



# GFA AD-645

(ISSUE 1)

## GFA AIRWORTHINESS DIRECTIVE

**TYPE AFFECTED:** Grob G-109 & G 109B LBA TC 817 All Serial no's.

**SUBJECT:** Main Undercarriage Legs Inspection / replacement.

**BACKGROUND:** GROB has received several reports of Main Undercarriage Leg failure during landing. In two of these cases it was found that the aircraft had been subjected to severe training use. The failures have occurred between 2500 & 3000 landings and the origin of the failure appears to be associated with incorrectly installed retaining bars, and pitting due to corrosion.

**DOCUMENTATION:** The LBA has issued AD 94-004/2, & GROB has issued Service Bulletin TM 817-39 04 Jan 1994, which is attached to and forms part of this AD.

**ACTION REQUIRED:** **Action A.** Inspect & if necessary modify or replace the Retaining Bars in accordance with TM 817-39 04 Jan 1994.

**Action B.** Carry out inspections of the Main Undercarriage Legs in accordance with TM 817-39 04 Jan 1994 & if necessary repair or replace the Main Undercarriage Legs. Ensure that the requirement for subsequent inspections is entered in the "Recurring Maintenance Items" section of the Maintenance Release at each subsequent Form II.

Once the Undercarriage Legs have been replaced the requirement for periodic inspections at 1000 flight cycle intervals is removed.

**WEIGHT AND BALANCE:** Nil effect.

**IMPLEMENTATION:** **Action A:** not later than 30<sup>th</sup> September 2009.

**Action B:** after the first 2000 landings, and at each subsequent 1000 landings until such time as the undercarriage legs are replaced.

Inspections & replacements may be performed by or under the direct supervision of the holder of a GFA 1109 Maintenance Inspectors Certificate endorsed for Annual inspections, or higher authorisation.

**COMPLIANCE:** The requirements of this GFA Airworthiness Directive are mandatory. This Directive is issued pursuant to the Rules and Regulations of the Gliding Federation of Australia.

SIGNED:

*John G Virey* 

SENIOR TECHNICAL OFFICER AIRWORTHINESS

For and on behalf of:

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OF AUSTRALIA INC

**Subject:** Main undercarriage legs inspection

**Concerned:** Motorglider G 109/ G 109B, all S/N's

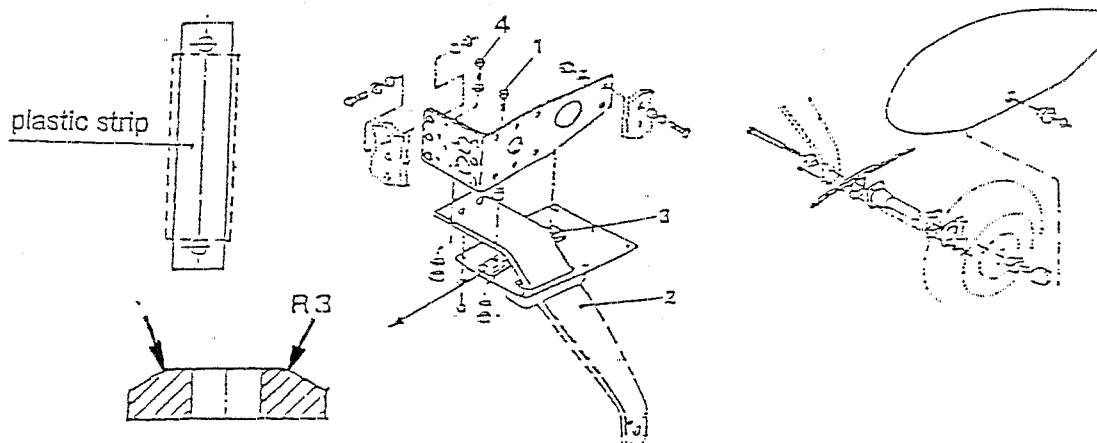
**Urgency:** Action A.: not later than 30 April 1994  
Action B.: at first after 2000 landings, then every 1000 landings until exchange of main undercarriage legs

**Procedure:** Three cases have been reported to GROB, where the main undercarriage legs failed during landing. Two of these incidents occurred on motorgliders subjected to very hard flight training and operated with increased take-off weight. The number of landings has been approx. 2500 to 3000. Origin for the failure seems to be incorrectly installed retaining bars and corrosion pitting. As a precautionary measure an inspection of the main undercarriage legs and the retaining bars, a modification of the retaining bars and, if necessary, an exchange of the retaining bars and undercarriage legs is mandatory.

