new engine mount design phase for the PA-46-350P, based on the design of the PA-46-500TP. Pending the completion of Piper's redesign of the engine mount for the PA 46 350P, Safety Recommendation A-10-45 remains classified OPEN—ACCEPTABLE RESPONSE.

From FAA  
To NTSB  
Date 08/03/2012  
Type Official Correspondence  
Response -From Michael P. Huerta, Acting Administrator: As previously Stated, the FAA worked with Piper to review the engine mount designs for the PA-46-310P, PA-46-350P, and PA-46-S00TP. In its letter dated December 22, 2011, the Board agreed that a redesign was not required for the PA-46-310P. Piper completed the preliminary design phase for the PA-46-350P, based on the design of the PA-46-S00TP, which was also supported by the Board. However, Piper's level of effort in this redesign requires additional time to complete the project compared to what was originally Stated.

Piper estimates that by summer 2013, they will incorporate the new design into production and make the field service kit available.

I will keep the Board informed of the FAA's progress on this recommendation and provide an update by July 31, 2013.

From NTSB  
To FAA  
Date 12/22/2011  
Type Official Correspondence  
Response The NTSB agrees with the FAA's determination that only the PA-46-350P engine mount requires a redesign, because of its heavier engine, and that a redesign for the PA-46-310 is unnecessary. We note that Piper is making two design changes to the PA-46-350P engine mount. First, Piper incorporated a stress relief process into the PA-46-350P design to reduce susceptibility to fatigue cracking. Piper has revised the PA-46-350P design drawings, and the revised design is being used in the aircraft production line as of March 22, 2010. Second, Piper is developing a new engine mount design, based on the design of the PA-46-500TP, which could be used in all existing PA-46-350P airplanes by means of a field service kit. Pending completion of Piper's redesign of the engine mount for the PA-46-350P, based on the design of the PA-46-500TP, Safety Recommendation A-10-45 is classified OPEN—ACCEPTABLE RESPONSE.

From FAA  
To NTSB  
Date 10/04/2011  
Type Official Correspondence  
Response From J. Randolph Babbitt, Administrator: The FAA worked with Piper to review the engine mount designs for the PA-46-310P and PA-46-350P, as well as the related PA-46-500TP. As described below, the FAA determined that only the PAA6-350P engine mount requires a redesign. As a result of the review and FAA efforts, Piper agreed to make two design changes to the PAA6•350P engine mount. First, as a fatigue life improvement, Piper incorporated the stress relief process improvement into the PA-46-350P current design to reduce the susceptibility of fatigue cracking. Revisions were made to the PA-46-350P drawings and verified in the aircraft production line as of March 22, 2010. Second, Piper is developing a new engine mount design Modeled closely after the PAA6-500TP design that would eliminate the recurring inspection requirement for all future PA-46-350P aircraft. The new mount would be applicable to all existing PA-46-350P airplanes by means of a field service kit. Piper estimates that it will require a little over one Year to incorporate the new design in production and make the field service kit available. The design changes will satisfy the

intent of the recommendation for the PA-46-350P.

Based on the following data, the FAA considers the intent of this recommendation met without further action on the PA-46-3 IOP mounts. First, all recent service data of mount cracking provided by the Board and verified by our research have occurred only on PA-46-350P Model aircraft. Second, service history and analysis show that even after adding a stress relief design change to the PA-46-350P engine mounts, the original design of the PA-46-310P engine mounts have a fatigue life that is four times longer. Finally, the PA-46-310P aircraft are currently out of production; therefore, design changes will not directly add to the safety of the PAA6-31 OP fleet. As an additional improvement, Piper will, however, follow up with a drawing change and an SB revision including the same stress relief on the PA-46-310P as the -350P.

The PA-46-500TP engine mount calls for stress relieving operations (Piper's process PPS-30000-1) to improve the fatigue life of the attach points. The PA-46-500TP design also uses a different method of fabrication at the gear attach point. To date, no service difficulties related to the PA-46-500TP have been reported in approximately 10 Years of service.

