EASA	AIRWORTHINESS DIRECTIVE
	AD No.: 2011-0105 **Date: 31 May 2011** Note: This Airworthiness Directive (AD) is issued by EASA, acting in accordance with Regulation (EC) No 216/2008 on behalf of the European Community, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation.

This AD is issued in accordance with EC 1702/2003, Part 21A.3B. In accordance with EC 2042/2003 Annex I, Part M.A.301, the continuing airworthiness of an aircraft shall be ensured by accomplishing any applicable ADs. Consequently, no person may operate an aircraft to which an AD applies, except in accordance with the requirements of that AD unless otherwise specified by the Agency [EC 2042/2003 Annex I, Part M.A.303] or agreed with the Authority of the State of Registry [EC 216/2008, Article 14(4) exemption].

Type Approval Holder's Name :	**Type/Model designation(s) :**
EUROCOPTER	SA 365, AS 365, SA 366 and EC 155 helicopters

TCDS Number :	DGAC France No. 159
Foreign AD :	Not Applicable
Supersedure:	This AD supersedes EASA AD 2009-0247 dated 13 November 2009.
ATA 05 **ATA 65**	**Time Limits and Maintenance Checks - Tail Gearbox (TGB) Oil Level and Magnetic Chip Detector - Inspection** **Tail Rotor - Pitch Control Rod Bearing - Inspection / Replacement**
Manufacturer(s):	Eurocopter (formerly Eurocopter France, Aerospatiale).
Applicability:	SA 365 N1, AS 365 N2, AS 365 N3, SA 366 G1, EC 155 B and EC 155 B1 helicopters, all serial numbers.
Reason:	In early 2006, a report was received concerning the loss of the tail rotor pitch control on a helicopter during a landing phase. Investigation showed that this loss of pitch control was due to significant damage to the bearing of the control rod in the tail gearbox (TGB). The loss of tail rotor pitch control can lead to the loss of yaw control of the helicopter. On February 2006, EASA issued Emergency AD 2006-0051-E to address this unsafe condition, which was subsequently superseded by Emergency AD 2006-0258R1-E dated 29 August 2006. That AD required the affected operators to maintain the TGB oil level at the maximum and to check the axial play in the tail rotor pitch control rod bearing, each time metallic particles were detected at the TGB magnetic plug. Since AD 2006-0258 R1-E was issued, another AS 365 N3 helicopter has experienced loss of yaw control due to deterioration of the control rod bearing, with a damage mode similar to the previous case. Following the investigation on this event, Eurocopter has determined that a repetitive check for absence of axial play in the pitch control rod bearing is necessary to ensure safety of flight and a new procedure has been developed and published in revised Alert Service Bulletins (ASB) AS 365 No. 05-00-54, SA 366 No. 05-37 and EC 155 No. 05A015, respectively. In addition, for 365 N helicopters only, the interval for checking the TGB oil level has been revised from "after the last flight of the day" (ALF check) to 10 flight hours (FH).

