

EASA	AIRWORTHINESS DIRECTIVE
	AD No : 2006 - 0302 Date: 05 October 2006
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.	
Type Approval Holder's Name : AIRBUS	Type/Model designation(s) : A330 Aircraft
TCDS Number : EASA A.004	
Foreign AD : Not applicable.	
Supersedure : DGAC AD F-2005-098, EASA Approval Number 2005-5887	
ATA 32	Landing Gear – Main Landing Gear Retraction Actuator Piston Rod – Inspection/Modification
Manufacturer(s):	AIRBUS (formerly AIRBUS INDUSTRIE)
Applicability:	AIRBUS A330 aircraft, models -201, -202, -203, -223, -243, -301, -302, -303, -321, -322, -323, -341, -342 and -343, all serial numbers except those on which AIRBUS modification 52980 has been embodied in production or AIRBUS Service Bulletin (SB) A330-32-3180 Revision 01 or AIRBUS SB A330-32-3174 Revision 02 has been embodied in-service. Note 1: Aircraft which have received application of the AIRBUS Service Bulletin (SB) A330-32-3173 at original issue or at Revision 01 or at Revision 02 are still concerned by this new Airworthiness Directive (AD).
Reason:	During an approach phase, the flight crew of an A330 aircraft had to perform a free-fall extension of the LH main landing gear (MLG). 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: <ul style="list-style-type: none"> - Corrosion resulting from incorrect application of the anti-corrosion protection, and - circumferential cracks resulting from normal operational loading effects.

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 compromising its structural integrity.

This situation, if uncontrolled, could lead during extension and landing to a potentially dangerous event.

Since AD F-2005-098 issuance, it has been concluded through extensive investigation 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.

This new AD:

- Takes over the requirements of AD F-2005-098,
- Revises the inspection requirements to reflect the investigation findings as follows:
 - a. Extend the repeat inspection interval for the removal of fluid from the internal volume of the piston rod using flight cycles in lieu of flight hours as this better represents the mechanism for the accumulation of water within the piston rod.
 - b. Remove the preliminary visual inspection from the ultrasonic longitudinal inspection of the upper end of the piston rod.
 - c. 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.
 - d. Mandate the new design hollow piston rod PN 114256328 (AIRBUS mod. 52980/SB A330-32-3180 Revision 01) without a vent hole thus eliminating moisture ingress as the terminative action.

Note 2: The piston rod PN 114256321 issue 06 subject to satisfactory results from corrosion sampling of some in-service piston rods may in the future be excluded from the mandatory inspections requirements as defined in this AD. The objective of the sampling of piston rod PN 114256321 issue 6 is to postpone the embodiment of the terminating action required in paragraph 6 of this AD until next Main Landing Gear overhaul.

Note 3: Further to discrepancies discovered in SB A330-32-3173 Revision 03 § Compliance/ Accomplishment timescale, AIRBUS has corrected this SB at revision 04 without introducing an additional work for aircraft already inspected by revision 03.

Therefore accomplishment instructions of SB A330-32-3173 Revision 04 are identical to the ones in Revision 03 and comply with the requirements of this AD.

Reminder of grace period mentioned in AD F-2005-098 requirements paragraph 3.2 and removed in the present AD:

"For each concerned retraction actuator already inspected by AIRBUS SB A330-32-3173 at original issue or at Revision 01 or Revision 02, within

