

NATIONAL TRANSPORTATION SAFETY BOARD

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AIRWORTHINESS

Group Chairman's Factual Report

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Attachment 2 – M7 Aerospace Service Bulletins (29 pages)

TO: HOLDERS OF SA227 SERIES SERVICE INFORMATION MANUALS

Attached is SA227 Series Service Bulletin 227-27-055, **Inspection/Replacement of the Aileron Control System Rod End Bearings**, Issued: September 04, 2014.

Several operators have reported higher than normal break out forces at the cockpit control wheel for the aileron. Review of the system by maintenance personnel have identified several spherical bearings in the control system located along the wing rear spar exhibiting frozen or extreme tightness. In at least one of these cases, the "frozen" bearing has caused the mating bellcrank bushings to become loose, causing damage to the bellcrank.

Please insert the attached revised Chapter 27 Index pages.





Inspection/Replacement of the Aileron Control System Rod End Bearings

1. PLANNING INFORMATION

A. Effectivity:

All SA227-TT/-AT/-AC/-BC Airplanes

B. Reason:

Several operators have reported higher than normal break out forces at the cockpit control wheel for the aileron. Review of the system by maintenance personnel have identified several spherical bearings in the control system located along the wing rear spar exhibiting frozen or extreme tightness. In at least one of these cases, the "frozen" bearing has caused the mating bellcrank bushings to become loose, causing damage to the bellcrank.

C. Description:

Inspect the three specific rod end bearings on the aileron control system on each wing for breakaway/breakout torque. If the torque values exceed the allowable, replace the bearing with the new low friction bearing. Inspect the mating bellcrank for any signs of related damage. Otherwise reinstall the control system link, re-rig, and reinspect at the next repeat inspection.

D. Compliance:

Mandatory

- (1) If flight crew are reporting increased breakaway forces at the control wheel, inspect bellcrank and aileron control link rod per Step 7 instruction prior to next flight. If inspection does not find any discrepancy, perform the torque check at the next Phase or Letter Check, or within 200 flight hours, from the date of this bulletin, whichever occurs later. If the inspection (per Step 7) does find a discrepancy, immediately determine and correct the source of the discrepancy. This bulletin covers discrepancies relating to damaged rod link bearings, interference between the aileron link rod and bellcrank/aileron hinge bracket, or out of plane wobbling/ free play.
- (2) For reasons other than 1.D.(1), inspect and perform torque check per Step 5 at the next zone related Phase or Letter Check inspection, or next 600 flight hours (but no later than 8 calendar months), whichever occurs later.
- (3) Continue to repeat inspect and perform torque checks per Step 5 at all 6 locations (3 per wing). Repeat every 6 calendar months following the threshold inspect/ check per 1.D.(1) or 1.D.(2).





- (4) Terminating action for the repeat inspection (step 1.D.(3)) requires the installation of the new low friction rod end bearings specified in Table 1 Material Listing.
- (5) It is recommended to coordinate this bulletin with M7 Aerospace Service Bulletin 227-27-056.

E. Approval:

FAA Approved for Engineering Design.

F. Manpower:

M7 Aerospace estimates 2 manhours to perform the inspect/torque check and a further 4 hours for rod end bearing replacement and rigging checks. This estimate is for direct labor only.

G. Material - Cost and Availability

Contact M7 Aerospace Spares/Sales Department for Cost and Availability. See Table 1 for listing.

H. Tooling-Price and Availability:

Refer to the SA227 Maintenance Manual (MM) for required tooling for rigging of control system. A local tool may be developed by the operator to aid in transferring rod end length and orientation angle once the rod end has been replaced and the rod link needs to be reset.

I. Weight and Balance:

None. The weight of the rod ends is comparable.

