EASA	AIRWORTHINESS DIRECTIVE
	AD No.: 2011-0145 **Date: 02 August 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 2011-0117 dated 24 June 2011.

ATA 05	**Time Limits and Maintenance Checks - Tail Gearbox (TGB) Oil Level and Magnetic Chip Detector - Inspection**
ATA 65	**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 On February 2006, EASA issued Emergency AD 2006-0051-E to address this unsafe condition, which was subsequently superseded by Emergency AD 2006-0258R1-E dated 29 August 2006.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 the issuance of AD 2006-0258 R1-E, another AS 365 N3 helicopter 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 (EC) 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, EC 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 the issuance 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 of a helicopter fitted with a TGB electrical chip detector. The analysis of this incident led EC 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, EC 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, additionally instruct 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.

Subsequently, EASA issued AD 2011-0105 which superseded, and partially retained the requirements of EASA AD 2009-0247, and additionally required:

- the introduction of an interval of 50 FC (in addition to the existing interval of 25 FH, whichever occurs first) for the repetitive inspections of the magnetic plug for helicopters fitted with magnetic plug without electrical indicating,
- the analysis of the particles collected (in the rinsing product used to clean the control shaft/rod assembly) to check for the presence of M50 particles before the replacement of the double bearing,
- the embodiment of MOD 0765B58, and
- the accomplishment of the simplified procedure to control the play of the rod double bearing after embodiment of MOD 0765B58.

	Since the issuance of EASA AD 2011-0105, some operators commented that the repetitive inspection of the rod double bearing play, by using the simplified procedure, was not clearly required by EASA AD 2011-0105 for helicopters that have embodied in-service the MOD 0765B58 before the effective date of EASA AD 2011-0105. EASA concurred with the comments and issued AD 2011-0117, superseding EASA AD 2011-0105, retaining its requirements, clarifying that the repetitive inspection of the rod double bearing play by using the simplified procedure is required by the AD for helicopters that have embodied in-service the MOD 0765B58 before the effective date of EASA AD 2011-0105 and makes paragraph (1) of the AD also applicable to EC 155 B helicopters. Since AD 2011-0117 was issued, EC discovered that the instructions to measure the play in the bearing of the TGB control shaft/rod assembly were incorrect for helicopters equipped with an 11-blade fenestron, because the Flight Manual of those helicopters prohibits operation of the yaw control with rotor stopped. Consequently, EC has revised the ASB instructions, including those for helicopters with the 10-blade fenestron. This modification of the procedure does not affect any measurements previously carried out, or the results obtained. In addition, it has been discovered that EC 155 ASB 05A015 and paragraph (9) of EASA AD 2011-0117 (and all the previous superseded ADs) were requiring, for TGBs equipped with electrical chip detector, a one-time inspection at the next scheduled check of the magnetic plug instead of requiring repetitive inspections at each scheduled check. This has been corrected in EC 155 ASB 05A015 at Revision 5. For the reasons described above, this AD supersedes AD 2011-0117, retaining most of its requirements, requires repetitive inspections of the magnetic plug for TGBs equipped with electrical chip detector and requires the play measurement of the TGB control rod/shaft assembly double bearing to be accomplished in accordance with the type of fenestron installed, making reference to the revised ASBs, ASB AS365 05.00.61, ASB SA 366 No. 05.41 and ASB EC155 No. 05A022.
Effective Date:	16 August 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 or Revision 1, - SP#5: Eurocopter ASB SA366 No. 05.41 Original issue or Revision 1, - SP#6: Eurocopter ASB EC155 No. 05A022 Original issue or Revision 1, - SP#7: Eurocopter AS365 SB No. 65.00.17 Original issue or Revision 1, - SP#8: Eurocopter SA366 SB No. 65.04 Original issue or Revision 1, and - SP#9: Eurocopter EC155 SB No. 65-006 Original issue or 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 Revision 1, 2, 3 or 4 OR of paragraph 3.B.1. of SP#4 and accomplish the associated corrective actions as defined in the 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 Revision 1, 2, 3 or 4 OR of paragraph 3.B.1. of SP#5 and accomplish the associated corrective actions as defined in the applicable ASB.

For EC 155 B and 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 Revision 1, 2, 3, 4 or 5 OR of paragraph 3.B.1. of SP#6 and accomplish the associated corrective actions as defined in the applicable ASB.