	For the reasons described above, Emergency AD 2008-0147-E, which superseded Emergency AD 2006-0258 R1-E, required the implementation of the additional and revised inspection and corrective actions as described in the above mentioned service bulletins. Following two new cases of loss of yaw control efficiency during the landing phase, both of which did not result in loss of control of the aircraft, Eurocopter has modified the procedure for checking play in the control rod bearing. The maintenance history of these TGBs showed that, in spite of compliance with the instructions contained in ASB AS 365 No. 05.00.54 at Revision 1 or Revision 2; SA 366 No. 05-37 at Revision 1 or Revision 2; EC 155 No. 05A015 at Revision 1 or Revision 2, no play had been detected before the incident. EASA AD 2009-0247 which retained the requirements of EASA AD 2008-0147-E, was superseded, and additionally required accomplishment of the new procedure to control wear of the rod double bearing, in accordance with the instructions of paragraph 2.B.3 of the applicable ASB at Revision 3. Since issue of EASA AD 2009-0247, a further case of major damage to the control rod double bearing has been discovered after the detection of particles by an operator a helicopter fitted with a TGB electrical chip detector. The analysis of this incident led EUROCOPTER to introduce flight cycle (FC) intervals in addition to the flight hour monitoring intervals for helicopters fitted with the basic magnetic plug, i.e. without electrical indicating through the revision 4 of ASB AS 365 No. 05.00.54, ASB SA 366 No. 05-37 and ASB EC 155 No. 05A015. Furthermore, during cleaning of the damaged TGB control shaft/rod assemblies, magnetic particles, which were not from the double bearing, were found by some operators. This led to the replacement of double bearings although they were in good condition. Therefore, revision 4 of ASB AS 365 No. 05.00.54, ASB SA 366 No. 05-37 and ASB EC 155 No. 05A015 integrates also a metallurgical analysis of the particles collected during cleaning in order to inspect whether they originate from the double bearing, so as to be able to maintain the bearing in service according to the analysis result. In parallel to the issuance of revision 4 of ASB AS 365 No. 05.00.54, ASB SA 366 No. 05-37 and ASB EC 155 No. 05A015, Eurocopter have developed a method to allow inspection of the axial play in the rod bearings. This inspection is the subject of the new ASB AS365 05.00.61, ASB SA 366 No. 05.41 and ASB EC155 No. 05A022. These ASB, which also retain the instructions of revision 4 of ASB AS 365 No. 05.00.54, ASB SA 366 No. 05-37 and ASB EC 155 No. 05A015, instruct additionally to embody Modification (MOD) 0765B58 which consists in the replacement of both guide bushes by 2 TORLON guide bushes. This modification improves the tolerance between the control shaft and the TGB wheel in order to limit the friction loads on the control bearing. For the reasons described above, this AD retains partially the requirements of EASA AD 2009-0247, which is superseded, and additionally requires the embodiment of MOD 0765B58, the introduction of 50 FC inspection intervals for helicopters fitted with the magnetic plug without electrical indicating and the accomplishment of the simplified procedure to control the play of the rod double bearing after embodiment of MOD 0765B58.
Effective Date:	14 June 2011

Required action(s) and Compliance Time(s):	Required as indicated, unless accomplished previously: For the purpose of this AD, the following Service Publications (SP) are defined: - SP#1: Eurocopter ASB AS365 No. 05.00.54, - SP#2: Eurocopter ASB SA366 No. 05.37, - SP#3: Eurocopter ASB EC155 No. 05A015, - SP#4: Eurocopter ASB AS365 No. 05.00.61 Original issue, - SP#5: Eurocopter ASB SA366 No. 05.41 Original issue, - SP#6: Eurocopter ASB EC155 No. 05A022 Original issue, - SP#7: Eurocopter AS365 SB No. 65.00.17 Original issue and Revision 1, - SP#8: Eurocopter SA366 SB No. 65.04 Original issue and Revision 1, and - SP#9: Eurocopter EC155 SB No. 65-006 Original issue and Revision 1. (1) **For SA 365 N1, AS 365 N2 and AS 365 N3 helicopters**: Within 10 FH after 05 August 2008 (effective date of EASA AD 2008-0147-E), and thereafter at intervals not to exceed 10 FH, inspect the oil level in accordance with the instructions of paragraph 2.B.1 of SP#1 Revisions 1, 2, 3 or 4 OR of paragraph 3.B.1. of SP#4 and accomplish the associated corrective actions as defined in applicable ASB. **For SA 366 G1 helicopters**: After 05 August 2008 (the effective date of EASA AD 2008-0147-E), during each ALF check and during each flight-related check (15 FH or 7 days, whichever occurs first), inspect the oil level in accordance with the instructions of paragraph 2.B.1 of SP#2 Revisions 1, 2, 3 or 4 OR of paragraph 3.B.1. of SP#5 and accomplish the associated corrective actions as defined in applicable ASB. **For EC 155 B1 helicopters:** After 05 August 2008 (the effective date of EASA AD 2008-0147-E), during each ALF check and during each flight-related check (15 FH or 7 days, whichever occurs first), inspect the oil level in accordance with the instructions of paragraph 2.B.1 of SP#3 OR of paragraph 3.B.1. of SP#6 and accomplish the associated corrective actions as defined in applicable ASB. (2) For helicopters which, on the effective date of this AD, do not embody in-production MOD 0765B58 or which embody MOD 0765B58 through the in-service accomplishment of SP#7, SP#8 or SP#9 as applicable to the helicopter version and having accumulated less than 60 FH after the last inspection for play in the double bearing of the TGB control rod/shaft assembly, as required by paragraph (2) of EASA AD 2008-0147-E, as applicable, and for all other helicopters which have not complied with paragraph (2) of EASA AD 2008-0147-E: Within 50 FH after the effective date of this AD, and thereafter at intervals not to exceed 110 FH, inspect for play in the double bearing of the TGB control rod/shaft assembly in accordance with the instructions of paragraph 2.B.3 of SP#1 Revision 3 or 4, SP#2 Revision 3 or 4, or SP#3 Revision 3 or 4, as applicable to the helicopter version. (3) For helicopters which, on the effective date of this AD, do not embody in-production MOD 0765B58 or which embody MOD 0765B58 through the in-service accomplishment of SP#7, SP#8 or SP#9 as applicable to the helicopter version and having accumulated more than 60 FH after the last inspection for play in the double bearing of the TGB control rod/shaft