- **NOTE**: It is recommended the aircraft operating weight be reestablished after incorporating 20 service bulletins classified as having negligible impact on aircraft weight and balance. This recommendation is derived from data provided in FAA Advisory Circular 120-27.
- J. Reference:

M7 Aerospace SDR Review Item. SA227 Maintenance Manual. SA227 Illustrated Parts Catalog (IPC) 27-10-10, Figure 1, 27-10-20, Figure 1. M7 Aerospace Drawing 27-32011 (latest FAA approved revision) M7 Aerospace Drawing 27-19097 (latest FAA approved revision) M7 Aerospace Drawing 27-32000 (latest FAA approved revision)

NOTE: References are for manufacturers' use only.



K. Other Publications Affected:

SA227 Illustrated Parts Catalog (IPC) 27-10-10, 27-10-20.

2. ACCOMPLISHMENT INSTRUCTIONS

Refer to Figures 1 through 5 for location of the rod end bearings to be checked. The subject rod end bearings are either directly attached to the aileron bellcrank at WS 217.51, or to the aileron at this mid hinge location. Three (3) bearings on LHS and 3 on RHS are the subject of this bulletin.

- A. Jack and shore the aircraft per SA227 Maintenance Manual (MM), chapter 07-10-00 and 07-20-00 such that the outer wing is supported for each wing to be worked on.
- B. Disconnect electrical power from the aircraft and remove GPU. Disconnect main batteries. Tag out circuit breakers and switches to prevent injury to personnel or damage to the aircraft.
- C. Placard the cockpit controls of the aileron control wheel and trim system "DO NOT OPERATE/MOVE".
- D. Gain access to the aft spar of the outer wing in the region of the aileron. It is permissible to perform the work on both wings at the same time.
- E. Remove the aileron for access to perform the inspection and torque check outlined in the following steps per SA227 Maintenance Manual (MM), chapter 27-10-00.
- F. Removal of the aileron requires detaching the aileron link (with subject rod end bearing, see Figure 2, item 3) from the aileron horn. It may be easier to start with this bearing first. The following steps can be performed in any order, systematically checking each bearing.
- G. Initially applying finger pressure, determine if the spherical bearing can be rotated within the outer race of the rod end bearing. Rotation of the bearing must be inplane. If the bearing moves freely and smoothly, without any sloppiness, the bearing may remain installed. Otherwise go to Step 3. and perform frozen bearing inspection. Go to Step 2.H. to perform the next bearing check. (See Figure 7 for in-plane rotation definition)
- H. Disconnect the aileron link (an assembly of male and female rod ends orientated 90 degrees to each other (see Figure 2, items 2 and 3). Disconnect the link from the aileron bellcrank at WS 217. Retain the hardware.
- Initially applying finger pressure, determine if the spherical bearing can be rotated within the outer race of the rod end bearing. Rotation of the bearing must be inplane. If the bearing moves freely and smoothly, without any sloppiness, the bearing may remain installed. Otherwise go to Step 3. and perform frozen bearing inspection. Go to Step 2.J. to perform the next bearing check. (See Figure 7 for in-plane rotation definition)



- J. Disconnect the aileron control tube (the outboard most tube as shown Figure 1, item 2) from the aileron bellcrank at WS 217. Retain the hardware.
- K. Initially applying finger pressure, determine if the spherical bearing can be rotated within the outer race of the rod end bearing. Rotation of the bearing must be inplane. If the bearing moves freely and smoothly, without any sloppiness, the bearing may remain installed. Otherwise go to Step 3. and perform frozen bearing inspection. Go to Step 6 for optional rod end bearing replacement. (See Figure 7 for in-plane rotation definition)
- L. It is permissible to leave the existing rod end bearings installed if the bearings pass the rotation check of Steps 2.G., 2.I., and 2.K. or the torque check per Step 5. Otherwise, the rod end bearings must be replaced.
- M. Reinstall all disconnected aileron tube and aileron links to aileron bellcrank and aileron surface. Refer to SA227 Illustrated Parts Catalog (IPC), chapter 27-10-10, Figure 1 and 27-10-20, Figure 1 for hardware if required. Reinstall aileron link to aileron using MS20995C32 safety wire per NASM33540 (note bolt NAS6605-18H, Figure 3). Reinstall aileron link to bellcrank using MS24665-132 cotter pin per NASM33540 (note bolt NAS1105-10D, nut MS17825-5, Figure 4). Reinstall aileron tube to bellcrank using MS24665-132 cotter pin per NASM33540 (bolt NAS1105-10D, nut MS17825-5, Figure 4). Reinstall aileron tube to bellcrank using MS24665-132 cotter pin per NASM33540 (bolt NAS1105-10D, nut MS14145L5, Figure 5). See Table 1 note for alternate hardware. Go to Step 4 for additional inspections and, once completed, go to Step 2.N.
- N. Reinstall aileron surface per SA227 MM chapter 27-10-00.
- O. Visually check the installation for correct orientation, positioning, and location of parts.
- P. Restore all systems disturbed by the steps above to perform this inspection/replacement. Refer to applicable sections of the SA227 MM. Ensure all relevant free play checks have been performed.
- Q. Remove placards and restore power and hydraulics.
- R. Perform several operational aileron rotations per SA227 MM chapter 27, looking for clearance between all parts and correct operation. Carefully monitor each aileron separately. If no discrepancies are found, go to step 2.S.
- S. Complete aircraft records in accordance with 14 CFR 43.9.
- T. Complete and return service bulletin Compliance Form to M7 Aerospace Technical Publications Department. Email: MetroTech@M7Aerospace.com. Fax: 210-820-8626.

