Australian Government
Civil Aviation Safety Authority

AIRWORTHINESS BULLETIN

Flight Control Rod Ends

AWB 27-018 **Issue** : 1
Date : 31 October 2013

1. Effectivity

All aircraft fitted with alternative part number rod ends part # MW-5TM-2 or MM-5TM-2. Or possibly any other alternative part number rod ends other than the original specified by the OEM.

11	HFE-5M	Rod End
	KBD5-243	Rod End (Alt PN) (V96579)
	H5-5	Rod End (Alt PN) (V83086)
	REF10ATC10Z	Rod End (Alt PN) (V21335)

13	HME-5M	Rod End
	KR5-MA	Rod End (Alt PN)
	KBDE-5-351	Rod End (Alt PN) (V96579)
	HE5-5	Rod End (Alt PN) (V83086)
	REM10ATC10ZM	Rod End (Alt PN) (V86174)
	MS21242-S5	Rod End (Alt PN)
	HMR-5M	Rod End (Alt PN) (V1DW08)

Figure 1

Alternative part number rod ends

2. Purpose

To alert all operators that alternative part number rod ends are not meeting the manufacturers design requirements for breakaway torque. An Australian operator was recently required to ground several aircraft following the discovery of excessive input requirements required for aileron control.

3. Background

Whilst an operator was conducting an investigation into aileron control stiffness they discovered rod ends were outside the nominated design requirements. The rod ends removed were not identifiable by part number or vendor, however, alternative part number rod ends MW-5TM-2 and MM-5TM-2 as specified in the M7 Aerospace SA227 Illustrated Parts Catalogue (Refer to Figure 3) have been found to require excessive load input to initiate movement known as “breakaway torque”. The operator began a fleet review which highlighted that several rod ends were outside of the design limitations. (Refer to Figure 2 for general specifications for MS standard rod ends) To remedy the situation the operator sourced the original part number specified by the Type Certificate holder within the IPC.

The cause of the excessive stiffness within the rod ends is unknown however long term storage may be a contributing issue with the swelling of polymers within the bearing ends or incorrect manufacturing processes.

TABLE II. LOAD REQUIREMENTS

DASH NO.	OSCILLATING LOAD LB	ULTIMATE STATIC LOAD LB	FATIGUE LOAD LB	AXIAL PROOF LOAD LB	WEIGHT MAX LB	NO LOAD BREAKAWAY TORQUE IN/LBS MIN	NO LOAD BREAKAWAY TORQUE IN/LBS MAX
- 3	1470 (c)	2360	1470 (c)	1000	.072	.5	6
- 4	3420	4860	2380	1000			
- 5	3590	7180	2770 (d)	1100	.087	1	10
- 6	5120	8550	3570	1660	.136		
- 7	6130	12000	4800	1850	.183		
- 8	8370	19500	7680 (d)	2040	.278		
10	10700	21900	9180	2430	.424		
-12	13200	29300	11600	2810	.639		
-14	16500	34500	13100	3320	.963	2	16
-16	26600	80300	30400	4340	2.546		

(c) BASED ON BOLT BENDING FATIGUE STRENGTH 180 000 PSI

Figure 2

Sample of breakaway design load requirements.

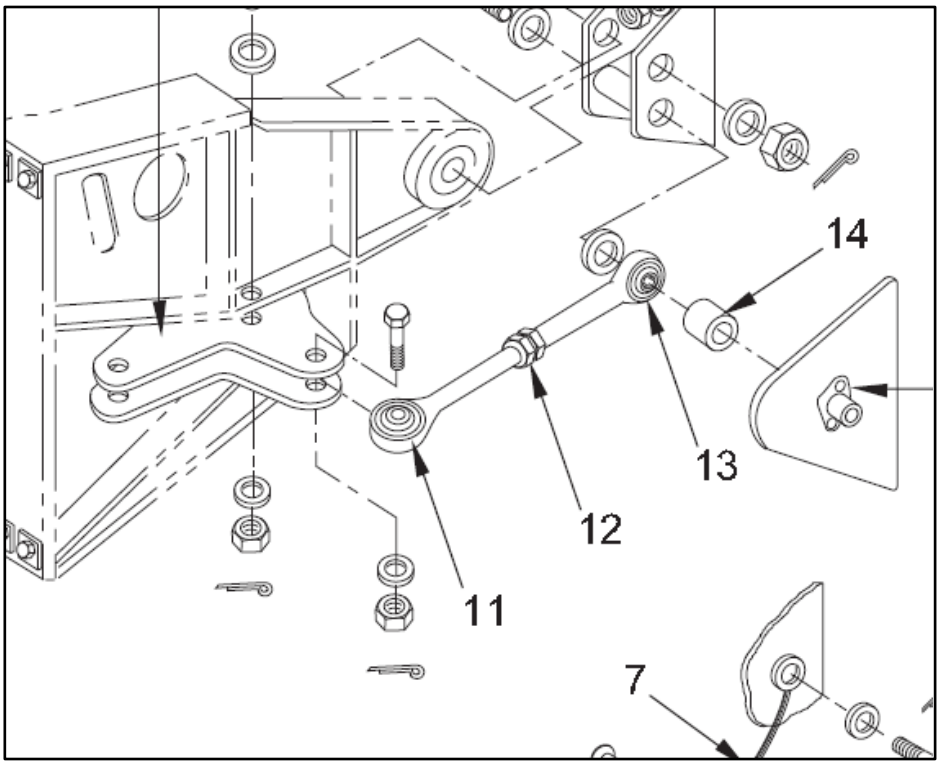

Figure 3

SA227 IPC image Aileron Rod ends

Figure 4

Image of Alternate Part Number Rod end

4. Recommendations

It is highly recommended that all rod ends be inspected and tested prior to use and at regular periodic intervals for adequate freedom of movement in accordance with manufacturers specifications. These rod ends may not be limited to the SA227 series or to aircraft or flight controls alone.

5. Reporting

All rod ends suspected of being outside of the required limitations should be reported to CASA via the SDR system.

6. Enquiries

Enquiries with regard to the content of this Airworthiness Bulletin should be made via the direct link e-mail address:

AirworthinessBulletin@casa.gov.au

or in writing, to:

Airworthiness and Engineering Standards Branch
Standards Division
Civil Aviation Safety Authority
GPO Box 2005, Canberra, ACT, 2601