As Stated in our response letter of June 24, 2010, Piper initially planned to serialize the engine mounts to track the stress relief design change. Instead of serializing the parts, Piper will meet the intent of tracking by creating a new part number mount for each of the following design changes: stress relief on PAA6-31 OP, stress relief on PA-46-350P, and redesign of PA-46-350P similar to the PA-46-500TP.

Piper assessed the impact of the additional stress relieving process on the mount fatigue life. Based on the assessment, Piper determined repetitive inspections were needed on both the stress relieved mounts and the non-stress relieved mounts, regardless of their one-piece or two-piece design. Piper also determined the new mounts may be used to replace the earlier configurations. As a result, all engine mounts except for those Modeled after the PA-46-500TP are included in the repetitive inspections and replacement information in SB 1103 revision D. The combination of improved engine mounts and an inspection program manages the susceptibility of fatigue to an acceptable level.

As a result of these actions, I consider Safety Recommendation A-10-44 closed. I will update the Board on the FAA's progress with Safety Recommendation A-10-45, in reference to the PA-46-J50P engine mount, by August 31, 2012.

From NTSB  
To FAA  
Date 01/10/2011  
Type Official Correspondence

**Response** The NTSB is disappointed that the FAA does not believe the recommended action is necessary. The FAA Stated that the Piper PA-46-500TP engine mount design is similar to that of the PA-46-310 and -350P but that the PA-46-500TP engine mount calls for stress-relieving operations of the welded area in the vicinity of the engine mount attachment. The FAA further Stated that Piper is revising the engine mount design drawings for the Piper PA-46-310P and -350P to add stress-relieving operations in the attachment foot areas to prevent fatigue cracking, as well as serializing the engine mounts to allow Piper to determine whether their mounts have been properly stress relieved.

The NTSB does not agree that the design of the PA-46-500TP engine mount is similar to the engine mount design in the PA-46-310 and -350P. In the -310 and -350P, the attachment points are welded together to the engine mount tubes where the welds themselves take the loads; the attachment point on the -500TP has a telescopic style arrangement with a one-piece machined component with tube-like sections that the structural tubes of the engine mount slide and that are welded secure. The loads are distributed throughout the motor mount. The stress-relief process has no direct bearing on the welded section of the new -500TP design.

The intent of this recommendation is for Piper to revise the design of the -310 and -350P to be similar to the design of the -500TP. The addition of stress relieving does not address the differences between the two designs. The NTSB asks the FAA to reconsider its determination that the two types of designs are similar and that there is no need to redesign the mounts of -310 and -350P airplanes. Pending the FAA's reconsideration and the completion of the recommended action, Safety Recommendation A-10-45 is classified OPEN -- UNACCEPTABLE RESPONSE.

**From** FAA

**To** NTSB

**Date** 06/24/2010

**Type** Official Correspondence

**Response** MC# 2100237 - From J. Randolph Babbitt, Administrator: After reviewing the engine mount designs for the PA-310 and -350P, FAA does not see the need to redesign the engine mounts at this time. However, it was discovered that the PA-46-500TP engine mount calls for stress relieving operations (Piper's process PPS-30000-1) of the welded areas in the vicinity of the engine mount attachment. To date, no service difficulty reports related to the PA-46-500TP have been reported. Therefore, Piper revised their engine mount design drawings for the Piper PA-46-310P and -350P to add stress relieving operations in the attachment foot areas to prevent fatigue cracking, in

addition to serializing the engine mounts. The addition of serial numbers will allow Piper to determine if their mounts have been properly stress relieved in accordance with the design change. Piper will need to quantify the impact of adding the stress relieving process on the life of the mount for the Piper PA-46-310P and -350P. This data will allow Piper to determine if repetitive inspections are needed on the new serialized mounts, and if these mounts may be used to replace the earlier configurations. I will keep the Board informed of the FAA's progress on these safety recommendations.