3. "FROZEN" ROD END BEARING INSPECTION

This step assumes the rod end bearing cannot be moved by finger pressure, the next check is to perform the torque check.

Go to Step 5.





4. AILERON HORN AND AILERON BELLCRANK VISUAL INSPECTION

These components are detail visually inspected for any damage.

- A. Using good light (min 100fc) and 1.5X magnifying power, inspect the horn of the aileron where the aileron link is attached. Similarly, inspect the bellcrank and the bellcrank bushings at the attachments of the aileron link and aileron tube.
- B. Replace any damaged components. Refer to applicable chapters of the SA227 IPC for parts and contact M7 Aerospace for further help if required.
- C. Return to Step 2.N.

5. TORQUE CHECK PROCEDURE

- A. This procedure assumes the rod end bearing to be checked in either the aileron link or aileron tube has been disconnected. The procedure can be performed on the wing or remote from the aircraft at the discretion of the operator.
- B. This method simply inserts a standard 5/16" diameter bolt (160ksi UTS) through the rod end to be checked. The bolt must be of sufficient grip length to allow installation of the NAS1149* washer (of 0.032 min thickness) under the head, and nut, MS21042L5, with one or two threads showing past the end of the nut.
- C. While holding the bolt head, lightly torque the nut to approximately 30-50 in-lbs. This provides adequate clamping support to measure the breakout friction of the rod end bearing.
- D. Obtain a torque wrench with a reading tolerance of +/- 0.5 in-lbs or better. Ensure the wrench is in calibration and is capable of measuring 4 to 7 in-lbs torque.
- E. The torque wrench is then applied to the bolt head only, and reset, to measure the breakout torque. A torque greater than 5 in-lbs indicates the rod end bearing needs replacement. Values less than 5 in-lbs permit the rod end bearing to remain in service.
 - (1) Torque greater than 5 in-lbs replace the rod end bearings. Proceed to Step 6.
 - (2) Torque less than or equal to 5 in-lbs return to relevant Steps 2.G. through 2.K. to complete torque check of existing bearings.

6. ROD END BEARING REPLACEMENT

A. Whether the existing bearings are "frozen" or do not meet the torque requirement, or by choice of the operator, the bearings can be removed and replaced with a new low friction bearing which will remove the repetitive inspection requirement on the bearings.



