THE GLIDING FEDERATION OF AUSTRALIA

GFA AN 49
(ISSUE 6)

AIRWORTHINESS ADVICE NOTICE

TYPE AFFECTED: Blanik L13 all variants.

SUBJECT: Miscellaneous reported defects and airworthiness information.

BACKGROUND: This AN records airworthiness information which is not mandatory but which is useful to know. This information includes approved modifications a brief descriptions of minor defects and maintenance tips.

ITEM 1. RELEASE MALFUNCTION

The belly release in a Blanik was not lubricated at each Form 2 as the glider was only subject to aero tow. The release subsequently jammed in the full open position which allowed the cable connecting the nose and belly releases to become slack.

The excess slack allowed the cable to loop around the actuating

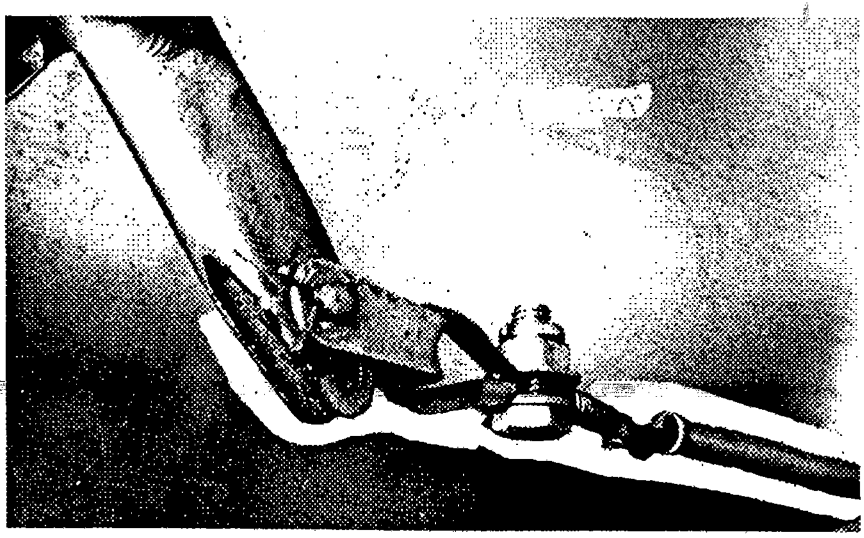

Figure 1. Correct Cable Position

lever (see Figure 2) which effectively shortened the cable by 35 to 50 mm. This prevented the nose release from opening because the belly release limited the action of the entire release circuit.

SIGNED:	For and on behalf of:
SENIOR TECHNICAL OFFICER AIRWORTHINESS	THE GLIDING FEDERATION OF AUSTRALIA

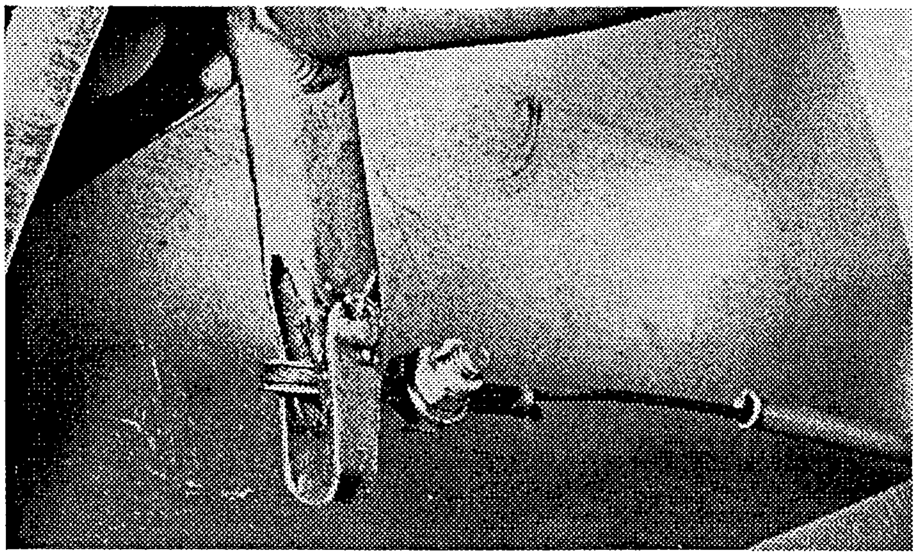

Figure 2 Incorrect Cable Position

Correct maintenance of the Belly Release at each annual inspection (see AD 277) will eliminate the possibility of the release seizing and thereby prevent the cable from becoming slack. The other option is to remove the belly release and its actuating mechanism and clearly placarding the glider:

Aerotow Launching Only.