assembly, as required by paragraph (2) of EASA AD 2008-0147-E;

Within 110 FH after accomplishment of the last check as required by paragraph (2) of EASA AD 2009-0247, as applicable, and thereafter at intervals not to exceed 110 FH, inspect for play in the double bearing of the TGB control rod/shaft assembly in accordance with the instructions of paragraph 2.B.3 of SP#1 Revision 3 or 4, SP#2 Revision 3 or 4, or SP#3 Revision 3 or 4, as applicable to the helicopter version.

(4) If, during any inspection required by paragraph (2) or (3) of this AD, play is detected in the double bearing of the TGB control rod/shaft assembly, before next flight, replace the double bearing and within 10 days after the inspection, report the inspection results to Eurocopter, in accordance with the instructions of paragraph 2.B.3 of SP#1 Revision 3 or 2.B.3.b of SP#1 Revision 4, or 2.B.3 of SP#2 Revision 3 or 2.B.3.b of SP#2 Revision 4, or 2.B.3 of SP#3 Revision 3 or 2.B.3.b of SP#3 Revision 4, as applicable to the helicopter version.

(5) If, during any inspection required by paragraph (2) or (3) of this AD, NO play is detected in the double bearing of the TGB control rod/shaft assembly, before next flight, clean the control shaft/rod assembly, collect the rinsing product and inspect for the presence of particles and/or of magnetic abrasion in the rinsing product in accordance with the instructions of paragraph 2.B.3 of SP#1 Revision 3 or 2.B.3.a of SP#1 Revision 4, or of paragraph 2.B.3 of SP#2 Revision 3 or 2.B.3.a of SP#2 Revision 4, or paragraph 2.B.3 of SP#3 Revision 3 or 2.B.3.a of SP#3 Revision 4.

(6) If, during the inspection required by paragraph (5) of this AD, particles and/or magnetic abrasion dusts are found in the rinsing product, accomplish the actions of one of the following paragraphs:

(6.1) Before next flight, replace the double bearing and within 10 days after the inspection, report the inspection results to Eurocopter in accordance with the instructions of paragraph 2.B.3 of SP#1 Revision 3 or 2.B.3.a of SP#1 Revision 4, or 2.B.3 of SP#2 Revision 3 or 2.B.3.a of SP#2 Revision 4, or 2.B.3 of SP#3 Revision 3 or 2.B.3.a of SP#3 Revision 4, as applicable to the helicopter version,

OR,

(6.2) Before next flight, analyze the collected particles and/or the magnetic abrasion dusts in accordance with the instructions of paragraph 2.B.3.a. of SP#1 Revision 4, SP#2 Revision 4, or SP#3 Revision 4, as applicable to the helicopter version.