	<p>1,750 flight hours, 315 flight cycles or 5 months from the date of the last inspection performed in accordance with AIRBUS SB A330-32-3173 at original issue or at Revision 01 or Revision 02 whichever occurs first.”</p> <p>The above requirements and grace periods were established to allow operators to initiate and schedule the inspections as those requirements were new at the time of AD F-2005-098 issuance.</p> <p>In the present AD, those grace periods are no longer needed due to newly increased inspection interval.</p>
Effective Date:	19 October 2006
Compliance:	<p>From the effective date of this AD, the following measures are rendered mandatory for retraction actuator piston rods PN 114256309 or PN 114256321 as soon as they have accumulated three years use in service:</p> <p>1. Detailed visual inspection of the retraction actuator piston rod:</p> <p>For each concerned retraction actuator not yet visually inspected in accordance with AIRBUS SB A330-32-3173 at Revision 01 or Revision 02 or Revision 03, at the latest when it reaches the three years old in service usage,</p> <p>or,</p> <p>for each concerned retraction actuator that has already been visually inspected in accordance with AIRBUS SB A330-32-3173 Revision 01 or Revision 02 or Revision 03, within 8 days from the last visual inspection performed in accordance with SB A330-32-3173 Revision 01 or Revision 02 or Revision 03</p> <p>1.1. Conduct the visual inspection of the visible chromed area of the piston rod in fully extended position to search for cracks in accordance with the instructions defined in AIRBUS SB A330-32-3173 Revision 03.</p> <p>1.2. If the results of the inspection defined in §1.1. indicate the presence of one or more cracks, replace the retraction actuator before the next flight in accordance with the instructions defined in AIRBUS SB A330-32-3173 Revision 03.</p> <p>1.3. Repeat this visual inspection at intervals not exceeding 8 calendar days in accordance with the instructions defined in AIRBUS SB A330-32-3173 Revision 03 and, if applicable, replace the retraction actuator.</p> <p>Note 4: No further repeat visual inspection is required as defined in § 1. after accomplishment of drainage of the fluid from the piston as defined in § 2. in addition to the one-time-ultrasonic NDT inspection of the full length of the piston as defined in § 4.</p> <p>2. Drain the fluid from the piston rod and seal the vent hole:</p> <p>For each concerned retraction actuator not yet inspected/ fluid-drained by AIRBUS SB A330-32-3173 at Revision 02 or Revision 03, at the latest when it reaches the three years old in service usage,</p> <p>or,</p> <p>for each concerned retraction actuator already inspected/ fluid-drained by AIRBUS SB A330-32-3173 at Revision 02 or Revision 03, within 1,000 flight cycles or 24 months, whichever occurs first, from the last inspection/</p>

fluid-drainage performed in accordance with AIRBUS SB A330-32-3173 at Revision 02 or Revision 03,

- 2.1. Conduct the procedure to drain fluid from the retraction actuator piston rod internal volume and seal the vent hole in accordance with the instructions defined in AIRBUS SB A330-32-3173 Revision 03.
- 2.2. Repeat the draining and the sealing of the vent hole at an interval not exceeding 1,000 flight cycles or 24 months whichever occurs first, in accordance with the instructions defined in AIRBUS SB A330-32-3173 Revision 03.

Note 5: Accomplishment of drainage of the fluid from the piston as defined in § 2. in addition to the one-time-ultrasonic NDT inspection of the full length of the piston as defined in § 4. cancels the repeat visual inspection requirement as defined in § 1.

3. Ultrasonic NDT inspection of the upper end of the piston rod:

For each concerned retraction actuator not yet inspected by AIRBUS SB A330-32-3173 at original issue or Revision 01 or Revision 02 or Revision 03, at the latest when it reaches the three years old in service usage,

or,

for each concerned retraction actuator already NDT inspected by AIRBUS SB A330-32-3173 at original issue or at Revision 01 or Revision 02 or Revision 03 within 1,400 flight hours, 250 flight cycles 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 whichever occurs first,

- 3.1. Conduct an ultrasonic inspection of the retraction actuator piston rod end in accordance with the instructions defined in AIRBUS SB A330-32-3173 Revision 03.
- 3.2. If the results of the inspection defined in § 3.1. give an indication above 90% FSH (Full Screen Height) and between 5 and 7 in Time Base, replace the retraction actuator before the next flight.
- 3.3. If the results of the inspection defined in § 3.1. give an indication between 75% and 90% FSH and between 5 and 7 in Time Base, replace the retraction actuator at latest within the next 10 flight cycles.
- 3.4. If the results of the inspection defined in § 3.1. give an indication below 75% FSH and between 5 and 7 in Time Base, repeat the inspections defined in § 3.1. at intervals not exceeding 1,400 flight hours or 250 flight cycles or 4 months, since the previous inspection, whichever occurs first.