- B. Prior to removal of each rod end, either using witness marks or some form of marking, note orientation of rod end with respect to the aileron horn, to the bellcrank, to the aileron link, or to the aileron tube as the new rod end must be installed in the same position. Note lengths of aileron tube and aileron link for reassembly. Also note orientation of cotter pins/safety wire. All of these features must be maintained to avoid any interference with other parts of the system.
- C. The new low friction bearing listed in Table 1 is a one-to-one replacement with the existing bearing.
- D. Discard the old rod end and install the new rod end. Reassemble the system using the witness marks or other marking as noted above.
- E. Return to steps 2.G. through 2.K. to complete checks or step 2.M. having completed bearing replacement.
- 7. ON-WING INSPECTION OF AILERON CONTROL SYSTEM

Using the existing open slot immediately below the bellcrank/aileron link rod, located on the underside of the wing and aileron, visually observe the bellcrank and aileron link rod. Refer to Figure 6 for location. By hand, carefully rotate the aileron surface up and down and observe the motion of the aileron link rod and bellcrank. The bellcrank should just rotate in-plane - there should be no out of plane motion of the bellcrank. Out of plane motion will require the bellcrank to be removed, inspected, and installation hardware checked and possibly adjusted. Look for any signs of contact between the aileron link rod and bellcrank tang inner faces (where there is a chamfer on these faces), and the aileron surface hinge bracket. Signs of contact would be missing paint or bare metal indicating parts rubbing against each other. There should be no contact between these parts, other than at the bearings. Signs of contact will require investigation and replacement of parts.

Check both left and right ailerons. It is advisable to coordinate this inspection with the inspection specified in Service bulletin 227-27-056 but not required.



| Material Listing - Per Aircraft | | | | | |
|---|--------------|----------|--------|--|--|
| Description | Part Number | Quantity | Vendor | | |
| Tube Rod End Bearing & Aileron Link Bearing, Male (Low Friction) | 27-32011-001 | 4 | M7 | | |
| Aileron Link Bearing, Female (Low Friction) | 27-32011-003 | 2 | M7 | | |

TABLE 1 MATERIAL LISTING

| Additional Parts Listing - Per Aircraft | | | | | |
|---|-------------|----------|--------|--|--|
| The following parts are for information and ordering if required: | | | | | |
| Description | Part Number | Quantity | Vendor | | |
| Nut, Tube Rod End | AN316-5 | 2 | CFE | | |
| Nut, Aileron Link | AN316-5R | 2 | CFE | | |

TABLE 2 ADDITIONAL PARTS LISTING



| Suggested Alternate Hardware <1> | | | |
|----------------------------------|--|--|--|
| B/P Bolt / Nut | Alternate Part Number | | |
| NAS1105 | NAS6205 | | |
| MS17825-5 | RMC9868-5 (P/N ESNA) F12NE4753-054 (P/N ESNA) F12NEC-524 (P/N GREER) E9868-5 (P/N ESNA) | | |
| MS14145L5 | MS14145-5 TE9868-5 RMTE 9868-5 | | |

Note <1> This table defines the blueprint (B/P) and acceptable alternate hardware associated with the installation of the aileron link and control tubes. Only bolts and nuts (provided with FAA Acceptable allowable data) shall be used on installation. Contact M7 Aerospace if hardware other than that listed above or shown in Figure 3 is desired.

TABLE 3ALTERNATE HARDWARE







NOTES:

1. Item 2 is the control tube that must be inspected and spherical rod end bearing torque checked.

FIGURE 1 AILERON CONTROL TUBES (ALONG WING AFT SPAR)

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NOTES:

- 1. Item 1 is the same as Item 1 in Figure 1.
- 2. Items 2 and 3 are the back-to-back sherical bearings that must be inspected and torque checked.
- 3. Item 2 is the male rod end bearing. (Bellcrank)
- 4. Item 3 is the female rod end bearing. (Aileron)

FIGURE 2 AILERON CONTROL LINK

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FIGURE 4 AILERON LINK TO AILERON BELLCRANK ATTACHMENT





FIGURE 5 AILERON TUBE TO AILERON BELLCRANK ATTACHMENT







FIGURE 6 LOCATION OF SLOT ON WING FOR VISUAL INSPECTION (WING STATION 218)







FIGURE 7 IN-PLANE ROTATION OF BEARING WITHIN RACE REF STEPS 2.G., 2.I., AND 2.K.

