

EASA	AIRWORTHINESS DIRECTIVE
	AD No.: 2010-0202R2 Date: 07 February 2012 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 : BAE SYSTEMS (OPERATIONS) LTD	Type/Model designation(s) : BAe 146 and AVRO 146-RJ aeroplanes
TCDS Number:	EASA.A.182
Foreign AD:	Not applicable
Revision/Supersedure: This AD revises EASA AD 2010-0202R1 dated 14 October 2010. The original issue of EASA AD 2010-0202 dated 05 October 2010 superseded EASA Emergency AD 2010-0001-E dated 4 January 2010 and EASA AD 2010-0072R1 dated 17 June 2010.	
ATA 32	Landing Gear – Nose Landing Gear Main Fitting – Inspection / Replacement
Manufacturer(s):	BAE Systems (Operations) Ltd, British Aerospace plc, British Aerospace (Commercial Aircraft) Ltd, British Aerospace (Operations) Ltd, British Aerospace Regional Aircraft Ltd, British Aerospace Regional Aircraft trading as Avro International Aerospace.
Applicability:	BAe 146 and AVRO 146-RJ aeroplanes, all models, all serial numbers.
Reason:	In June 2000, prompted by a crack found at the top of the Nose Landing Gear (NLG) oleo, BAE Systems (Operations) Ltd (BAE Systems) issued Inspection Service Bulletin (ISB) ISB.32-158. This ISB was classified mandatory by the United Kingdom Civil Aviation Authority under AD number 002-06-2000, requiring repetitive Non-Destructive Testing (NDT) crack inspections on the upper end of the NLG oleo. The AD also provided an optional terminating action for the repetitive inspections, by embodiment of Messier-Dowty (M-D) Service Bulletin (SB) SB.146-32-150. Later, as part of an accident investigation, the examination of a fractured NLG main fitting showed that M-D SB.146-32-150 was not accomplished, although the records indicated that it had been. BAE Systems determined that more NLG units could be similarly affected. These NLG units were overhauled at Messier Services in Sterling, Virginia, in the United States. To address this situation, EASA issued Emergency AD 2009-0043-E to require repetitive NDT inspections of each affected NLG unit and, if cracks are found, replacement with a

serviceable unit, in accordance with the instructions of BAE Systems Alert ISB.A32-180 and M-D SB.146-32-149.

Subsequently, investigation and analysis by M-D identified the need for a reduction of the inspection threshold and the repetitive inspection interval for the affected NLG units and replaced M-D SB 146-32-149 with M-D SB.146-32-174. Consequently, BAE Systems SB 32-158 was withdrawn and superseded by BAE Systems Alert ISB.A32-180 Revision 1, which was mandated by EASA Emergency AD 2009-0197-E.

As further information became available, BAE Systems saw a need to clarify the compliance instructions in the ISB and issued Revision 2 of Alert Service Bulletin ISB.A32-180. The layout of Revision 2 was no longer compatible with the instructions of EASA Emergency AD 2009-0197-E, so EASA issued AD 2010-0001-E which superseded EASA AD 2009-0197-E and which reduced the threshold and interval of the repetitive NDT inspections and required repetitive NDT inspections of each affected NLG unit and, if cracks were found, the replacement of the NLG with a serviceable unit.

The optional closing action of EASA AD 2010-0001-E is embodiment of M-D SB 146-32-150 (polishing and shot peening of the NLG main fitting) or confirmation that it has already been accomplished, as applicable. Further investigation by M-D showed that if any undetected crack was present at the time of the embodiment of M-D SB 146-32-150, Part B or Part C, it could continue to grow while the NLG is in service and could lead to the failure of the main fitting and possible collapse of the NLG. For this reason, EASA issued AD 2010-0072 (and its revision 1) which required the introduction of repetitive NDT inspections (defined in BAE Systems ISB 32-181) on NLG main fittings following embodiment of M-D SB 146-32-150. Despite the aforementioned measures, BAE Systems have received additional reports of cracked NLG main fittings. One operator reported a crack in a pre-modification main fitting. Shot peening was not present, as this was a pre-modification gear, but the surface finish was better than that required for a post-modification fitting. This implies that the surface finish achieved by the modification may not be effective in preventing cracking. In addition, a positive inspection return from BAE Systems ISB 32-181 also questions whether the combination of improved surface finish and shot peening are effective, as a crack may have initiated from a surface which is compliant with the modification standard.