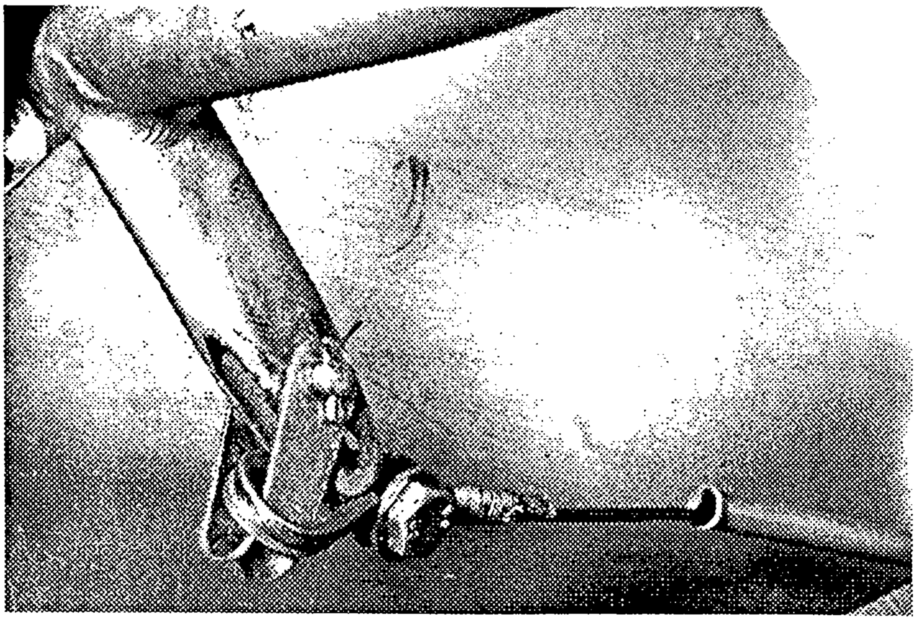

Figure 3 Another Possible Cable Position

ITEM 2. REPLACEMENT TAILWHEELS

The castoring tailwheel originally fitted to most Blaniks has caused a significant amount of damage such as cracks, loose rivets and worn pins to the rear fuselage, fin and tailplane because it lacked adequate shock absorption, thus causing high fatigue loads and because when the castor was offset the eccentric load caused high twisting loads on the tailwheel mounts.

There has been a significant number of fixed tailwheel modifications fitted to Blaniks over the years and three examples are shown here the best of which use pneumatic wheels of 200x50 or 210x65 size.

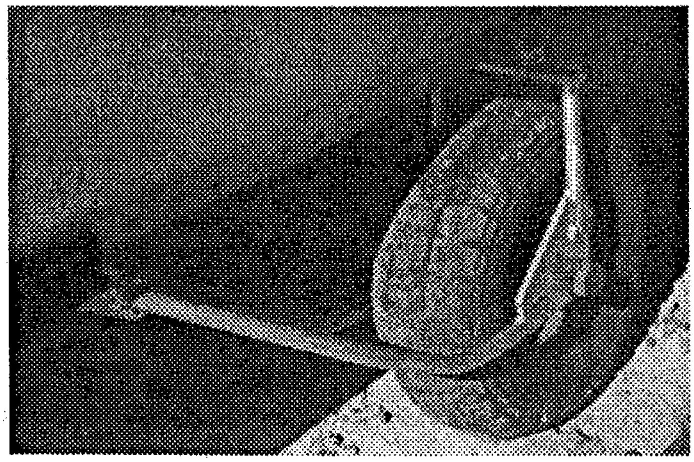

Figure 4 Alternate Tailwheel Type 1

Copies of the drawings of the Tailwheel Type 1 are available from the GFA Secretariat as GFA MOD 82-19 (Courtesy of Dieter Hillenbrand) on request.

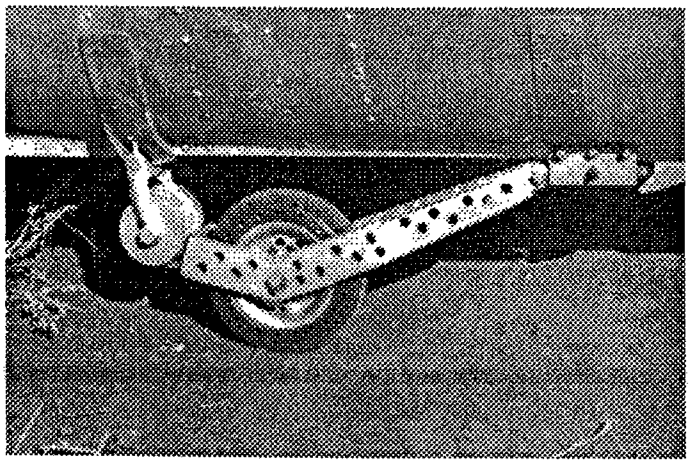

Figure 5 Alternate Tailwheel Type 2

Any tailwheel installed should have design approval from an appropriately qualified Design Engineer who will ensure that the design is adequate. The following points will be considered:

1. That the assembly is strong enough.

2. That the effect on weight and balance is taken in to account. Each glider which has a new tailwheel fitted will have to have the weight and balance confirmed either by reweighing the glider or by calculation.

3. That the assembly cannot catch on tow lines (see AN 57).

Because most of these tailwheels are taller that the original castoring tailwheel the glider may tend to land tailwheel first landings although this has not proved to be a significant problem in normal operations.