TO: HOLDERS OF SA227 SERIES SERVICE INFORMATION MANUALS

Attached is SA227 Series Service Bulletin 227-27-056, **Inspection of the Aileron Link Rod, Bellcrank, and Aileron Hinge Bracket for Damage,** Issued: September 04, 2014.

An operator recently experienced loss of Aileron Control on one wing which required the pilot to use full opposite aileron to maintain level flight. The loss of Aileron Control was a result of the female rod end bearing completely failing on the aileron link rod, disconnecting the aileron control system to the aileron surface.

M7 Aerospace is issuing this immediate inspection of the aileron link rod, the mating aileron bellcrank (trailing edge wing rib), and aileron hinge bracket (on the aileron) for signs of damage and/or freeplay or possible interference.

Please insert the attached revised Chapter 27 Index pages.





Inspection of the Aileron Link Rod, Bellcrank, and Aileron Hinge Bracket for Damage

1. PLANNING INFORMATION

A. Effectivity:

All SA227-TT/-AT/-AC/-BC Airplanes

B. Reason:

An operator recently experienced loss of Aileron Control on one wing which required the pilot to use full opposite aileron to maintain level flight. The loss of Aileron Control was a result of the female rod end bearing completely failing on the aileron link rod (see Figure 2), disconnecting the aileron control system to the aileron surface.

M7 Aerospace is issuing this immediate inspection of the aileron link rod, the mating aileron bellcrank (trailing edge wing rib), and aileron hinge bracket (on the aileron) for signs of damage and/or freeplay or possible interference.

C. Description:

Perform a one-time detail visual inspection of the aileron link rod (an assembly of a male rod end bearing threaded into a female rod end bearing), the aileron bellcrank (mounted to the wing trailing edge rib), and the aileron surface hinge bracket (to which the aileron link rod is attached).

Examine the link rod for signs of cracking, specifically on the female banjo body. Examine the aileron hinge bracket for possible signs of contact with the link rod. Examine the aileron bellcrank for freeplay out of plane to the normal rotation of the bellcrank. Also examine the bellcrank for signs of contact with the aileron link rod between the two bellcrank tangs.

D. Compliance:

Mandatory

- (1) Perform initial inspection per Step 2.B. within the next 75 flight hours from the date of this service bulletin.
- (2) Perform the follow-up inspection per Step 2.C. within 400 flight hours from the date/time of the initial inspection (Step 1.D.(1)) or no later than than 6 calendar months from date of initial inspection, whichever occurs first.
- (3) Perform a repeat inspection per 2.C. no more than every 12 calendar months from the date of the initial inspection. An additional inspection may be performed to align the repeat inspection with an existing inspection in the same zone/area.





This repeat inspection shall be incorporated into the Phase and Letter check inspection manuals.

- (4) This service bulletin inspection should be coordinated with service bulletin 227-27-055.
- E. Approval:

FAA Approved for Engineering Design.

F. Manpower:

M7 Aerospace estimates 0.5 hours to perform the initial inspection on both ailerons and 3 man-hours per aileron to perform the follow-up inspection. This estimate is for direct labor only.

G. Material - Cost and Availability

None

H. Tooling-Price and Availability:

None

I. Weight and Balance:

No Change.

- **NOTE**: It is recommended the aircraft operating weight be reestablished after incorporating 20 service bulletins classified as having negligible impact on aircraft weight and balance. This recommendation is derived from data provided in FAA Advisory Circular 120-27.
- J. Reference:

M7 Aerospace SDR Review Item. SA227 Maintenance Manual. SA227 Illustrated Parts Catalog (IPC) 27-10-10, Figure 1, 27-10-20, Figure 1. M7 Aerospace Drawing 27-32011 (latest FAA approved revision) M7 Aerospace Drawing 27-19097 (latest FAA approved revision) M7 Aerospace Drawing 27-32000 (latest FAA approved revision)

NOTE: References are for manufacturers' use only.

