



GFA AIRWORTHINESS DIRECTIVE

TYPE AFFECTED: DG-500 series Sailplanes & Powered Sailplanes. German Type certificate no's 348 and 843.
DG-500 ELAN ORION: All Serial No's.
DG-500 ELAN TRAINER: All Serial No's.
DG-500/20 ELAN: All Serial No's.
DG-500/22 ELAN: All Serial No's.
DG-500M: All Serial No's.
DG-500MB: All Serial No's.

SUBJECT: Flight controls:- Failure of elevator bellcrank bearing attachment bolt.

BACKGROUND: In a DG-500 Elan Trainer the bolt in the bearing mount 5RU61, which is the pivot for elevator bellcrank 5St19, failed for as yet unconfirmed reasons. This led to loss of control of the aircraft which subsequently crashed & was destroyed by impact forces. Fortunately, the occupants were able to escape by parachute. The failure occurred in the shank of the bolt within the glassfibre matrix & thus would not have been detectable during routine inspections or maintenance.

Although the reason for the failure of the bolt has not yet been confirmed it is believed to be fatigue resulting from insufficient assembly torque of the retaining nut which could result in the shank of the bolt undergoing excessive cyclic bending loads.

DOCUMENTATION: The LBA has issued AD 2007-219, the EASA has issued AD 2007-0176-E & Glaser Dirks has issued Technical Notes 348/19 and 843/26 (same document). The TN and Work Instructions 1 & 2 are attached and form part of this AD. Work instruction No 3 for installation of an optional support bracket has yet to be issued.

ACTION REQUIRED: Carry out bolt torque measurements in accordance with TN-348/19 843/26 and if required, bolt replacement in accordance with the relevant working instructions.

The inspections may be performed by the holder of a GFA 1109 Maintenance authority endorsed for Issue of a Maintenance Release or higher authorization.

Replacement of the bolt may be performed by the holder of a GFA 1109 Maintenance authority endorsed for minor repairs FRP or higher authorization.

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Note: Replacement of a flight control component requires secondary inspection & signature by the holder of a GFA Daily Inspection authority or higher authorization.

WEIGHT AND BALANCE: Nil effect.

IMPLEMENTATION: ACTION 1: Before further flight: The bolt torque must be checked and if necessary adjusted IAW Working Instruction No 1.

ACTION 2: If the torque was less than 3 Nm the aircraft must not be flown until the bolt is replaced iaw Working Instruction No 2. This condition is to be reported to the GFA Airworthiness Department as soon as possible. A mail back slip is included for this purpose.



ACTION 3: Unless already replaced under ACTION 2, the bolt must be replaced iaw Working Instruction No 2, once the aircraft reaches 1000 hours, but in any case not later than 31 December 2007, and thereafter at intervals not exceeding 1000 hours. If the aircraft has already exceeded 1000 hours it must not be flown until the bolt is replaced.

NOTE: After cutting the access hole in the fuselage seal the raw edges with a coating of epoxy resin.

ACTION 4: The bolt torque is to be checked at each FORM II.

Details for the installation of an optional support bracket are not yet available but it is anticipated that installation of this bracket will cancel the requirements for periodic replacement of the bolt.

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:  		For and on behalf of: © THE GLIDING FEDERATION OF AUSTRALIA	
CHIEF TECHNICAL OFFICER AIRWORTHINESS			
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76646 Bruchsal

Technical Note
No. 348/19, 843/26

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- Subject** : Bolt of bearing stand 5RU61 for the bell crank 5St19 located in the mid-fuselage
- Effectivity** : DG-500 all models, all serial numbers
DG-500M all models, all serial numbers
- Accomplishment** : Instruction 1: prior to next flight
Instruction 2: if necessary prior to next flight
Instruction 3: 1x per year
Instruction 4: every 1000 flight hours, first time latest up to 31.12. 2007
Instruction 5: optional
- Reason** : The bolt of bearing stand 5RU61 which is the pivot for bell crank 5St19 failed in a DG-500 ELAN Trainer for an unknown reason. As the cause of the failure we suspect that the nut fixing the bell crank had become loose. Otherwise a bending load which may cause the failure can't be explained.
- Instructions** : 1. Check the actual torque of the nut which fixes bellcrank 5St19 to the bolt according to working instruction No. 1 for TN348/19. If the torque is 3 Nm or higher it can be assumed that the bolt was not overstressed during operation. Increase the torque to 12 Nm.
2. If the torque was less than 3 Nm the bolt must be replaced according to working instruction No. 2 for TN348/19. In such a case please send within 7 days after the check a note by e-mail to design@dg-Flugzeugbau.de.
3. The torque must be checked annually and adjusted if necessary.
4. As a protective measure the bolt must be changed every 1000 flight hours. If the glider has already more than 1000 flight hours at the time of the first execution of instruction 1 and if instruction 1 was positive the bolt should be replaced as soon as possible but not later than Dec. 31.2007 according to instruction 2.
5. The periodical change of the bolt is not necessary when an additionally bracket is installed according to working instruction No. 3 for TN348/19.
- Material** : working instruction No. 1 for TN348/19

