

Service Bulletin SB-9 Revision A

December 11, 2017

Procedures specified in this service bulletin must be accomplished in accordance with accepted methods of aircraft maintenance and applicable government regulations. Appropriate log book entries must be made.
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I. SUBJECT

This service bulletin addresses a potential failure of McFarlane Aviation, Inc. part number MC0411257 universal joint. The universal joint is used in various model Cessna aircraft and attaches the control tube to the shaft for control of the flight control surfaces of the aircraft.

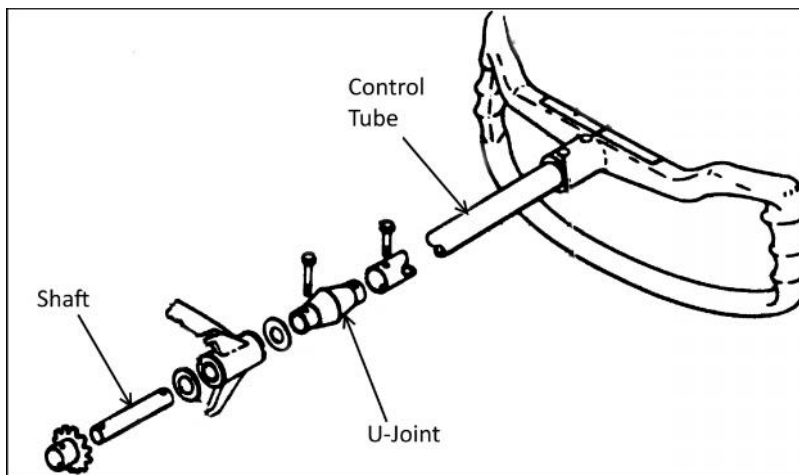


Figure 1

II. BACKGROUND

McFarlane Aviation, Inc. was notified that a failure of a part number MC0411257 universal joint had occurred, resulting in a separation of the joint parts.

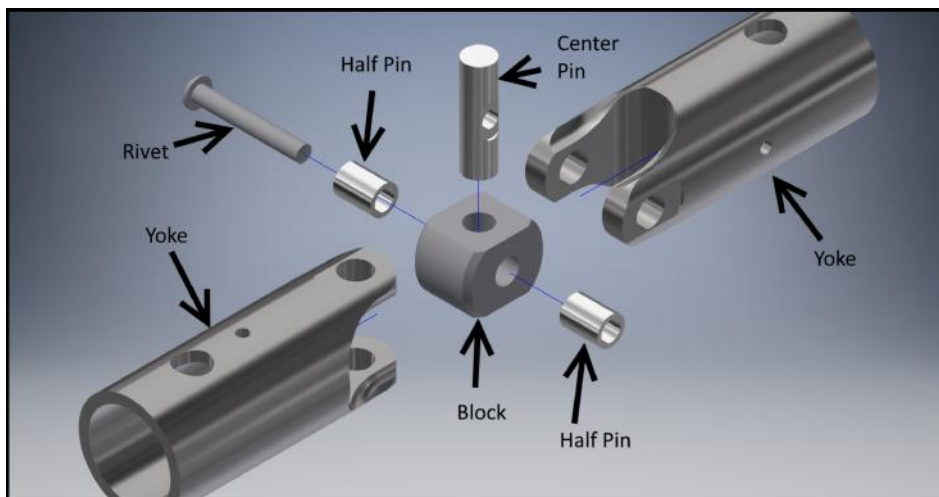


Figure 2

After review, McFarlane Engineering determined that one or more of the pinned connections became frozen (“locked up”) with possible contributing factors of a) **contact of similar metals (pins and block)**, b) **lack of proper lubrication**, and/or c) **particle contamination of the assembly**. As a result of this lock up and with continued usage, the resultant transfer of force caused galling of the internal parts, failure of the rivet, and, ultimately, separation of the two halves of the joint.

Beginning with production after August of 2016, McFarlane Aviation introduced a nitriding process (in addition to the heat treatment) to the pins and block so as to enhance wear resistance and improve bearing surface tolerance to lack of lubrication and contamination. Additional testing has confirmed that this greatly enhances the ability of the universal joint to resist locking up under adverse conditions. Accordingly, McFarlane Aviation has issued this Service Bulletin with inspection & replacement instructions for joints produced prior to this design change.

