

EASA	AIRWORTHINESS DIRECTIVE
	<p>AD No.: 2011-0179</p> <p>Date: 16 September 2011</p> <p>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.</p>
<p>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].</p>	
Type Approval Holder's Name : AIRBUS	Type/Model designation(s) : A330 aeroplanes
TCDS Number:	EASA.A.004
Foreign AD:	Not applicable
Supersedure:	This AD supersedes EASA AD 2006-0302R1 dated 10 September 2010.
ATA 32	Landing Gear – Main Landing Gear Retraction Actuator Piston Rod - Inspection / Modification
Manufacturer(s):	Airbus (formerly Airbus Industrie)
Applicability:	<p>Airbus A330-201, A330-202, A330-203, A330-223, A330-243, A330-301, A330-302, A330-303, A330-321, A330-322, A330-323, A330-341, A330-342 and A330-343 aeroplanes, all manufacturer serial numbers, except those on which Airbus modification (mod.) 52980 has been embodied in production on both Main Landing Gear (MLG) units.</p> <p>Aeroplanes on which Airbus mod. 54500 has been embodied in production are not affected by this AD.</p>
Reason:	<p>During an approach phase, the flight crew of an A330 aeroplane had to perform a free-fall extension of the left-hand (LH) MLG.</p> <p>Rupture of the LH MLG retraction actuator piston rod was found near to the rod attachment point. The inspection revealed at the location of the rupture the presence of corrosion resulting from incorrect application of the anti-corrosion protection, and circumferential cracks resulting from normal operational loading effects.</p> <p>Since the above rupture, new cases of crack propagation along the length of the piston rod occurred. At this time the source of the failure load was not known. These ruptures led to a non-damped extension of the landing gear. Fully extended, the landing gear assembly was submitted to high loads jeopardising its structural integrity.</p> <p>This condition, if not detected and corrected, could lead to MLG failure during landing or roll-out and consequent damage to the aeroplane and</p>

	<p>injury to occupants</p> <p>DGAC France issued AD F-2005-098 (EASA approval 2005-5887) to address this unsafe condition. Since that AD was issued, the results of extensive investigation determined that the presence of water in the internal volume of the piston rod can lead to the formation of ice which presents a potential source of high magnitude tensile hoop stresses in the material of the rod leading to propagation of longitudinal crack in the body of the piston rod.</p> <p>Prompted by these findings, EASA issued AD 2006-0302, partially retaining the requirements of DGAC France AD F-2005-0098, which was superseded, and to revise the inspection requirements as follows:</p> <ol style="list-style-type: none"> Extend the repetitive inspection interval for the removal of fluid from the internal volume of the piston rod using flight cycles (FC) in lieu of flight hours (FH), as this better represents the mechanism for the accumulation of water within the piston rod. Remove the preliminary visual inspection from the ultrasonic longitudinal inspection of the upper end of the piston rod. Add a new one-time ultrasonic longitudinal and circumferential inspection of the full piston rod length to eliminate any parts that exhibit severe corrosion along the internal length of the piston rod. Mandate the new design hollow piston rod part number (P/N) 114256328 (Airbus mod. 52980/SB A330-32-3180 Revision 01) without a vent hole, thus eliminating moisture ingress as the terminating action. <p>EASA AD 2006-0302 was later revised to extend the inspections threshold from 3 to 6 years in service usage for retraction actuator piston rod P/N 114256321 issue 06 which was re-identified to P/N 114256326 issue 01 in accordance with the instructions of Airbus SB A330-32-3216.</p> <p>More recently, the sampling of piston rod P/N 114256326 issue 1 and P/N 114256321 issue 06 have confirmed the need to replace all retraction actuator piston rods by a piston rod P/N 114256328.</p> <p>This AD retains the requirements of EASA AD 2006-0302R1, which is superseded, and requires the replacement of all retraction actuator piston rods by piston rod P/N 114256328, which constitutes terminating action to the repetitive requirements of this AD.</p>
Effective Date:	30 September 2011
Required Action(s) and Compliance Time(s):	<p>Required as indicated, unless previously accomplished:</p> <p><u>A) Restatement of EASA AD 2006-0302R1 requirements</u></p> <p>Paragraphs (1), (2), (3), (4), (5), (6) and (7) of this AD are applicable, as indicated, after 19 October 2006 [the effective date of EASA AD 2006-0302R1], for aeroplanes equipped with:</p> <ol style="list-style-type: none"> Retraction actuator piston rods P/N 114256309 and P/N 114256321 issue 03, upon accumulation of three years of use in service, and Retraction actuator piston rods P/N 114256326 issue 01 and P/N 114256321 issue 06, upon accumulation of six years of use in service: <ol style="list-style-type: none"> <u>Detailed visual inspection of the retraction actuator piston rod:</u> For each concerned retraction actuator piston rod not yet visually inspected in accordance with the instructions of Airbus SB A330-32-3173 at Revision 01, or Revision 02, or Revision 03, or Revision 04, or Revision 05, at the latest upon accumulation of three years or six years, as applicable, of in service usage, or, for each concerned retraction actuator piston rod that has already

been visually inspected in accordance with the instructions of Airbus SB A330-32-3173 Revision 01, or Revision 02, or Revision 03, or Revision 04, or Revision 05, within 8 days from the last visual inspection performed in accordance with SB A330-32-3173 Revision 01, or Revision 02, or Revision 03, or Revision 04, or Revision 05,

(1.1) Accomplish a visual inspection of the visible chromed area of the piston rod in fully extended position to search for cracks, in accordance with the instructions of Airbus SB A330-32-3173 Revision 05.

