	AIRWORTHINESS DIRECTIVE No F-2002-414 R3		Distribution: B	Issue date: July 07, 2004	Page : 1/5
	Direction générale de l'aviation civile France	This Airworthiness Directive is published by the DGAC : <input checked="" type="checkbox"/> on behalf of EASA, the Primary Airworthiness Authority for the affected product. <input type="checkbox"/> as the Registration Airworthiness Authority for the affected aircraft..		<i>Translation of « Consigne de Navigabilité » of same number. In case of difficulty, reference should be made to the French issue.</i>	
GSAC publication	No person may operate an aircraft to which an Airworthiness Directive applies, except in accordance with the requirements of that Airworthiness Directive, unless otherwise agreed with the Authority of the State of Registry.				
Corresponding foreign Airworthiness Directive(s): Not applicable			Airworthiness Directive(s) replaced: 2002-414 Revision 2		
Person in charge of airworthiness: AIRBUS SAS			Type(s): A330 aircraft		
Type certificate(s) No. A.004 TCDS No A.004					
ATA chapter: 27		Subject: Flight controls - THSA - Repetitive inspection and modification of ball-nut transfer tubes - Repetitive inspection and greasing of the screw/nut assembly			

1. EFFECTIVITY:

AIRBUS A330 aircraft, models -201, -202, -203, -223, -243, -301, -302, -303, -321, -322, -323, -341, -342 and -343, all serial numbers.

2. REASONS:

2.1. Several cases of transfer tube disconnection from the ball-nut of the trimmable horizontal stabilizer actuator (THSA) PN 47172 and 47147-400 were detected on the ground during greasing and maintenance.


This situation is caused by water ingress into the ball-nut resulting in the jamming of the ball transfer circuit when the water freezes.

If the three (independent) ball circuits are lost, then the THSA will operate on a fail-safe nut. This nut (which operates without balls) would then jam after several movements on the screw of the THSA. This degraded operation is not detectable in the cockpit by the crew as long as the THSA does not jam and could damage the ball screw and the fail-safe nut.

This situation was judged as unacceptable and the aim of the Airworthiness Directive (AD) 2001-356 R2 was to render mandatory the repetitive inspection of the transfer tubes and their collars in order to detect at an early stage any distortion or initiation of disconnection.

Further to a new case of transfer tube disconnection, AD 2001-356 R2 introduced a repetitive greasing task with reinforcement of the ball-nut maintenance greasing instructions.

In addition, the electrical flight control computers monitor the operation of the THSA and the jamming of this actuator could be detected and indicated by messages on the maintenance system and on the ECAM. In this case a mandatory inspection of the THSA is required before the next flight.

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2.2. The AD 2002-038 required application of a final fix [related to inspection and greasing task required by AD 2001-356] for the THSA PN 47172 by application of the AIRBUS modification 49590/Service Bulletin (SB) AIRBUS A330-27-3085. It changes the THSA PN from 47172 to 47172-300.

2.3. This new AD is issued:

2.3.1. For THSA's PN 47147-400 and 47172,

to repeat the ball transfer tube repetitive inspection actions every 150 FH, rendered mandatory by Airworthiness Directive 2001-356 R2.

The ball-nuts of THSA's PN 47147-400 and 47172 use ceramic balls both for the spacer and loaded balls. Following internal contamination, resistance to or jamming of ball transfer induces high loads in the transfer tubes leading to disconnection of the tubes. The loads are higher with ceramic balls due to a higher friction coefficient between the ceramic material and the screw/nut.

2.3.2. For all THSA's PN 47147-XXX, 47172 and 47172-300,

The THSA has two load transmission channels allowing transfer of the loads to the secondary nut in case of malfunction of the primary nut. When the secondary nut is under load, the friction increases between the titanium nut and the steel screw and should lead to the jamming of the THSA after several movements. During bench tests with simulation of flight conditions and application of loads to the secondary nut, significant damage was observed on the screw and secondary nut after several flights. If operation on the secondary nut is not detected by the flight control primary computer (FCPC), a malfunction of the primary channel can lead to damage to the screw and secondary nut and, in the extreme case, lead to unwanted runaway of the trimmable horizontal stabilizer.

In order to ensure full integrity of the primary and secondary channels of the THSA, a repetitive inspection of the screw/nut assembly every 700 flight hours (FH) is required by this AD.

2.3.3. For all THSA's PN 47147-XXX, 47172 and 47172-300,

to extend to all THSA's the repetitive greasing actions every 700 FH, in replacement of those rendered mandatory every 650 FH by AD 2001-356 R2.

This greasing reduces the risk of contamination of the ceramic or metal ball circuits.

2.3.4. For THSA PN 47172,

to restate the request for final fix (modification of THSA PN 47172 to PN 47172-300 by modification 49590/SB AIRBUS A330-27-3085) rendered mandatory by AD 2002-038, before December 31, 2003.


2.3.5. For THSA PN 47147-400,

to render mandatory the final fix modification of THSA PN 47147-400 to PN 47147-500 (by modification 49591/SB AIRBUS A330-27-3093) before July 31, 2004.

Consequently, this AD replaces the AD's 2001-356 R2 and 2002-038.

2.4. The Revision 1 was issued:

- to confirm, in paragraph 3.2 "Compliance", that inspection of the screw/nut assembly is repetitive every 700 FH, as already mentioned in paragraph 2.3.2. "reasons" of this AD at original issue,
- to give more details for a good understanding of the AD content.

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- 2.5. The aim for Revision 2 was to extend the field applicability of this AD to the new model A330-201, recently certified, and to take into account the replacement of the AOT AIRBUS A330-27A3102, Revision 1, by AIRBUS SB A330-27-3102 Revision 2.