K. Other Publications Affected:

SA227 Illustrated Parts Catalog (IPC) 27-10-10, 27-10-20. SA227 Letter Check Inspection SA227 Phase Inspection





2. ACCOMPLISHMENT INSTRUCTIONS

- A. Prior to removal of any components, placard the cockpit controls of the aileron control wheel and trim system "DO NOT OPERATE/MOVE".
- B. Perform initial inspection using the existing open slot immediately below/above the bellcrank/aileron link rod located on the underside/topside of the left and right wing and aileron at W.S. 218, visually observe the bellcrank and aileron link rod. See Figure 1 for location. Use good light (min 100fc) and a mirror is recommended for this inspection.
 - (1) By hand, carefully rotate the aileron surface up and down and observe the motion of the aileron link rod and bellcrank. The bellcrank should just rotate in-plane; there should be no out-of-plane motion on the bellcrank. Out-of-plane motion will require the bellcrank to be removed, inspected, installation hardware checked, and possibly adjusted or replaced. Look for any signs of contact between the aileron link rod and the bellcrank tang inner faces (where there is a chamfer on these faces) and the aileron surface hinge bracket. Signs of contact would be missing paint or bare metal indicating parts rubbing against each other. There should be no contact between these parts other than at the bearings. Signs of contact will require investigation and replacement of parts. Go to Step 2.C if any discrepancy is found, otherwise remove placard installed per Step 2.A and go to Step 2.D.
- C. Follow-up Inspection: Check both left and right ailerons.
 - (1) Gain access to the bellcrank, the aileron link rod, and aileron surface hinge bracket. This will require removal of the aileron. Ensure the orientation of the aileron link rod is maintained during this process. Refer to SA227 Maintenance Manual, Chapter 27-10-00 for removal/installation of aileron.
 - (2) Detail visual inspect using good light (at least 100fc) and 5X magnification the aileron link rod for signs of cracking in the banjo body, specifically where it is necked down around the bearing (see Figure 2). Detail visually inspect using good light (100fc) and 1.0-1.5X magnification the link rod for signs of contact with any part of the bellcrank or hinge bracket to which it is mounted. Scoring, gouges, bare metal, cracks, or other damage to the link rod, requires replacement of the link rod. Report all findings to M7 Aerospace Engineering at MetroTech@M7Aerospace. com. The link rod consists of female and male rod end bearing with a nut securing them together. Replacement parts are PN 27-32011-001 (male), PN 27-32011-003 (female), and PN AN316-5R nut.
 - (3) Detail visual inspect using good light (at least 100fc) the bellcrank for signs of damage and freeplay. Determine if bearings in bellcrank pivot are worn or loose. Determine if the bellcrank pivot bolt installation is not providing the correct clampup within the trailing edge rib assembly. See Figures 3 and 4. Check the hardware stack up per SA227 Illustrated Parts Catalog (IPC), Chapter 27-10-10. Replace bellcrank if there has been contact with the aileron link rod or the bearings are





worn/loose. Reference SB 227-27-012 for additional checks of the 27-71016 Bellcrank that may be incorporated at this time as required. Report all findings to M7 Aerospace Engineering at MetroTech@M7Aerospace.com. Replacement part for the bellcrank is PN 27-71016-035. If a new bellcrank is installed, ensure it rotates correctly without out-of-plane motion.

- (4) Detail visual inspect using good light (at least 100fc) the aileron surface hinge bracket. The center hinge bracket is bolted to the aileron spar. See Figures 3 and 4. Look for signs of contact on the face of the bracket adjacent to the link rod. Report all findings to M7 Aerospace Engineering at MetroTech@M7Aerospace. com.
- (5) Reinstall all components per SA227 Maintenance Manual, Chapter 27. Protect any bare metal per SA226/227 Structural Repair Manual (SRM), Chapter 51-30-02.
- (6) Remove placards and restore power and hydraulics.
- (7) Perform functional checks of the aileron system per SA227 MM Chapter 27. Check for any contact signs of interference between the link rod, bellcrank, and aileron hinge bracket.
- D. Complete aircraft records in accordance with 14 CFR 43.9.
- E. Complete and return service bulletin Compliance Form to M7 Aerospace Technical Support Department. Email: MetroTech@M7Aerospace.com. Fax: 210-820-8626.