It has been concluded that the polishing and the shot peening of the NLG main fitting embodied through M-D SB 146-32-150 are potentially ineffective in preventing cracks and that all NLG main fittings should be subject to the same 300 flight cycles (FC) repetitive inspection to ensure pre-critical crack detection.

Undetected cracks could lead to failure of the NLG Main Fitting and collapse of the NLG.

With that view, BAE Systems issued ISB.32-182 to implement this repetitive 300 FC inspection on all NLG main fittings regardless of their modification standard. ISB.32-182 supersedes existing ISBs A32-180 and 32-181, initially with no closing action.

For the reasons described above, EASA issued AD 2010-0202, superseding EASA Emergency AD 2010-0001-E and EASA AD 2010-0072 Revision 1, to require repetitive NDT inspections of all NLG main fittings and, if cracks are found, replacement of the NLG with a serviceable unit.

Revision 1 of EASA AD 2010-0202 was issued to restrict the required corrective actions to the NLG main fittings, not the whole NLGs and NLG main fittings may have accumulated different flight cycle amounts.

Revision 2 of EASA AD 2010-0202 is issued to delay the threshold for the initial inspection of the upper part of the NLG main fitting.

Effective Date:	Revision 2: 21 February 2012 Revision 1: 28 October 2010 Original issue: 19 October 2010.
Required action(s) and Compliance Time(s):	Required as indicated, unless accomplished previously: (1) Before the NLG main fitting accumulates 12 000 flight cycles (FC) or within the next 300 FC, whichever occurs later, after 19 October 2010 [the effective date of the original issue of this AD], carry out an initial inspection of the upper part of the NLG main fitting in accordance with the instructions of M-D SB.146-32-174. Note: NLG main fittings that have previously been inspected due to having greater than 5 000 FC (as required by EASA AD 2010-0202R1) are not required to be re-inspected until 12 000 FC. (2) If inspections have previously been carried out in accordance with M-D SB 146-32-174 (as required by EASA AD 2010-0001-E) or M-D SB 146-32-175 (as required by EASA AD 2010-0072R1), the last inspection carried out, if it has been carried out within the last 300 FC, after 19 October 2010 [the effective date of the original issue of this AD] may be claimed as the initial inspection for the purpose of paragraph (1) of this AD. (3) Within 300 FC after the initial inspection as required by paragraph (1) or (2) of this AD, as applicable, and thereafter at intervals not exceeding 300 FC, repeat the inspection of the upper part of the NLG main fitting in accordance with the instructions of M-D SB.146-32-174. (4) If a crack is found during any inspection required by this AD, before further flight, replace the NLG main fitting with a serviceable unit. (5) Replacement of the NLG main fitting does not constitute terminating action for the repetitive inspection requirements of paragraph (3) of this AD. (6) After 19 October 2010 [the effective date of the original issue of this AD], do not install any affected NLG main fitting on an aircraft unless it has been inspected in accordance with the requirements of this AD.
Ref. Publications:	BAE Systems (Operations) Limited ISB.32-182 Revision 1 dated 02 November 2011. Messier-Dowty Ltd SB 146-32-174 Revision 2 dated 16 August 2010. Messier-Dowty Ltd SB 146-32-174 Appendix A Revision 1 dated 2 September 2009. 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: BAE Systems (Operations) Ltd, Customer Information Department, Prestwick International Airport, Ayrshire, KA9 2RW, Scotland, United Kingdom; Telephone +44 1292 675207, Facsimile +44 1292 675704;

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