For instruction 2:
working instruction No. 2 for TN348/19
1 bolt M6x44 LN9037
1 lock nut M6 DIN985-8zn or M6 LN9348

For instruction 5:
working instruction No. 3 for TN348/19
bracket 5St122
Epoxy resin with hardener according to the list in the repair manual
Cottonflocks
Glasfibre fabric Interglas 92125
- Weight and balance** : influence negligible

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Remarks

- : Instructions 1 and 3 may be executed by the owner.
All instructions are to be inspected and entered in the aircraft logs by a licensed inspector with the next annual inspection.
Instructions 2 and 5 are to be executed by the manufacturer or by a licensed workshop.
All instructions are to be inspected and entered in the aircraft logs by a licensed inspector.

The working instructions will be published on the DG web-site:
www.dg-flugzeugbau.de

Bruchsal, date:
19.06.2007

Author:
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Modifications approved by EASA under Approval P-EASA.A.C.07548
Date 20.06.2007

Wilhelm Dirks

DG Flugzeugbau GmbH
Working instruction No. 1 for TN348/19

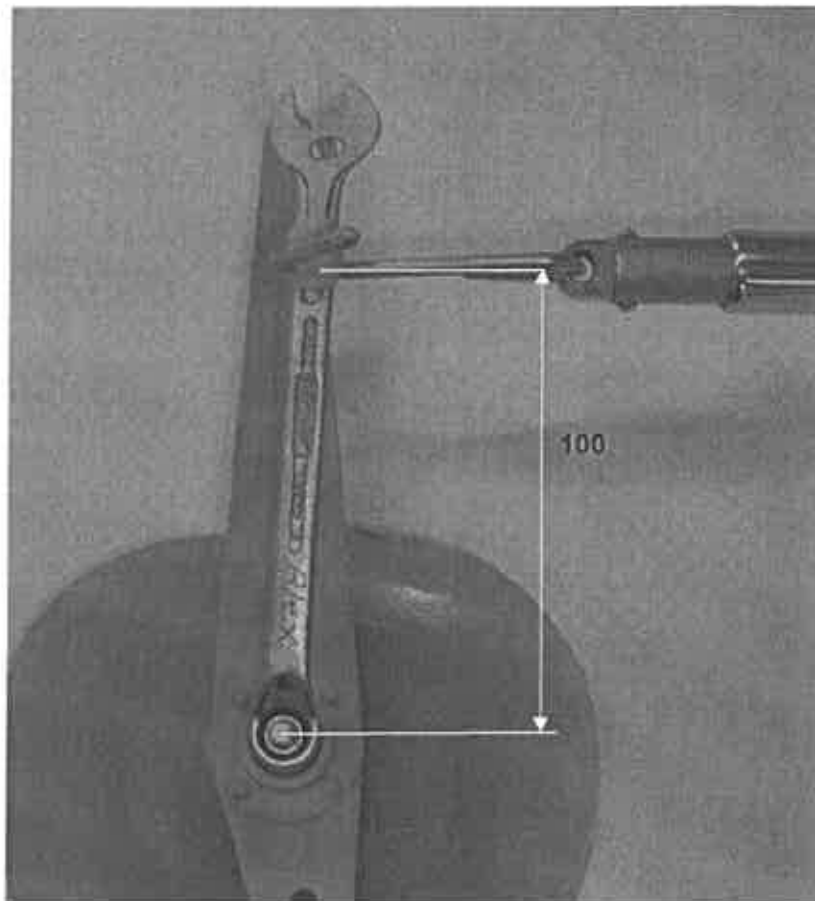
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Check of the actual torque of the nut which fixes the bellcrank 5St19 to the bolt of the bearing stand

1. Derig the glider and remove the baggage compartment floor and back cover plate.
2. Identify the bellcrank 5St19 referring to diagram 1 of the maintenance manual.
3. The check should be executed with a torque wrench equipped with a 10 mm socket wrench.

Adjust the torque wrench to 3 Nm (2.2 ft.lb.) and try to retorque the nut. If retorquing was possible the actual torque was too low and instruction 2 of TN359/19 (replacing the bolt) must be executed prior to the next flight.