III. AFFECTED AIRCRAFT

All serial numbers of the following aircraft are:

120	A152	P172D
140, 140A	F152	R172E (T-41B,C,D), R172F (T-41D), R172G (T-41C,D), R172H (T-41D), R172K
150,150A,B,C,D,E,F,G,H,J,K,L,M	FA152	
A150K, A150L, A150M	170, 170A, 170B	175,175A,B,C
F150F,G H,J,K,L,M	172,172A,B,C,D,E,F,G,H,I,K,L,M,N,P,Q,R,S	180,180A,B,C,D,E,F,G,H,J,K
FA150K, FA150L, FA150M	F172D, E,F,G,H,K,L,M,P	182,182A,B,C,D
FRA150L, FRA150M	FP172	185,185A,B,C,D
152	FR172E,F,G,H,J,K	A185E, A185F
210,210A		

IV. AFFECTED PARTS

All affected parts were from the following job orders (lot numbers): **JO41505, JO41997, JO43600, & JO45454**

V. IDENTIFICATION METHODS

Aircraft service records as well as the part must be reviewed to determine if a universal joint from the affected list has been previously installed. *If service records show the U-joints have not been replaced, or were replaced with non-McFarlane parts, then examination of the U-joints is not necessary.*

All affected articles were shipped from McFarlane between **7/1/2015** and **9/30/2016**. Job order numbers are found marked on the side of the universal joints directly under the part number marking. If a protective sleeve has been installed on the U-joint, slide it aside to reveal part markings.

Note: ALL McFarlane manufactured U-joints are made from heat-treated stainless steel and are therefore not coated. U-joints that are yellow or gold in color are NOT affected McFarlane parts. No further inspection is necessary.

VI. COMPLIANCE

Inspection compliance is mandatory and immediate, if the universal joint is one of the lots covered in this service bulletin.

-) If the inspection **fails**, immediate replacement is required prior to further flight.
-) If the inspection **passes**, re-inspection is required every 25 hours of further flight time, until the universal joint has been replaced. **U-joint must be replaced within 100 flight hours after the initial inspection or 1 calendar year, which ever comes first.**

VII. ACCOMPLISHMENT INSTRUCTIONS

A. Free Rotation

1. Detach one side of the universal joint (U-joint) by removing the bolts from that end of the universal joint. Either side may be chosen for ease of access.
2. Remove the protective sleeve (see Figure 5) if present.
3. Hold the still-connected side of the U-joint, as shown in Figure 3.

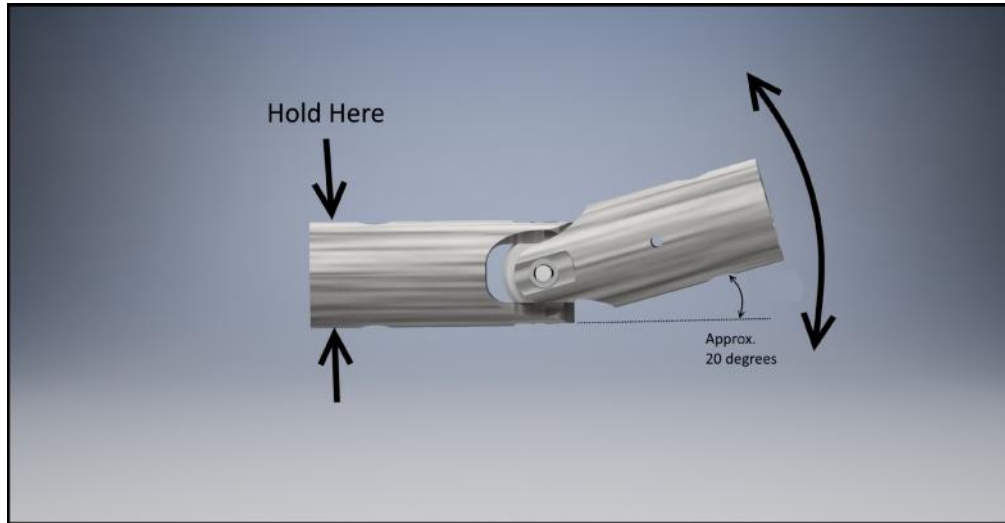


Figure 3

4. Hold the free end of the U-joint up, above the neutral axis, as shown in Figure 3.
5. Release the raised end of the U-joint and verify that the yoke can drop freely to the other extent of rotation.
6. Rotate the U-joint 90 degrees and repeat Steps 3-5 with the other pin axis.
7. If the yoke does not fall freely, in either orientation, **stop and replace the universal joint before further flight.**

B. Half Pins Rotation

1. Using a permanent ink marker, mark both half pins with a vertical line as shown in Figure 3.
2. Rotate the joint and verify that the yoke is rotating around the inner pin and not rotating the pins. If the U-joint yokes fail to rotate freely around the pins, the pin is locked.
3. Repeat Step 2 for the other half pin.
4. If either half pin is locked, **stop and replace the universal joint before further flight.**