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

Unless already accomplished, at the latest when each concerned retraction actuator reaches the three years old in service usage,

or

within 1,750 flight hours, 315 flight cycles or 5 months, whichever occurs first, following the effective date of this AD,

whichever occurs later:

- 4.1. One-time ultrasonic longitudinal NDT inspection of the full length of the piston rod:

4.1.1. Conduct a one-time ultrasonic inspection of the chromium-plated area (full length) of the piston rod in accordance with the instructions defined in AIRBUS SB A330-32-3173 Revision 03, and if necessary, apply the corrective actions mentioned in § 3.2 or § 3.3 of this AD.

4.1.2. If the results of the inspection defined in § 4.1.1 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 Conduct a one-time ultrasonic circumferential inspection of the chromium-plated area (full length) of the piston rod in accordance with the instructions defined in AIRBUS SB A330-32-3173 Revision 03.

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

4.2.3 If the results of the inspection defined in § 4.2.1 give an indication between 75 and 90% FSH and between 7 and 9.5 on the time base, replace the retraction actuator within the next 10 landings.

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

Note 6: Accomplishment of the one-time-ultrasonic NDT inspection of the full length of the piston as defined in § 4. in addition to the drainage of the fluid from the piston as defined in § 2. cancel the repeat visual inspection requirement as defined in § 1.

Note 7: Any retraction actuator piston rod PN 114256309 or 114256321, installed as a replacement, new or used, must be submitted to the mandatory actions described in Compliance paragraph of this AD at the stated thresholds and intervals.

5. Reporting

5.1. In all cases, report to AIRBUS the results (regardless of findings) from:

- 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,

upon completion of the tasks in accordance with the instructions defined in AIRBUS SB A330-32-3173 Revision 03.

5.2. Report also the results whenever the replacement of the retraction actuator is required in accordance with the instructions defined in AIRBUS SB A330-32-3173 Revision 03.

6. MODIFICATION

Unless already accomplished, not later than 31 December 2007, remove and replace the retraction actuator piston rod in accordance with the instructions defined in AIRBUS SB A330-32-3180 Revision 01.

	<p>Installation of retraction actuator piston rod PN 114256323 as per embodiment of SB A330-32-3174 Revision 02 constitutes an acceptable means of compliance of paragraph 6 of this AD.</p> <p>Note 8: Following to embodiment of SB A330-32-3180 Revision 01, the new retraction actuator piston rod PN will be 114256328.</p> <p>Note 9: Embodiment of AIRBUS SB A330-32-3180 at original issue in addition to the re-identification of the retraction actuator required by SB A330-32-3180 Revision 01 cancel the inspection requirements of this AD.</p>
Ref. Publications:	<p>AIRBUS SB A330-32-3173 Original issue, or SB A330-32-3173 Revision 01, or SB A330-32-3173 Revision 02, or SB A330-32-3173 Revision 03 ; and</p> <p>AIRBUS Service Bulletin A330-32-3180 Revision 01 ; and</p> <p>AIRBUS Service Bulletin A330-32-3174 Revision 02;</p> <p>or later approved revisions of these Service Bulletins.</p>
Remarks :	<ol style="list-style-type: none"> 1. If requested and appropriately substantiated the responsible EASA manager for the related product has the authority to accept Alternative Method of Compliance (AMOCs) for this AD. 2. This AD was posted as PAD 06-147 for consultation on 13 June 2006 with a comment period until 27 June 2006. The Comment Response Document can be found at http://ad.easa.eu.int/ 3. Enquiries regarding this Airworthiness Directive should be referred to the Airworthiness Directive Focal Point - 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 AIRBUS SAS –Airworthiness Office - EAL Fax: +33 5 61 93 45 80.