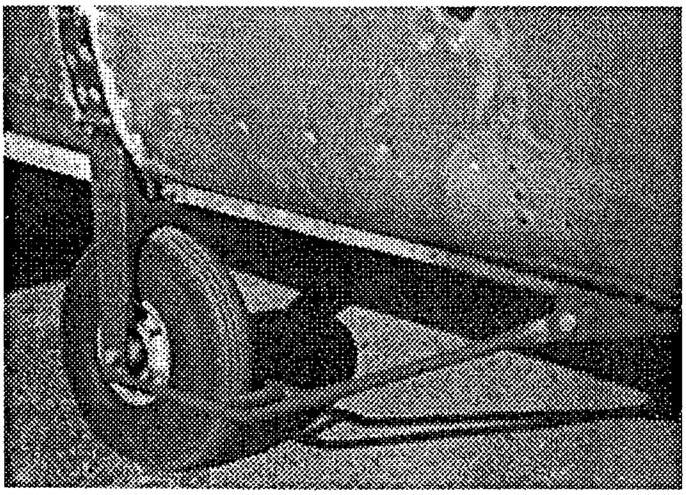

Figure 6 Alternate Tailwheel Type 3

Fixed tailwheels pose some problems for ground handling as the glider tail can no longer be pushed sideways. If a fixed tailwheel is fitted the glider should also be equipped with a taildolly which includes a swivelling pneumatic wheel for all ground handling.

The optimum solution to the problem of damage to the rear end of Blaniks seems to be a pneumatic fixed tailwheel for flight operations and tail dolly with a swivelling pneumatic wheel for ground handling.

ITEM 3. ELEVATOR TRAVEL RESTRICTION

There have been a number of incidents in Australia and England where the T piece joining the two elevators has been fitted back to front. This results in excess down elevator and no up elevator.

To aid refitting this part correctly paint one end of the T Piece a distinctive colour (red is the normal colour) and then paint the fuselage on the same side with the same colour. Painting the elevators will not aid in reassembling these parts as the elevators can be fitted to either side.

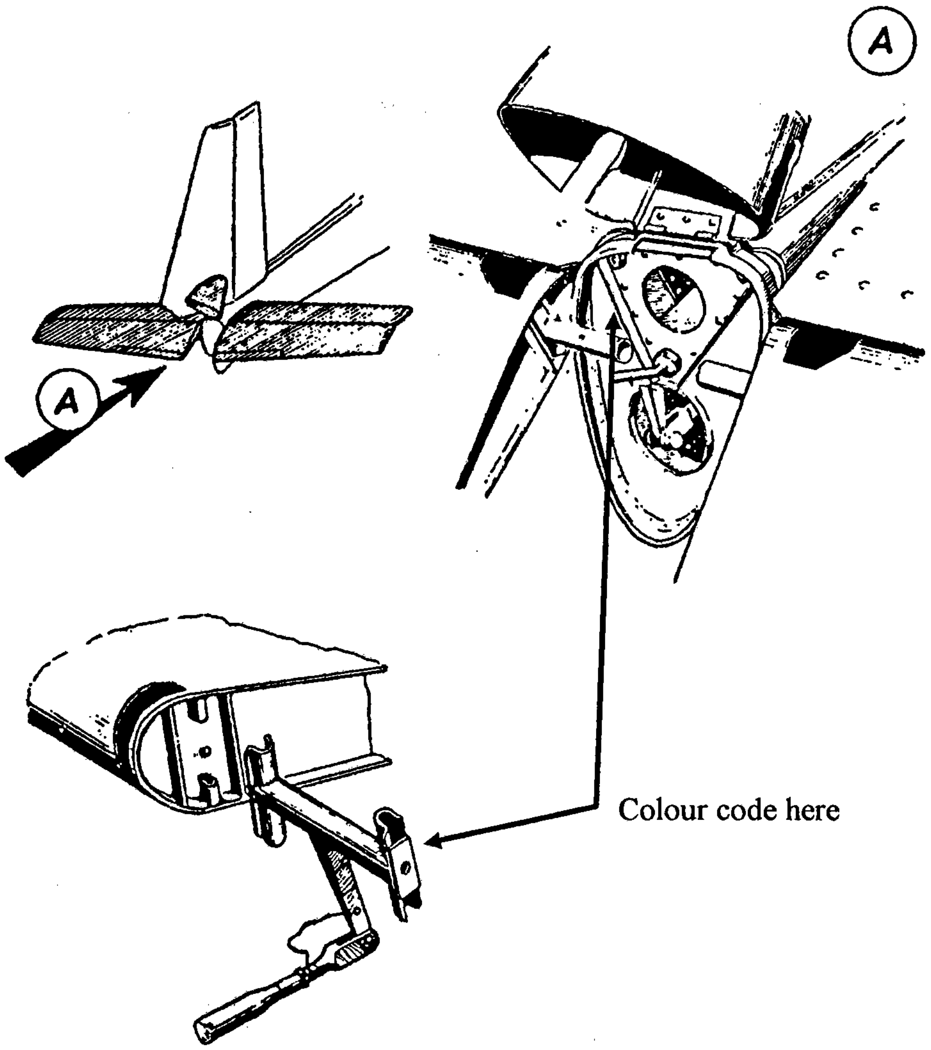

Figure 7 Tailplane T Piece Colour Coding

ITEM 4. NOSE CONE DIRT GUARD

To prevent dirt entering the nose release and the front rudder pedal mechanism a false floor can be fitted, extending the existing floor into the nose cone.

When installing a Dirt Guard the following points should be taken into account:

1. The slot for the nose release arm must not touch the arm. A piece of slotted rubber glued to the guard will keep the dirt out. The metal part of the guard should be a minimum of 5 mm from the release arm.

2. An edge strip of U shaped rubber or a length of instrument tubing with a slot cut in it and pushed onto the guard will provide a seal against the nose cone.