It is to note that this new model is concerned only by repetitive inspection and greasing required per the paragraphs 3.2. and 3.3. of this AD.

- 2.6. The aim for Revision 3 of this AD is to extend the effectivity to the new models A330-302 and A330-303, recently certified.

These new models are concerned only by repetitive inspection and greasing required per the paragraphs 3.2. and 3.3. of this AD.

3. MANDATORY ACTIONS AND COMPLIANCE TIMES:

3.1. THSA's PN 47147-400 and 47172 inspection:

- 3.1.1. Unless already accomplished, not later than 150 FH counted from the last inspection as per AD 2001-356 R2:

visually inspect the transfer tubes and the collars of the ball-nut of the THSA in accordance with the instructions given in SB A330-27-3088 Revision 3.

- 3.1.2. If the rejection criteria defined in paragraph 3.B(1)c) of the SB mentioned in paragraph 3.1.1. of this AD are met, replace the THSA by an airworthy THSA before the next flight in accordance with the instructions of the paragraph 3.B(1)c) of the SB mentioned in paragraph 3.1.1. of this AD.

- 3.1.3. Repeat the THSA inspection and/or replacement actions as described in paragraphs 3.1.1. and 3.1.2. above at intervals not exceeding 150 FH.

- 3.1.4. If one of the "PRIM X PITCH FAULT" or "STAB CTL FAULT" messages is displayed on the ECAM associated with the "PITCH TRIM ACTR (1CS)" maintenance message, inspect and replace, if necessary, the THSA before the next flight following the messages display in accordance with paragraphs 3.1.1. and 3.1.2. above.

- 3.1.5. In case of anomaly, inform AIRBUS of the inspection results.

3.2. Screw/nut assembly inspection of all THSA's PN 47147-XXX, 47172 and 47172-300 to ensure the integrity of the primary and secondary load paths:


- 3.2.1. Unless already accomplished, not later than 700 FH from the effective date of this AD at original issue, visually inspect the ball screw assembly and check the gap at the secondary nut trunnion in accordance with the instructions of AIRBUS SB A330-27-3102 Revision 2 paragraphs 3.B.(1) and 3.B.(2).

- 3.2.2. Repeat the inspection defined in above paragraph 3.2.1. at intervals not exceeding 700 FH.

- 3.2.3. If one of the "PRIM X PITCH FAULT" or "STAB CTL FAULT" messages is displayed on the ECAM associated with the "PITCH TRIM ACTR (1CS)" maintenance message, inspect and check the THSA before the next flight following the messages display in accordance with paragraph 3.2.1. above.

- 3.2.4. If the rejection criteria as defined in paragraph 3.B.(3) of the SB AIRBUS A330-27-3102 Revision 2 are met, before the next flight following the inspection of paragraph 3.2.1. and paragraph 3.2.2. of this AD, replace the THSA by an airworthy THSA in accordance with the instructions of the paragraph 3.B.(3) of the SB AIRBUS A330-27-3102 Revision 2.

- 3.2.5. In case of anomaly, inform AIRBUS of the inspection results.

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3.3. Ball-nut greasing of all THSA's PN 47147-XXX, 47172 and 47172-300:

3.3.1. Before accumulation of 700 FH since the last greasing of the ball-nut, grease the THSA ball-nut in accordance with the instructions defined in AMM 12-22-27 page block 301.

3.3.2. Repeat the greasing task defined in above paragraph 3.3.1. at intervals not exceeding 700 FH.

3.3.3. If, during the greasing procedure, the new grease is expelled from the transfer tube (instead of from the drain hole), before the next flight following this greasing procedure:

- for THSA PN 47147-2XX, 47147-3XX, 47147-400 and 47172 replace the THSA by an airworthy THSA,
- for THSA PN 47147-500 and 47172-300, contact AIRBUS.

3.4. Modification of THSA PN 47172:

Before December 31, 2003, modify the ball-nuts of THSA PN 47172 in accordance with the instructions of SB AIRBUS A330-27-3085, THSA PN 47172 becomes PN 47172-300.

Note 1: This action renders the instructions for inspections every 150 FH of paragraph 3.1. above null and void.

3.5. Modification of THSA's PN 47147-400 and 47147-2XX/3XX:

Before July 31, 2004,

- modify the ball-nuts of THSA PN 47147-400 in accordance with the instructions of SB A330-27-3093, THSA PN 47147-400 becomes PN 47147-500.
- modify THSA's PN 47147-200, -210, -213, -300, -303 and -350 in accordance with the instructions given in SB AIRBUS A330-27-3052 and SB AIRBUS A330-27-3093. The THSA's PN 47147-2XX/3XX become PN 47147-500.


Note 2: This action renders the instructions for inspections every 150 FH of paragraph 3.1. above null and void.

4. REFERENCE PUBLICATIONS:

Bulletin Service AIRBUS A330-27-3052
 Bulletin Service AIRBUS A330-27-3085
 Bulletin Service AIRBUS A330-27-3088 Revision 3
 Bulletin Service AIRBUS A330-27-3093
 Bulletin Service AIRBUS A330-27-3102 Revision 2
 (Any later approved Revision of these SBs is acceptable)
 AMM procédure 12-22-27 page bloc 301.

5. EFFECTIVE DATES:

Original issue : August 17, 2002
Revision 1 : September 14, 2002
Revision 2 : November 09, 2002
Revision 3 : July 17, 2004.

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6. REMARK:

For questions concerning the technical contents of this AD's requirements, contact:

AIRBUS SAS - Gérard MEUREY - Fax : 33 5 61 93 45 80.

7. APPROVAL:

This AD Revision is approved under EASA reference No 2004-7036 dated June 29, 2004.