**Actions:** Note: Generally both undercarriage legs must be checked!

**A.: Inspection and modification of retaining bars**

1. Support fuselage at the firewall and remove undercarriage fairings.
2. Remove 2 screws (1) and remove retaining bar (3).
3. Check retaining bar (3) for a radius (minimum R3) (refer to arrow).



4. If the radius exists, a plastic strip P/N 109-5000.07 must be glued to the bars (refer to sketch) to restrict the risk of fretting. The glueing area must be cleaned and degreased.
  5. If the bar has sharp edges (i.e. no radius), a new bar (P/N 109-5000.02) with plastic strip must be installed.
- Note:** Before installation of the undercarriage leg, remove corrosion from leg and paint leg in these areas (refer also to workstep B.11., page 3 of 5).
6. Install retaining bars, torque 2 screws M10 with 3,2 daNm (23.6 lb.ft.) (refer also to "Caution", workstep B.13., page 3 of 5).
  7. Install undercarriage leg fairings.

B.: Inspection of the undercarriage legs

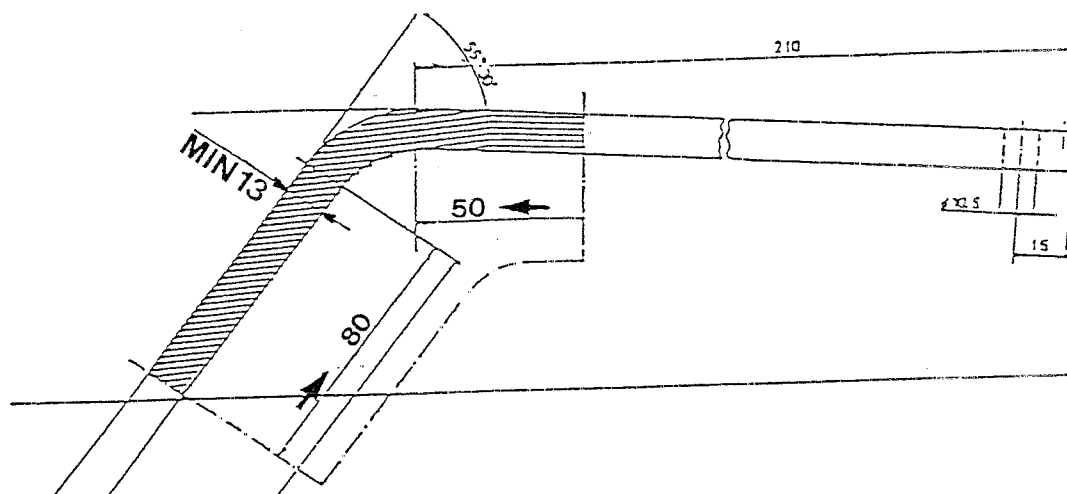
Note: Generally both undercarriage legs must be checked!

1. De-rig wings.
2. Support fuselage at the firewall and the tail.
3. Remove undercarriage and wheel fairings.
4. Remove brake cylinder from wheel, remove attachments of brake lines from undercarriage leg, remove L/H and R/H wheel.
5. Remove L/H and R/H seat.
6. Remove 4 screws M10 (1, 4) and remove undercarriage leg (2) and retaining bar (3).
7. Remove paint from the undercarriage leg in the indicated area:
  - apply pickling agents (e.g. "Abbeizfluid", Hohmann GmbH & Co. KG company, Germany) to the undercarriage leg
  - remove paint with a non metallic scraper
  - carefully clean the paint removed area (prevent filling of possible cracks with paint) with acetone, allow area to dry

Warning: Use pickling agent (e.g. "Abbeizfluid" Hohmann company approx. 10 min.) only as long as necessary, to cause no hydrogen embrittlement. In all cases the Operating Instructions of the pickling agents manufacturer must be observed.

8. Remove carefully and uniformly the scaling coat from the undercarriage leg (at the beginning use 60 grade emery paper, then use fine-grained paper up to grade 400).

Caution: Pay attention only to remove the scaling coat. Do not cause additional scratches and grooves. Consider minimum thickness of 13 mm (refer also to workstep B.10.)!



9. Check undercarriage leg for cracks in the removed paint area.

Proper test methods:

- magnetic particle test

Note: De-magnetising of the legs after testing is essential to protect the motorglider electrical systems and instruments from being affected.

- X-ray analysis

**Note:** This method is qualified with restrictions, because X-rays will only find cracks, if they are in the plane of the crack  $\pm 1^\circ$ .