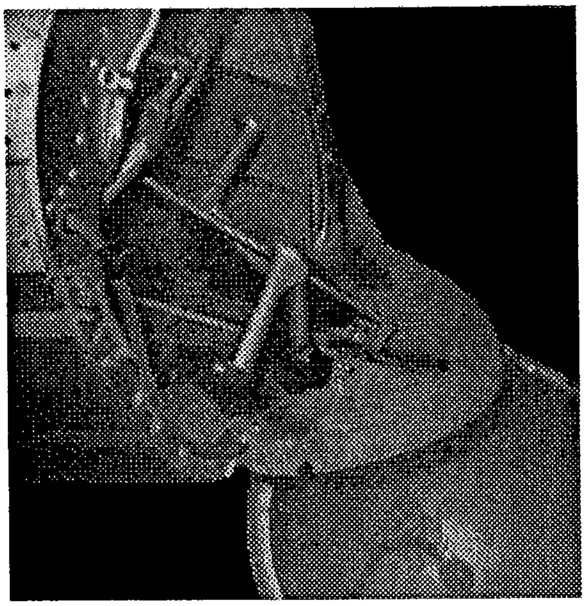

Figure 8 Nose Cone Dirt Guard

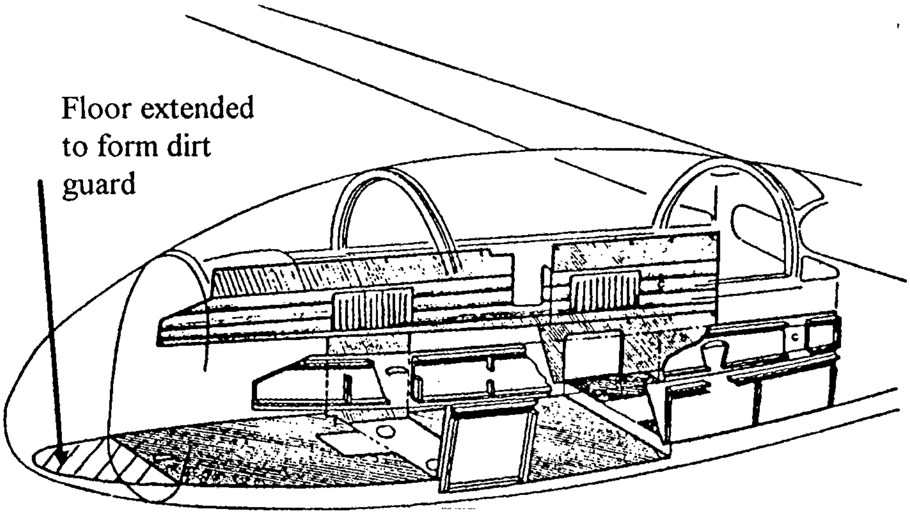

Figure 9 Schematic of Dirt Guard

ITEM 5. PILOT HARNESS ANCHORAGE

A Blanik was involved in a stall/spin accident and during the investigation it was found that the front pilot left shoulder harness attachment point had failed before the harness. This failure may have contributed to the injuries sustained by the pilot as he may not have been properly restrained.

As there has only been one case of failure and that was in an accident (which would have placed unusual load on the part) no mandatory action was taken however it is recommended that one of the two following mods be incorporated to prevent failure of the harness mount.

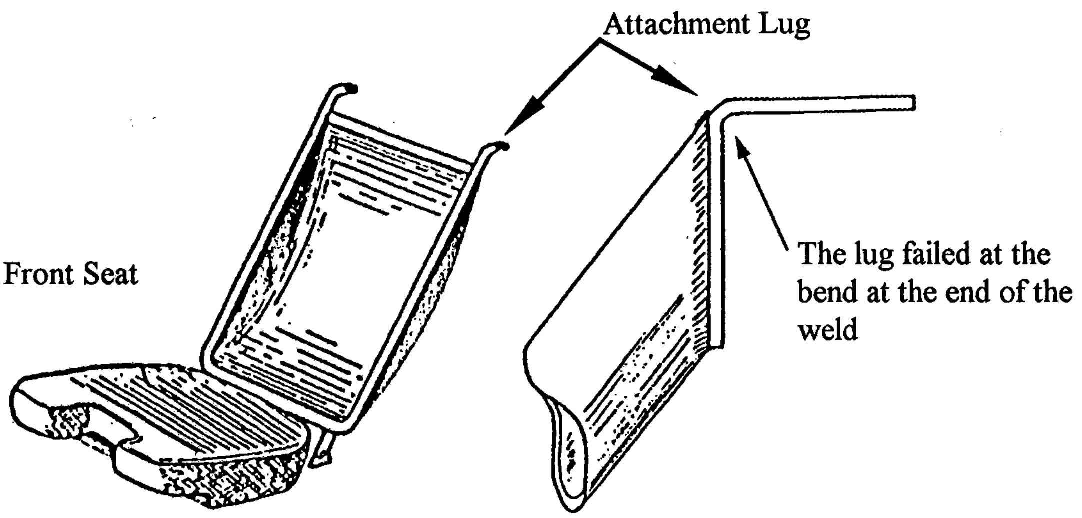

Figure 10 Position of Lug Failure

1. LUG MODIFICATION

Modify both lugs on the top of the back seat in accordance with Figure 11. This modification must be certified by an approved welder.