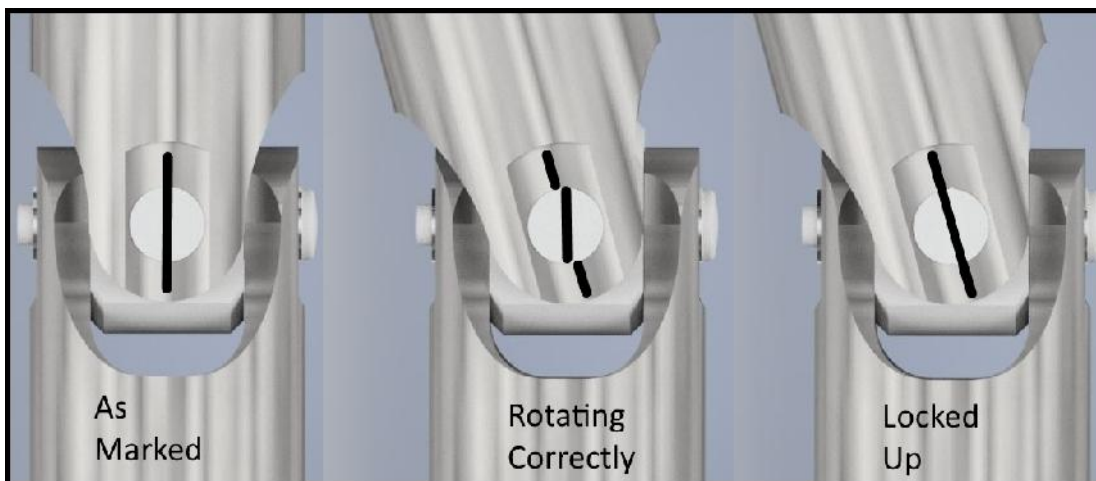


Figure 4

C. Center Pin Rotation

1. Using a permanent ink marker, mark the center pin (without the rivet) with a vertical line.
2. Rotate the joint and verify that the yoke is rotating around the center pin and not rotating the pin. If the U-joint yokes fail to rotate freely around the pin, **stop and replace the universal joint before further flight.**

D. Rivet Inspection

1. Inspect the rivet for tightness. It should be tight with no end play.
2. Rivet heads should be fully formed with no visible cracking or other obvious defects.
3. Immediately replace any U-joint with a defective or suspect rivet.

E. Lubricate and Return to Service

1. Re-lubricate the universal joint as required by the applicable Cessna service manual. DO NOT USE PENETRATING TYPE OILS such as WD-40 or Liquid Wrench
2. Replace the protective sleeve or install new sleeve, P/N MC6183, as shown in Figure 5. Note: MC6183 is a PMA replacement part for Cessna part number S1495-10. Not all aircraft in the affected list feature the sleeve in the parts & service manuals. McFarlane Engineering has concluded that it shall now be required for all installations of the McFarlane U-joint.
3. Re-install the U-joint to the steering yoke linkage. Install with new self-locking nuts. Do not re-use existing nuts.
4. Verify smoothness of yoke control over entire range allowed by linkage.

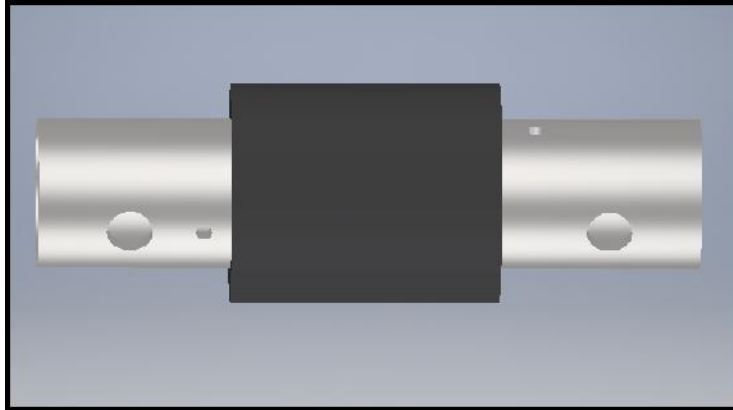


Figure 5

VIII. MATERIAL PRICE AND AVAILABILITY

Part number MC0411257 universal joint and part number MC6183 sleeve are available from McFarlane Aviation, Inc.

IX. CREDIT INFORMATION

McFarlane Aviation, Inc. will issue a credit of \$50.00 labor for the replacement of a universal joint from the affected lots (see Section IV). Part Credit and a surface freight allowance will be given upon return of the affected part(s).

X. APPROVAL

FAA approved articles are affected by this service bulletin. The technical portions of this service bulletin are FAA approved.

XI. DISTRIBUTION

This service bulletin has been distributed to all customers for whom McFarlane Aviation, Inc. has sales records indicating the purchase of affected parts. All McFarlane service bulletins may also be found at www.mcfarlaneaviation.com. Please forward this urgent information to the current owner or operator of the affected aircraft. For further information or questions call (800) 544-8594 or (785) 594-2741. All persons are free to copy this bulletin if it is copied in its entirety with no alterations or additions.