4. If no torque wrench is available which can be adjusted to a torque of 3 Nm the check may be executed with a 10mm spanner according to the photo below,
Fix a spring balance measuring range 50N (5kg, 10 lbs.) or 100 N (10 kg, 200 lbs.) at a distance of 100mm (4 in.) from the centre of the nut to the spanner e.g. with tape.
Retorque the nut with a force of 30 N (3 kg, 6 lbs.).
If retorquing was possible the actual torque was too low and instruction 2 of TN359/19 (replacing the bolt) must be executed prior to the next flight.
5. If the nut had still a torque of 3 Nm or higher and if you don't want to replace the bolt immediately retorque the nut with a torque wrench adjusted to a value of 12 Nm(9 ft. lb.)
6. Execute a control check.
7. Reinstall the baggage compartment floor and back cover plate.



DG Flugzeugbau GmbH
Working instruction No. 2 for TN348/19

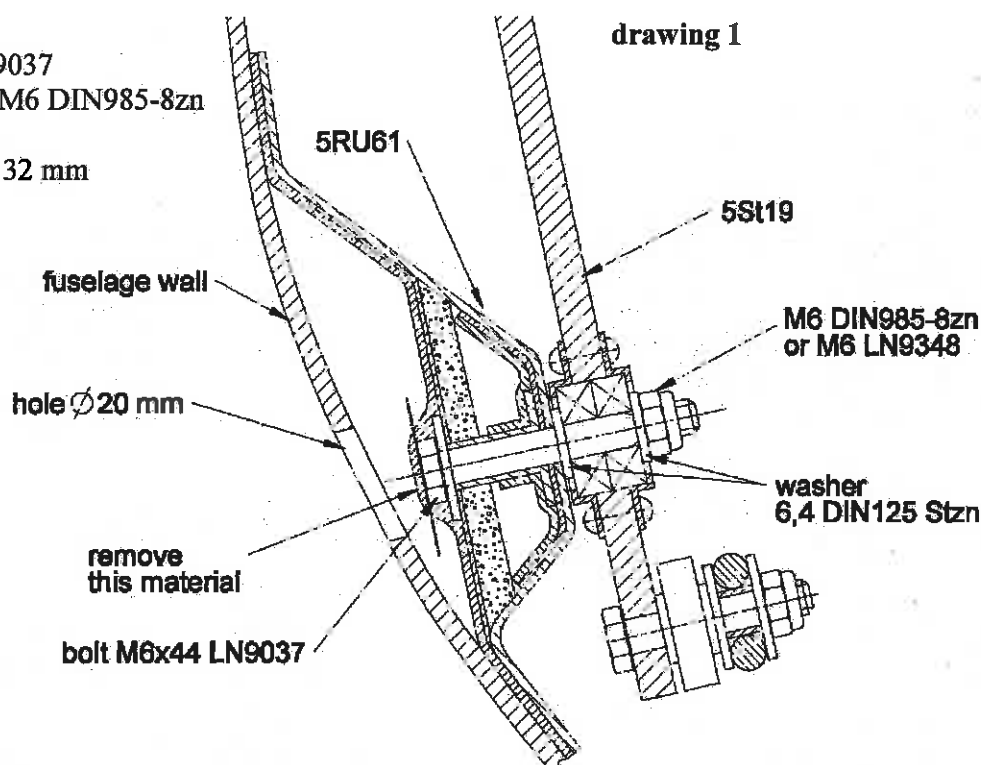
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Replacing the bolt of bearing stand 5RU61

1. Derig the glider and remove the baggage compartment floor and back cover plate.
2. Identify the bellcrank 5St19 referring to diagram 1 of the maintenance manual.
3. Use a powerful lamp to illuminate the fuselage from the inside. Mark the edges of the gluing flange of bearing stand 5RU61 on the outside of the fuselage.
4. Drill a 6mm (1/4 in.) hole in the centre of the marking according to drawing 1. Enlarge this hole with a 10 mm (3/8 in.) drill. Then enlarge it to a dia. of max. 20 mm (6/8 in.) with a 6mm (1/4 in.) hard metal cutter. Shift the centre of the hole to the centre of the bolt head while enlarging the hole.
5. Remove any resin and the GFRP fabric located on top of the bolt head with the hard metal cutter. Don't remove the resin and the fabric from the spanner flats of the bolt head.
6. Heat the bolt head up to approx. 150°C (300° F) with a fan heater. The fan heater must be equipped with a nozzle with an inside diameter of approx. 5mm.
7. Push the bolt from the inside out of the fuselage using a steel hammer..
8. Push in the new bolt so that its spanner flats slip into the recess from the existing bolt head.
9. Reinstall bellcrank 5St19, use a new self locking nut.
10. Retorque the nut with a torque wrench with a torque of 12 Nm(9 ft. lb.)
11. Execute a control check.
12. Reinstall the baggage compartment floor and back cover plate.
13. The hole in the fuselage wall shall not be closed permanently. It shall remain as an access hole.
Close the hole with a suitable sticker.