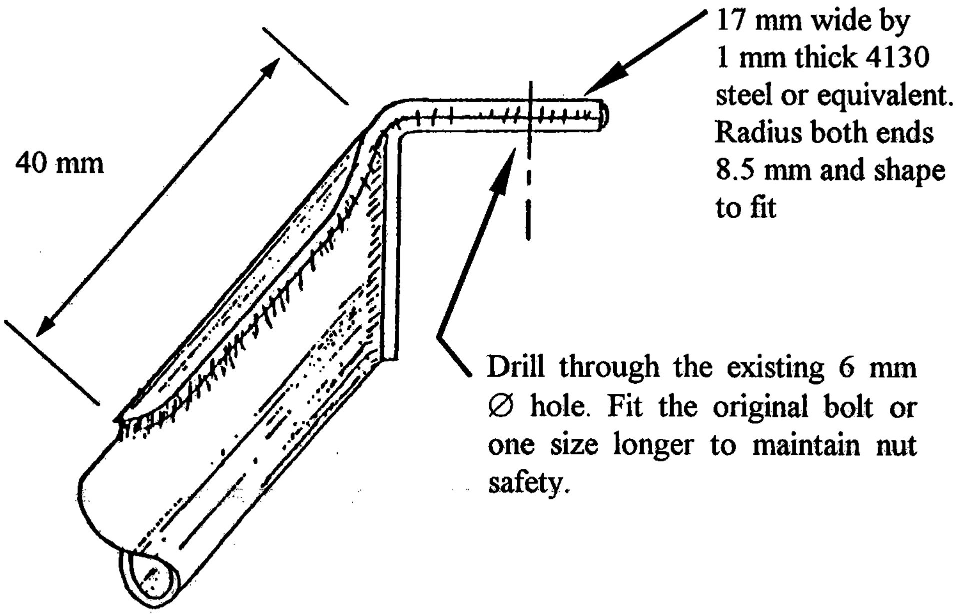

Figure 11 Lug Modification

2. HARNESS MODIFICATION

When next having the harness rewebbed a separate D fitting should be installed so that the harness can be bolted directly to the fuselage frame behind the pilot in accordance with Figure 12.

The installation of the new harness must be carried out by a Glider Inspector rated Component Replacement or higher.

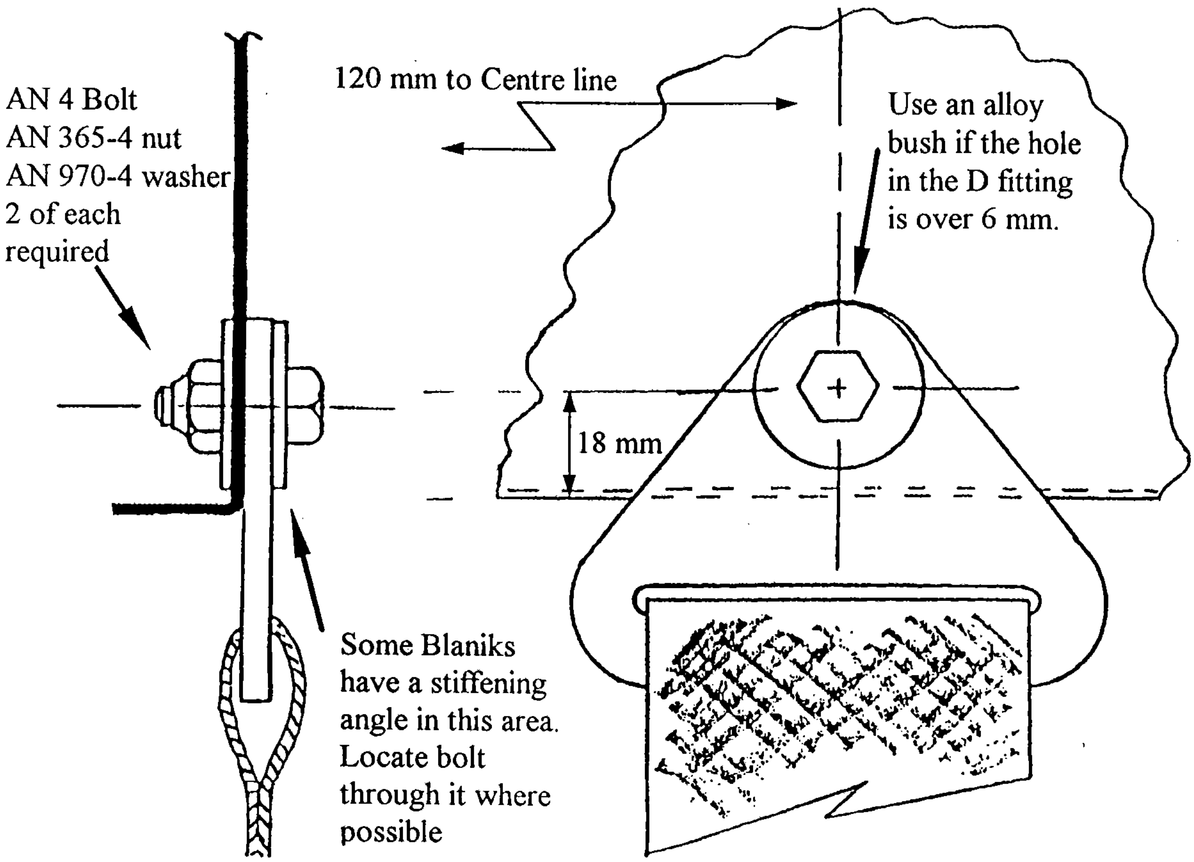

Figure 12 Harness modification

ITEM 6. CRACKED UNDERCARRIAGE OPERATING ARM

The undercarriage actuating arm is prone to cracking at the section change and should be carefully inspected at each annual inspection and following a heavy landing.