(7) If, during the analysis of the collected particles as required by paragraph (6.2) of this AD, one or more M50 particles are detected, and unless the double bearing has been replaced as required by paragraph (6.1) of this AD, before next flight, replace the double bearing and within 10 days after the inspection, report the inspection results to Eurocopter in accordance with the instructions of paragraph 2.B.3.a. of SP#1 Revision 4, SP#2 Revision 4, or SP#3 Revision 4, as applicable to the helicopter version.

(8) For TGBs which are not equipped with an electrical chip detector:

At the next scheduled check of the magnetic plug after 05 August 2008 (effective date of EASA AD 2008-0147-E) and thereafter at intervals not to exceed 25 FH or 50 FC whichever occurs first, inspect that there are no particles at the magnetic plug, in accordance with the instructions of paragraph 2.B.2 SP#1 Revisions 1, 2, 3 or 4, SP#2 Revisions 1, 2, 3 or 4 or SP#3 Revisions 1, 2, 3 or 4 OR with the instructions of paragraph 3.B.2 of SP#4, SP#5 or SP#6, as applicable to the helicopter version and corresponding ASB version. If particles are detected, before next flight, accomplish the associated corrective actions in accordance with the instructions of paragraph 2.B.2.b) of SP#1 Revisions 1, 2, 3 or 4, SP#2

Revisions 1, 2, 3 or 4 or SP#3 Revisions 1, 2, 3 or 4 OR with the instructions of paragraph 3.B.2 of SP#4, SP#5 or SP#6, as applicable to the helicopter version and corresponding ASB version.

(9) For TGBs equipped with electrical chip detector:

At the next scheduled check of the magnetic plug, or after illumination of the TGB “CHIP” warning light, whichever occurs first after 05 August 2008 (effective date of EASA AD 2008-0147-E), and thereafter upon each event of illumination of the TGB “CHIP” warning light, inspect that there are no chips at the magnetic plug, in accordance with the instructions of paragraph 2.B.2 of SP#1 Revisions 1, 2, 3 or 4, SP#2 Revisions 1, 2, 3 or 4 or SP#3 Revisions 1, 2, 3 or 4 OR with the instructions of paragraph 3.B.2 of SP#4, SP#5 or SP#6 as applicable to the helicopter version and corresponding ASB version. If particles are detected, before next flight, accomplish the associated corrective actions in accordance with the instructions of paragraph 2.B.2.b) of SP#1 Revisions 1, 2, 3 or 4, SP#2 Revisions 1, 2, 3 or 4 or SP#3 Revisions 1, 2, 3 or 4 OR with the instructions of paragraph 3.B.2 of SP#4, SP#5 or SP#6 as applicable to the helicopter version and corresponding ASB version.

(10) Within 3 calendar months or within 300 FH after the effective date of this AD, whichever occurs first, and unless already embodied, embody MOD 0765B58 in accordance with SP#7, SP#8 or SP#9 as applicable to the helicopter version.

(11) Embodiment of MOD 0765B58 as required by paragraph (10) of this AD terminates the repetitive inspection requirements of paragraphs (2) and (3) of this AD.

(12) Concurrently with embodiment of MOD 0765B58 as required by paragraph (10) of this AD, clean the control shaft/rod assembly, collect the rinsing product and analyse the particles and/or of magnetic abrasion collected in the rinsing product in accordance with paragraph 3.B.3.b. of SP#4, SP#5 or SP#6 as applicable to the helicopter version.

(13) If, during the particles analysis as required by paragraph (12) of this AD, one or more M50 particles are detected in the particles and/or the magnetic abrasion dusts collected, accomplish the following actions:

(13.1) Before next flight, replace the double bearing in accordance with the instructions of paragraph 3.B.3.a. of SP#4, SP#5 or SP#6 as applicable to the helicopter version, and

(13.2) After replacement of the double bearing and before next flight, measure the reference play of the (new) double bearing of the TGB control rod/shaft assembly in accordance with paragraph 3.B.4.a. of SP#4, SP#5 or SP#6, as applicable to the helicopter version, and thereafter at intervals not to exceed 110 FH, measure the play (evolution) in the double bearing of the TGB control rod/shaft assembly and accomplish the associated corrective actions, in accordance with the instructions of paragraphs 3.B.4.b. and 3.B.4.c. of SP#4, SP#5 or SP#6, as applicable to the helicopter version, and

(13.1) Within 10 days after the inspection, report inspection results to Eurocopter in accordance with the instructions of paragraph 3.B.3.b. of SP#4, SP#5 or SP#6 as applicable to the helicopter version.