**Note:** The dye penetrant test is not suitable, because cracks may not be determined with this method.

**Caution:** The Operating Instructions of the test equipment manufacturer and the valid test specifications for the test personell must be observed. The tests must be performed only by authorized personell.

10. If cracks are determined, the cracks can be polished to a depth of approx. 0,5 mm each side with a polish radius of approx. 100 mm and a peak-to-valley height of  $\frac{1}{2}$ . The minimum thickness of 13 mm of the undercarriage leg must not be exceeded. If the minimum thickness is less than 13 mm at any position, the undercarriage leg has to be exchanged immediately.

**Note:** It is recommended, to exchange the undercarriage legs in pairs.

11. If no cracks are determined, the undercarriage leg may be reinstalled. Before installation the leg must be cleaned from all test materials or de-magnetized. The leg must be primed using a proper primer and painted using coating laquer (e.g. 2-component-acrylpaint).
12. The inspection for cracks must be repeated every 1000 landings and certified in the logbook. If cracks are determined during later inspections, the undercarriage leg must be exchanged immediately.

**Note:** After exchange of the undercarriage legs, the above mentioned, periodical inspection is dropped.

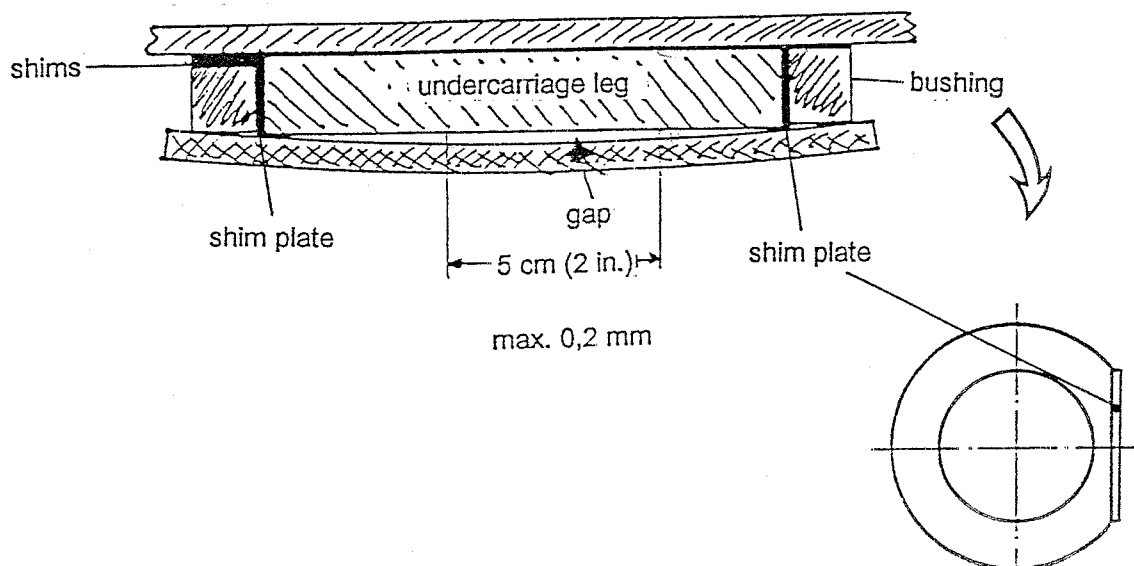
13. Install undercarriage leg and retaining bar (with plastic strip).

**Cautions:**

- I. Because of different thicknesses of undercarriage legs (e.g. due to polishing of the legs), it might be possible, that the installation of shims during reassembly is necessary. Pay attention to tighten the screws at the bars symmetrically and step by step up to the torque value of 3,2 daNm (23.6 lb.ft.). To achieve a forcelocking connection, gaps at the bushings must be compensated using shims. The shims must be adapted to the contour of the bushing (refer to sketch, page 4 of 5).  
The gap between undercarriage leg and retaining bar may be max. 0,2 mm on a length of 5 cm to prevent bending of the bar.