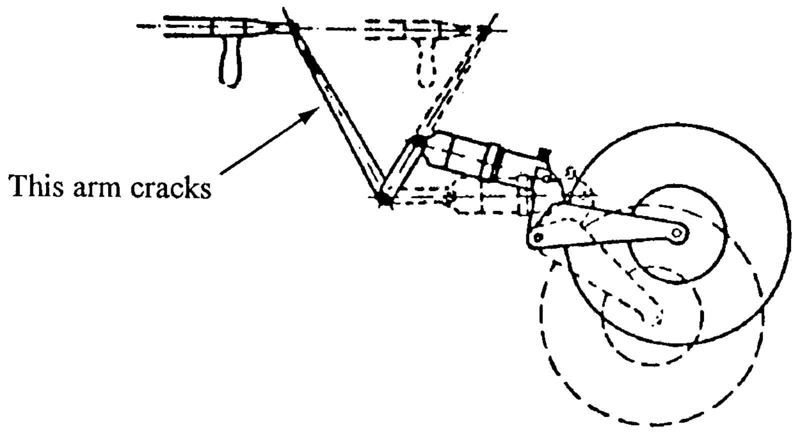

Figure 13 Undercarriage operating arm

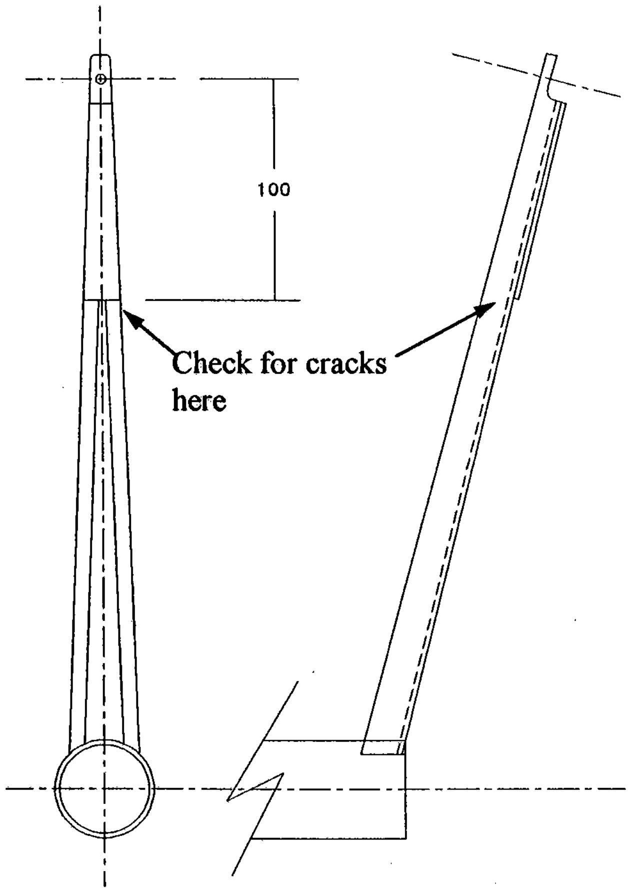

Figure 14 Detail of Arm

ITEM 7. AILERON PUSHRODS WORN AT RIB 17

During trailering, if the aileron circuit is not locked, the pushrod can rub on the edge of the lightening hole in Rib No. 17 resulting, in some cases, in substantial wear on the pushrod, as the aileron moves backwards and forwards. See Item 16 for the location of rib 17

The rib may be cracked as a result of the contact, which can be seen through the lower dive brake outboard hinge hole. If found, the damage to the tube should be polished smooth with fine grade paper. A small crack in the rib is not detrimental to the structure.

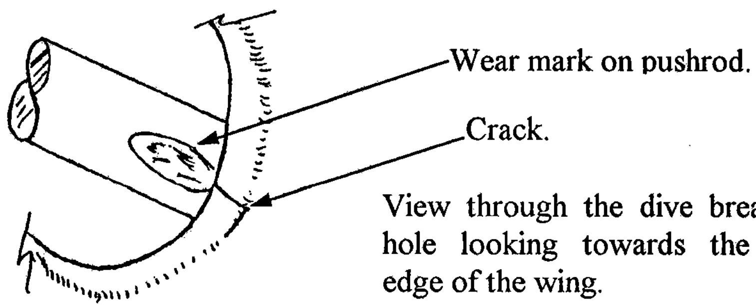

Figure 15. Typical Wear Pattern.

ITEM 8. DISPLACEMENT OF FLAP TORQUE TUBE BEARING

Excessive chordwise movement of the flaps may be caused by the thin fibre bearings bolted to rib 13 moving out of its housing. This allows the torque tube to bear directly on the bearing housing which can result in wear on the torque tube.