(1.2) Thereafter, at intervals not exceeding 8 days, repeat the visual inspection required by paragraph (1.1) of this AD, in accordance with the instructions of Airbus SB A330-32-3173 Revision 05.

(1.3) If during any inspection required by paragraphs (1.1) and (1.2) of this AD, one or more cracks are found, before next flight, replace the retraction actuator, in accordance with the instructions of Airbus SB A330-32-3173 Revision 05.

Note 1: No further repetitive visual inspection is required to comply with paragraph (1) of this AD after accomplishment of drainage of the fluid from the piston as required by paragraph (2) of this AD in addition to the one-time-ultrasonic non-destructive testing (NDT) inspection of the full length of the piston as required by paragraph (4) of this AD.

(2) **Drain the fluid from the piston rod and seal the vent hole:**

For each concerned retraction actuator piston rod not yet inspected/ fluid-drained in accordance with the instructions of Airbus SB A330-32-3173 at Revision 02, or Revision 03, or Revision 04, or Revision 05, at the latest upon accumulation of three years or six years, as applicable, of in service usage,

or,

for each concerned retraction actuator piston rod that has already been inspected/ fluid-drained in accordance with the instructions of Airbus SB A330-32-3173 at Revision 02, or Revision 03, or Revision 04, or Revision 05, within 1 000 FC or 24 months, whichever occurs first, from the last inspection/ fluid-drainage performed in accordance with the instructions of Airbus SB A330-32-3173 at Revision 02, or Revision 03, or Revision 04, or Revision 05,

(2.1) Do the procedure to drain fluid from the retraction actuator piston rod internal volume and seal the vent hole in accordance with the instructions of Airbus SB A330-32-3173 Revision 05.

(2.2) Thereafter, at intervals not exceeding 1 000 FC or 24 months, whichever occurs first, repeat the draining and the sealing of the vent hole required by paragraph (2.1) of this AD, in accordance with the instructions of Airbus SB A330-32-3173 Revision 05.

Note 2: Accomplishment of drainage of the fluid from the piston as required by paragraph (2) of this AD, in addition to the one-time-ultrasonic Non-Destructive Testing (NDT) inspection of the full length of the piston as required by paragraph (4) of this AD, constitutes terminating action for the repetitive visual inspections required by paragraph (1) of this AD.

(3) **Ultrasonic NDT inspection of the upper end of the piston rod:**

For each concerned retraction actuator piston rod not yet inspected in accordance with the instructions of Airbus SB A330-32-3173 at original issue, or Revision 01, or Revision 02, or Revision 03, or Revision 04, or Revision 05, at the latest upon accumulation of three years or six years, as applicable, of in service usage,

or,

for each concerned retraction actuator piston rod that has already

been NDT inspected in accordance with the instructions of Airbus SB A330-32-3173 at original issue, or at Revision 01, or Revision 02, or Revision 03, or Revision 04, or Revision 05, within 1 400 FH, 250 FC or 4 months from the date of the last NDT inspection performed in accordance with Airbus SB A330-32-3173 at original issue or at Revision 01 or Revision 02 or Revision 03 or Revision 04 or Revision 05, whichever occurs first,

(3.1) Do an ultrasonic inspection of the retraction actuator piston rod end in accordance with the instructions of Airbus SB A330-32-3173 Revision 05.

(3.2) If the results of the inspection required by paragraph (3.1) of this AD give an indication above 90% FSH (Full Screen Height) and between 5 and 7 in Time Base, before next flight, replace the retraction actuator.

(3.3) If the results of the inspection required by paragraph (3.1) of this AD give an indication between 75% and 90% FSH and between 5 and 7 in Time Base, within the next 10 FC, replace the retraction actuator.

(3.4) If the results of the inspection required by paragraph (3.1) of this AD give an indication below 75% FSH and between 5 and 7 in Time Base, at intervals not exceeding 1 400 FH, or 250 FC, or 4 months whichever occurs first since the previous inspection, repeat the inspections required by paragraph (3.1) of this AD.

(4) **One-time ultrasonic (longitudinal and circumferential) NDT inspections of the full length of the piston rod:**

(a) At the latest when each concerned retraction actuator piston rod reaches three years or six years, as applicable, of in service usage, or

(b) Within 1 750 FH, 315 FC or 5 months, whichever occurs first after 19 October 2006 [the effective date of EASA AD 2006-0302R1]

whichever occurs later between (a) and (b):

(4.1) **One-time ultrasonic longitudinal NDT inspection of the full length of the piston rod:**

(4.1.1) Do a one-time ultrasonic longitudinal inspection of the chromium-plated area (full length) of the piston rod in accordance with the instructions of Airbus SB A330-32-3173 Revision 05, and do the applicable corrective actions mentioned in paragraph (3.2) or (3.3) of this AD.