(2) For helicopters which, on 14 June 2011 (the effective date of EASA AD 2011-0105), do not embody in-production MOD 0765B58 or MOD 0765B56 (which includes 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 27 November 2009 (the effective date of EASA AD 2009-0247), 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, 4 or 5, as applicable to the helicopter version.

(3) For helicopters which, on 14 June 2011 (the effective date of EASA AD 2011-0105), do not embody in-production MOD 0765B58 or MOD 0765B56 (which includes 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 (3) of EASA AD 2009-0247, 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, 4 or 5, 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 EC, 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 or 5, 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 or 5.

(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 EC 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 or 5, 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 or 5, 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 EC 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 or 5, 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 Revision 1, 2, 3 or 4, SP#2 Revision 1, 2, 3 or 4 or SP#3 Revision 1, 2, 3, 4 or 5 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 Revision 1, 2, 3 or 4, SP#2 Revision 1, 2, 3 or 4 or SP#3 Revision 1, 2, 3, 4 or 5 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 and, after the effective date of this AD during each scheduled check of the magnetic plug, inspect that there are no chips at the magnetic plug, in accordance with the instructions of paragraph 2.B.2 of SP#1 Revision 1, 2, 3 or 4, SP#2 Revision 1, 2, 3 or 4 or SP#3 Revision 1, 2, 3, 4 or 5 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 Revision 1, 2, 3 or 4, SP#2 Revision 1, 2, 3 or 4 or SP#3 Revision 1, 2, 3, 4 or 5 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 14 June 2011 (the effective date of EASA AD 2011-0105), whichever occurs first, and unless MOD 0765B58 or MOD 0765B56 (which includes MOD 0765B58) already embodied, embody MOD 0765B58 in accordance with SP#7, SP#8 or SP#9 as applicable to the helicopter version.

(11) Accomplish the actions of one of the following paragraphs as applicable:

(11.1) 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,

OR,

(11.2) For helicopters that have MOD 0765B58 embodied before 14 June 2011 (the effective date of EASA AD 2011-0105) in accordance with SP#7, SP#8 or SP#9 as applicable to the helicopter version, within 3 calendar months or 300 FH after 14 June 2011 (the effective date of EASA AD 2011-0105), whichever occurs first, 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.

(12) If, during the particles analysis as required by paragraphs (11.1) or (11.2) of this AD, as applicable, one or more M50 particles are detected in the particles and/or the magnetic abrasion dusts collected, accomplish the following actions:

(12.1) Before next flight, replace the double bearing 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, and

(12.2) 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 depending on the type of fenestron installed, 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 depending on the type of fenestron installed, and

(12.3) Within 10 days after the particles analysis, report the analysis results to EC, 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.

(13) If, during the analysis of the collected particles as required by paragraphs (11.1) or (11.2) of this AD, as applicable, 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 depending on the type of fenestron installed, 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 depending on the type of fenestron installed. (14) For helicopters for which MOD 0765B58 or MOD 0765B56 (which includes MOD 0765B58) has been embodied in-production (since new or complete overhaul) before 08 July 2011 [the effective date of AD 2011-0117], 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 depending on the type of fenestron installed, 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 depending on the type of fenestron installed. (15) Accomplishment of required actions of paragraphs (11) and (12) or (13), as applicable, terminates the repetitive inspection requirements of paragraphs (2) and (3) of this AD. (16) Embodiment of MOD 0765B58 or MOD 0765B56 and replacement of the double bearing of the TGB control rod/shaft assembly do not constitute terminating action for the repetitive measurements of the play of the TGB control rod/shaft assembly, as required by paragraphs (12.2), (13) and (14). (17) For the play measurements (reference and evolution) of the double bearing of the TGB control rod/shaft assembly required by paragraphs (12), (13) and (14) of this AD, after the effective date of this AD, these must be accomplished in accordance with the instructions of paragraphs 3.B.4.a and 3.B.4.b. of SP#4, SP#5 or SP#6 at Revision 1 or subsequent, as applicable to the helicopter version and depending on the type of fenestron installed.
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 5 dated 25 July 2011, Eurocopter ASB AS365 No. 05.00.61 Revision 1 dated 13 July 2011, Eurocopter ASB SA366 No. 05.41 Revision 1 dated 13 July 2011, Eurocopter ASB EC155 No. 05A022 Revision 1 dated 13 July 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 Safety Information Section, Executive 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.