Wear marks on left and right torque tubes. Wear is 2/3rd s through the tube wall.

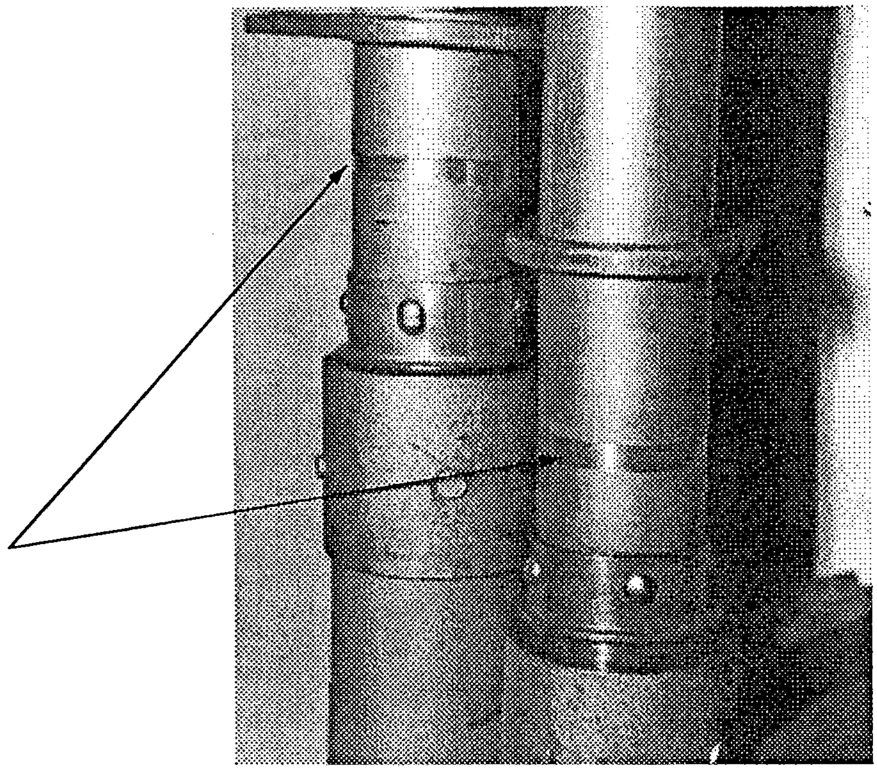

Figure 16 Wear Caused by Displacement of Bearing

To prevent the fibre bearing from coming out of its mount fit a hose clamp around torque tube so that the bearing cannot be displaced along the torque tube.

ITEM 9. BENT RUDDER PULL RODS

During daily inspections the nose cone should be removed and the rudder pull rods from the rear pedals to the front pedals checked for buckling.

This type of damage is caused by the rear pedals being used as a type of rudder lock. If the rear pedals are locked and the rudder is loaded by a gusty wind then the pull rods are placed in compression. These rods were only designed for tension loads and so fail at quite low compressive loads.

If the rods are found to be gently curved they may be straightened once without work hardening or weakening. If they are kinked then they must be replaced or repaired in accordance with a standard repair scheme.

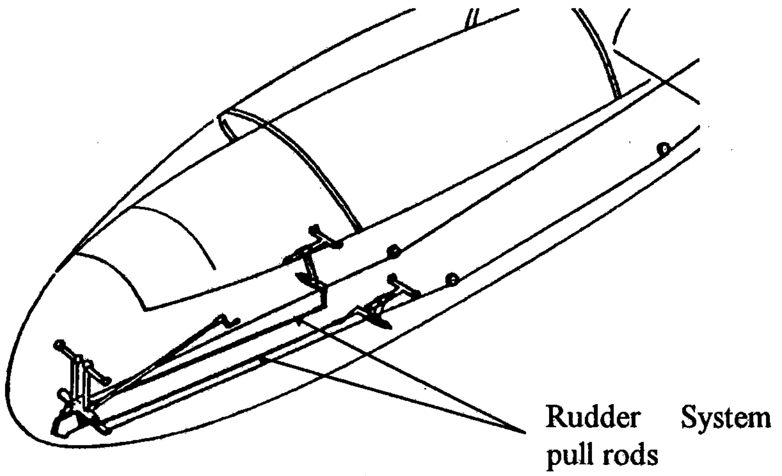

Figure 17 Rudder Pull Rods

When tying down in the open or when trailering always use and external rudder lock to prevent damage to the rudder control system.

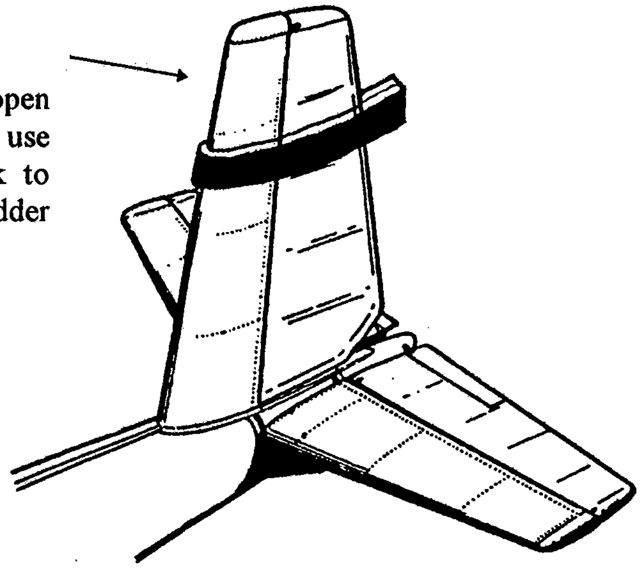

Figure 18 Rudder Lock

ITEM 10. CONTROL CABLE TENSION

The control cable tensions originally published in the Blanik service manual result in stiff controls, high rates of cable wear and cracking of the control systems.