(4.1.2) If the results of the inspection required by paragraph (4.1.1) of this AD give an indication below 75% FSH and between 5 and 7 in Time Base, no further action is required.

(4.2) **One-time ultrasonic circumferential NDT inspection of the full length chromed part of the piston rod:**

(4.2.1) Do a one-time ultrasonic circumferential inspection of the chromium-plated area (full length) of the piston rod in accordance with the instructions of Airbus SB A330-32-3173 Revision 05.

(4.2.2) If the results of the inspection defined in paragraph (4.2.1) of this AD give an indication above 90% FSH and between 7 and 9.5 on the time base, before next flight replace the retraction actuator.

(4.2.3) If the results of the inspection required by paragraph (4.2.1) of this AD give an indication between 75 and 90%

FSH and between 7 and 9.5 on the time base, within the next 10 landings replace the retraction actuator.

- (4.2.4) If the results of the inspection defined in paragraph (4.2.1) give an indication below 75% FSH and between 7 and 9.5 in Time Base, no further action is required.

Note 3: Accomplishment of the one-time-ultrasonic NDT inspection of the full length of the piston required by paragraph (4) of this AD in addition to the drainage of the fluid from the piston required by paragraph (2) of this AD constitutes terminating action for the repetitive visual inspections required by paragraph (1) of this AD.

Note 4: Any retraction actuator piston rod P/N 114256309 or 114256321 or 114256326 issue 01, installed as a replacement, new or used, must comply with the applicable requirements of this AD at the stated thresholds and intervals.

(5) **Reporting:**

- (5.1) In all cases, upon completion of the tasks in accordance with the instructions of Airbus SB A330-32-3173 Revision 05, report to Airbus the results (regardless of findings) of:

- the visual inspection,
- fluid drain/seal of the retraction actuator piston rod,
- ultrasonic NDT of the upper end of the piston rod, and
- the one time ultrasonic NDT inspection.

- (5.2) Report also the results whenever the replacement of the retraction actuator is required in accordance with the instructions of Airbus SB A330-32-3173 Revision 05.

- (6) Aeroplanes that have been inspected or drained before the effective date of this AD in accordance with the instructions of Airbus SB A330-32-3173 Revision 03 or Revision 04, are compliant with the requirements of paragraph (1), (2), (3), (4) and (5) of this AD. However, after the effective date of this AD, the repetitive inspections or draining must be accomplished in accordance with the instructions of Airbus SB A330-32-3173 Revision 05.

(7) **Modification:**

No later than 31 December 2007, remove and replace the retraction actuator piston rod P/N 114256309 or P/N 114256321 issue 03 in accordance with the instructions of Airbus SB A330-32-3180 Revision 01.

- (8) Installation of retraction actuator piston rod P/N 114256323 in accordance with the instructions of Airbus SB A330-32-3174 revision 02 constitutes an acceptable method to comply with the requirements of paragraphs (1), (2), (3), (4), (6) and (7) of this AD for that MLG retraction actuator.

B) New Requirements of this AD

- (9) For all aeroplanes listed in the applicability section of this AD, within 48 months after the effective date of this AD, modify the left-hand and right-hand MLG retraction actuators in accordance with the instructions of Airbus SB A330-32-3180 Revision 03.
- (10) Aeroplanes on which, before the effective date of this AD:
- a MLG retraction actuator has been modified in accordance with the instructions of Airbus SB A330-32-3180 Revision 01 or Revision 02, or
 - a MLG retraction actuator has been modified in accordance with the instructions of Airbus SB A330-32-3180 at original issue and re-identified in accordance with the instructions of Airbus SB A330-32-3180

	<p>Revision 01 or Revision 02, are compliant with the requirements of paragraph (9) of this AD for that MLG retraction actuator.</p> <p>(11) Modification of a MLG retraction actuator in accordance with the requirements of paragraph (9) of this AD constitutes terminating action for all repetitive requirements of this AD for that MLG retraction actuator.</p>
Ref. Publications:	<p>Airbus SB A330-32-3173 Revision 05 dated 26 September 2008.</p> <p>Airbus SB A330-32-3174 Revision 02 dated 16 September 2005.</p> <p>Airbus SB A330-32-3180 Revision 03 dated 28 January 2011.</p> <p>The use of later approved revisions of these documents is acceptable for compliance with the requirements of this AD.</p>
Remarks:	<ol style="list-style-type: none"> 1. If requested and appropriately substantiated, EASA can approve Alternative Methods of Compliance for this AD. 2. This AD was posted on 07 July 2011 as PAD 11-066 for consultation until 04 August 2011. The Comment Response Documents can be found at http://ad.easa.europa.eu/. 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: AIRBUS – Airworthiness Office – EIAL; Fax: +33 5 61 93 45 80. E-mail: airworthiness.A330-A340@Airbus.com.