II. Pay attention, that no play is between undercarriage leg and bushing. Existing play must be removed as follows:

- glue shim plate P/N 109-5000.09, 1 mm thick, on to the bushing using Loctite 638 (curing time approx. 24 hours at room temperature and pressure, e.g. using a box clamp or a screw clamp)
- pay attention for a play free installation of the bushings, if necessary remove shim plate layers (each 0.05 mm) from front and rear bushing



**Final worksteps:**

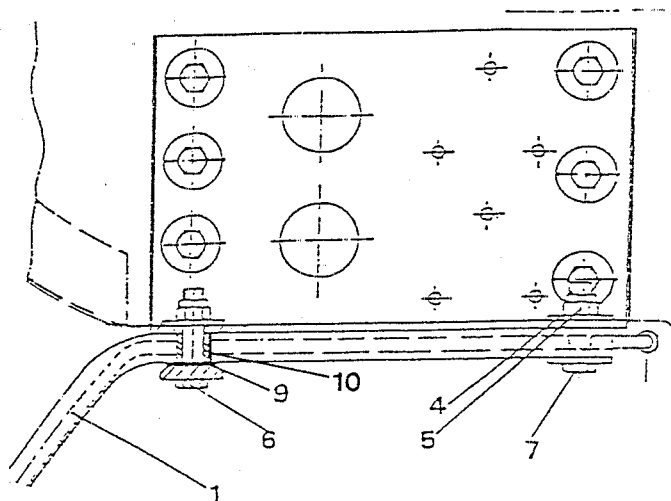
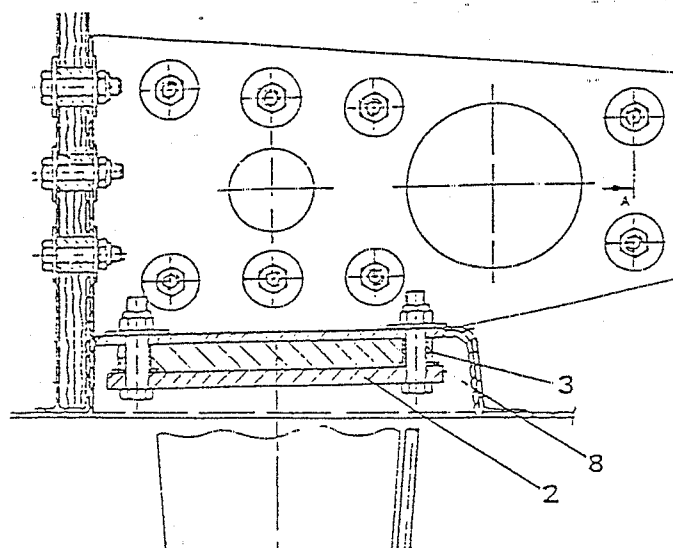
- Install main wheels and wheel brake, attach brake lines to undercarriage leg.
- Install undercarriage and wheel fairings.
- Install L/H and R/H seats.
- Rig wings.
- Perform function test of brake system.

Item	Number	Name	P/N
1	1	Undercarriage leg	109B-5001.01/1
2	1	Retaining bar	109-5000.02
3	2	Bushing	109-5000.04
4	4	Washer	10,5 DIN 9021
5	4	Nut	M10 LN 9348
6	2	Screw	M 10x45 LN 9037
7	2	Screw	M 10x35 LN 9037 For G 109, G 109B S/N 6200-6445
			M 10x40 LN 9037 For G 109B as of S/N 6500
8		Shim	DIN 988, 16x10x0,5
9	1	Plastic strip	109-5000.07
10		Shim plate	109-5000.09

Note:

Direction of installation of screws (6) and (7):

- G 109 all S/N's and G 109B, S/N 6200 - 6445: from bottom to top
- G 109B, S/N as of 6500: from top to bottom

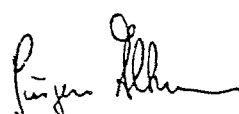


Material: The material can be ordered from GROB.

Weight and Balance: not concerned

- Remarks:
1. The inspection and exchange of the retaining bars (Action A.) can be performed by a competent person and has to be certified in the logbook by an authorized inspector.
  2. The test for cracks of the undercarriage legs (Action B.) can be performed by an authorized company/ institution with proper test equipment and has to be certified in the logbook by an authorized inspector.
  3. If it is ensured, that already new, polished undercarriage legs (marked with "0" on the front) are installed (delivery date as of July 1992), Action B. "Inspection of undercarriage legs" is not necessary.
  4. If you have sold your motor glider in the meantime, would you kindly pass this information on to the new owner and forward his name and address and aircraft S/N to us.

Mattsies, 04 January 1994

  
Dipl. Ing. J. Altmann  
(Airworthiness engineer)  
certification staff)

LBA approved:

This Service Bulletin is originally written in German and approved by the German LBA on the 19 January 1994 and is signed by Mr. A. Skov.

The translation has been accomplished to the best of our knowledge and judgement. In case of doubt, the German original is authoritative.