FIGURE 1 LOCATION OF SLOT ON WING FOR VISUAL INSPECTION (WING STATION 218 LHS SHOWN, RHS OPPOSITE)

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FEMALE BANJO BODY OF ROD END BEARING

FIGURE 2 FAILED FEMALE ROD END BEARING





KEY:

- Item 1 Aileron Bellcrank.
- Item 2 Male rod end bearing half of Aileron Link Rod.
- Item 3 Female rod end bearing half of Aileron Link Rod.
- Item 4 Aileron Hinge Bracket.
- Item 5 Aileron Bellcrank Pivot Bolt.

FIGURE 3 AILERON CONTROL LINK







TO: HOLDERS OF SA227 SERIES SERVICE INFORMATION MANUALS

Attached is Revision 1 to SA227 Series Service Letter 227-SL-060, **Inspect Aileron Spar Web at Hinges for Cracking**, Issued: June 10, 2013; Revised: September 19, 2014.

There have been limited reports of the RH aileron spar web cracking adjacent to the inboard, center, and outboard hinge fittings. M7 Aerospace is requesting operators to do an inspection of the LH and RH aileron spar webs for any cracks in the area of the inboard, center, and outboard hinge fittings. Operators are requested to contact M7 Aerospace LLC if any discrepancies are noted.

Since issue of this service letter, several operators have reported cracking in spar at other hinge locations. This revision revises content in 2. REASON and 3. ACTION. All changes are denoted by a black revision bar in the left hand margin.

Please insert the attached revised Service Letter Index pages.





FLIGHT CONTROLS

SUBJECT: INSPECT AILERON SPAR WEB AT HINGES FOR CRACKING

1. EFFECTIVITY:

All SA227-TT/-AT/-AC/-BC Airplanes.

2. <u>REASON</u>:

There have been limited reports of the RH aileron spar web cracking adjacent to the inboard, center, and outboard hinge fittings. M7 Aerospace is requesting operators to do an inspection of the LH and RH aileron spar webs for any cracks in the area of the inboard, center, and outboard hinge fittings. Operators are requested to contact M7 Aerospace LLC if any discrepancies are noted.

Since issue of this service letter, several operators have reported cracking in spar at other hinge locations. This revision revises content in 2. REASON and 3. ACTION. All changes are denoted by a black revision bar in the left hand margin.

3. <u>ACTION</u>:

- A. Detail Visual Inspect (DVI*) a 5.0" X 5.0" square area on the upper and lower skins adjacent to the aileron hinge fitting location. Look for signs of cracking of the skin, or pulled skin at fastener heads along both internal rib rivet attachment row, and spar rivet attachment rows.
- B. Detail Visual Inspect (DVI*) the aileron spar web immediately either side of each hinge fitting by rotating the aileron to increase visibility of the spar web. Look for cracks emanating out from under the fitting, particularly in the upper and lower spar web radius. (See FIGURE 1). Optimum inspection viewing is looking down in aileron cutouts from above the aileron, using a mirror to aid in inspection.
- C. Perform this initial inspection at the next Phase or Letter Check. Repeat inspection on annual basis. Repeat inspection will be incorporated into the Phase and Letter Check Inspection manuals.
- D. Report all findings to M7 Aerospace Engineering at MetroTech@M7Aerospace.com or fax to 210-820-8609.

Include photos, or sketch showing crack details, aircraft model and serial number, Total Aircraft Tine (TAT), and any known history on the particular aileron.

* NOTE: DVI - Detail Visual Inspection is defined as the following for this inspection.

Issued: June 10, 2013 Revised: September 19, 2014



Inspect using an illumination device (such as circular fluorescent inspection luminaire) which produces a minimum of 100 fc of light intensity at the part surface, and a magnification device (such as the integral magnifier of the aforementioned inspection luminaire) producing approximately 1.5X magnification or greater, examine all surface details of the part, noting any obvious defects.





FIGURE 1 EXAMPLE OF SPAR WEB CRACKING VIEW LOOKING AFT AT AILERON SPAR (OUTBOARD HINGE SHOWN)

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