(14) If, during the analysis of the collected particles as required by paragraph (12) of this AD, no M50 particle is detected in the particles and/or the magnetic abrasion dusts collected, before next flight, measure the reference play of the double bearing of the TGB control rod/shaft assembly in accordance with paragraph 3.B.4.a. of SP#4, SP#5 or SP#6, as applicable to the helicopter version, and thereafter at intervals not to exceed 110 FH, measure the play (evolution) in the double bearing of the

	TGB control rod/shaft assembly and accomplish the associated corrective actions, in accordance with the instructions of paragraphs 3.B.4.b. and 3.B.4.c. of SP#4, SP#5 or SP#6, as applicable to the helicopter version. (15) For helicopters for which MOD 0765B58 has been embodied in-production (since new or complete overhaul) before the effective date of this AD, within 110 FH after the last inspection for play in the double bearing of the TGB control rod/shaft assembly, in compliance with paragraph (2) of EASA AD 2008-0147-E or with paragraph (2) or (3) of EASA AD 2009-0247, as applicable, measure the reference play of the double bearing of the TGB control rod/shaft assembly in accordance with paragraph 3.B.4.a. of SP#4, SP#5 or SP#6, as applicable to the helicopter version, and thereafter at intervals not to exceed 110 FH, measure the play (evolution) in the double bearing of the TGB control rod/shaft assembly and accomplish the associated corrective actions, in accordance with the instructions of paragraphs 3.B.4.b. and 3.B.4.c. of SP#4, SP#5 or SP#6, as applicable to the helicopter version. (16) Embodiment of MOD 0765B58 as required by paragraph (10) of this AD and replacement of the double bearing of the TGB control rod/shaft assembly does not constitute terminating action for the repetitive measurements of the play of the TGB control rod/shaft assembly as required by paragraphs (13.2), (14) and (15).
Ref. Publications:	Eurocopter ASB AS365 No. 05.00.54 Revision 4 dated 16 May 2011, Eurocopter ASB SA366 No. 05.37 Revision 4 dated 16 May 2011, Eurocopter ASB EC155 No. 05A015 Revision 4 dated 16 May 2011, Eurocopter ASB AS365 No. 05.00.61 Original issue dated 16 May 2011, Eurocopter ASB SA366 No. 05.41 Original issue dated 16 May 2011, Eurocopter ASB EC155 No. 05A022 Original issue dated 16 May 2011, Eurocopter SB AS365 No. 65.00.17 Revision 1 dated 21 March 2011, Eurocopter SB SA366 No. 65.04 Revision 1 dated 21 March 2011, and Eurocopter SB EC155 No. 65-006 Revision 1 dated 21 March 2011. The use of later approved revisions of these documents is acceptable for compliance with the requirements of this AD.
Remarks:	1. If requested and appropriately substantiated, EASA can approve Alternative Methods of Compliance for this AD. 2. The required actions and the risk allowance have granted the issuance of a Final AD with Request for Comments, postponing the public consultation process after publication. 3. Enquiries regarding this AD should be referred to the Airworthiness Directives, Safety Management & Research Section, Certification Directorate, EASA. E-mail: ADs@easa.europa.eu. 4. For any question concerning the technical content of the requirements in this AD, please contact: EUROCOPTER (STDI) - Aéroport de Marseille Provence 13725 Marignane Cedex, France. Telephone +33 (0) 4 42 85 97 97, Fax +33 (0) 4 42 85 99 66. E-mail: Directive.technical-support@eurocopter.com.