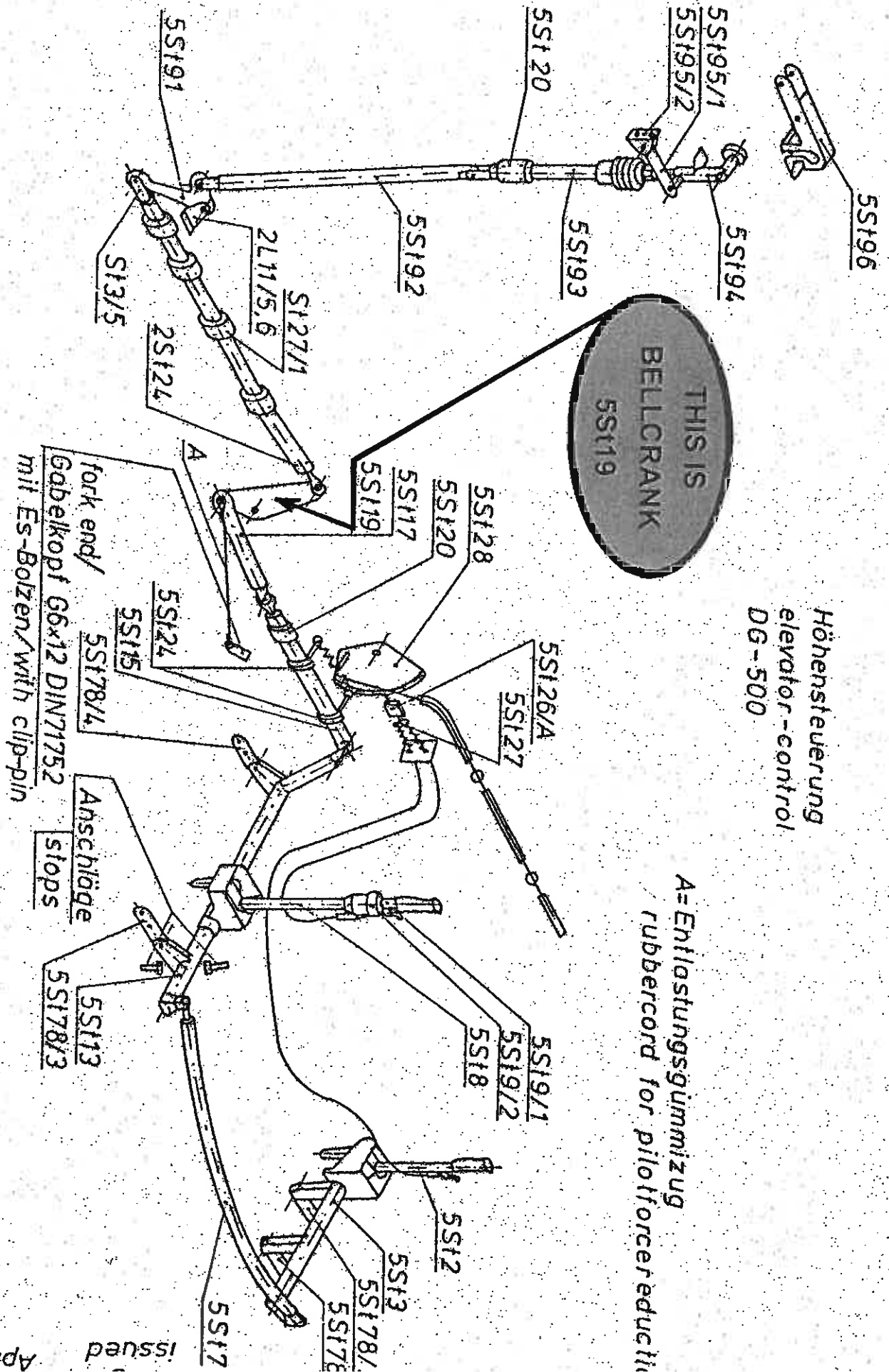
Material:

- 1 bolt M6x44 LN9037
- 1 self locking nut M6 DIN985-8zn or M6 LN9348
- 1 sticker diameter 32 mm



issued: 20.06.2007

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issued

April 1995