Many years of service in Australia has shown that if the elevator cable tension is set at 18 kg and the rudder cable tension is set at 16 kg then the controls are much freer and the cable wear is reduced. The reduced cable tension has not caused any flutter incidents to date.

ITEM 11. ACCESS HOLE FOR THE BELLY RELEASE

Removal of the Tost belly release can be made easier by enlarging the existing hole in the fuselage floor to the size shown below.

To prevent ingress of dirt and foreign objects a removable cover should be fitted over the hole using self tapping screws. The original sized hole can be reinstalled and sealed by gluing on a piece of rubber and cutting a slit to allow access.

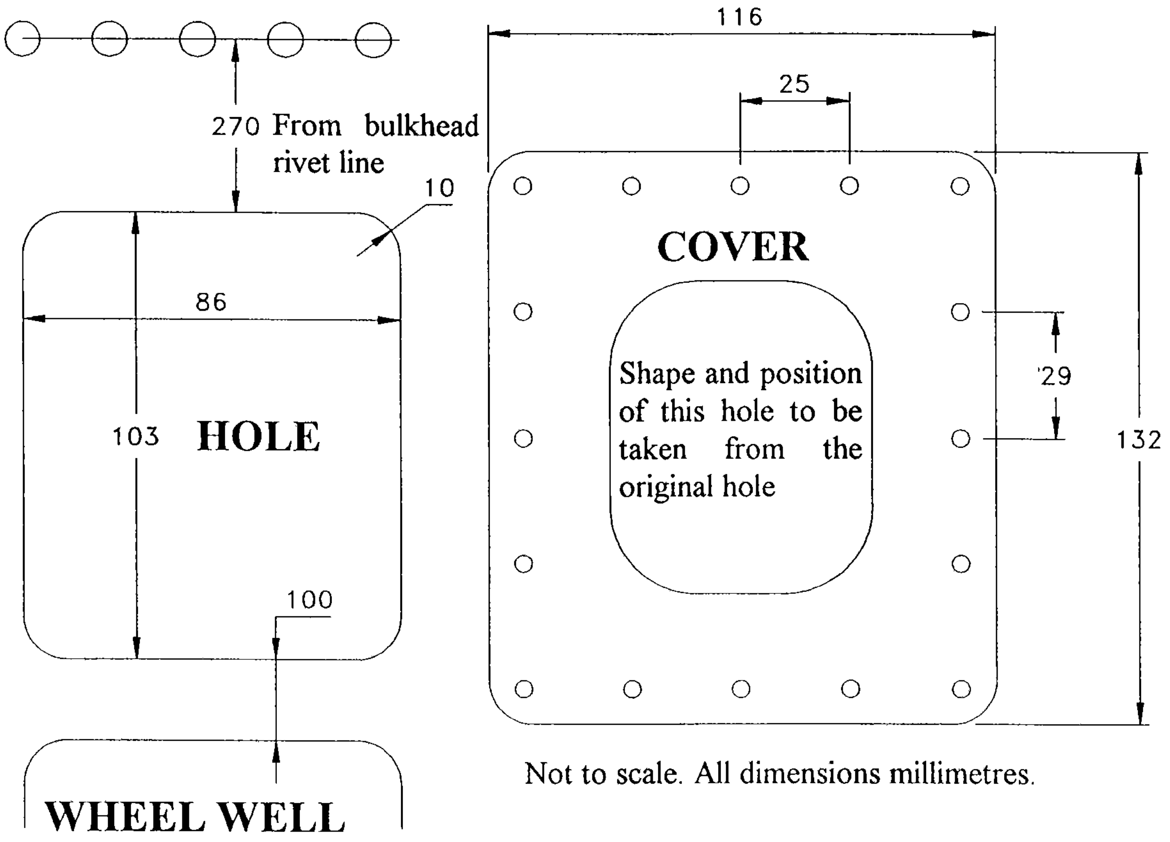

Figure 19 Belly release access hole

ITEM 12. CONTROL CIRCUIT BEARINGS

When purchasing replacement control circuit bearings it is important to order bearings with the correct radial clearances.

A bearing with a C3 tolerance rating will have a maximum clearance of 105 µm (0.105 mm) while a C2 tolerance bearing has a maximum clearance of 32µm (0.032 mm). As there a many bearings in the system and the tolerances are cumulative then bearings should be ordered with the minimum possible clearance.

In almost all cases the correct bearing to order is the GE6E-C2.

When fitting spherical plain bearings which have filling slots or split outer rings they must be mounted so that the splits or slots are at right angles to the line of action of the resultant radial load or a reduction of service life may occur.

ITEM 13. CRACKING IN WELDED FITTINGS.

The area around a weld is the most likely place in a structure for a crack to develop.

The following places are areas where cracks have been found and repaired by welding. All welds should be checked for cracking as a routine part of any Annual Inspection.

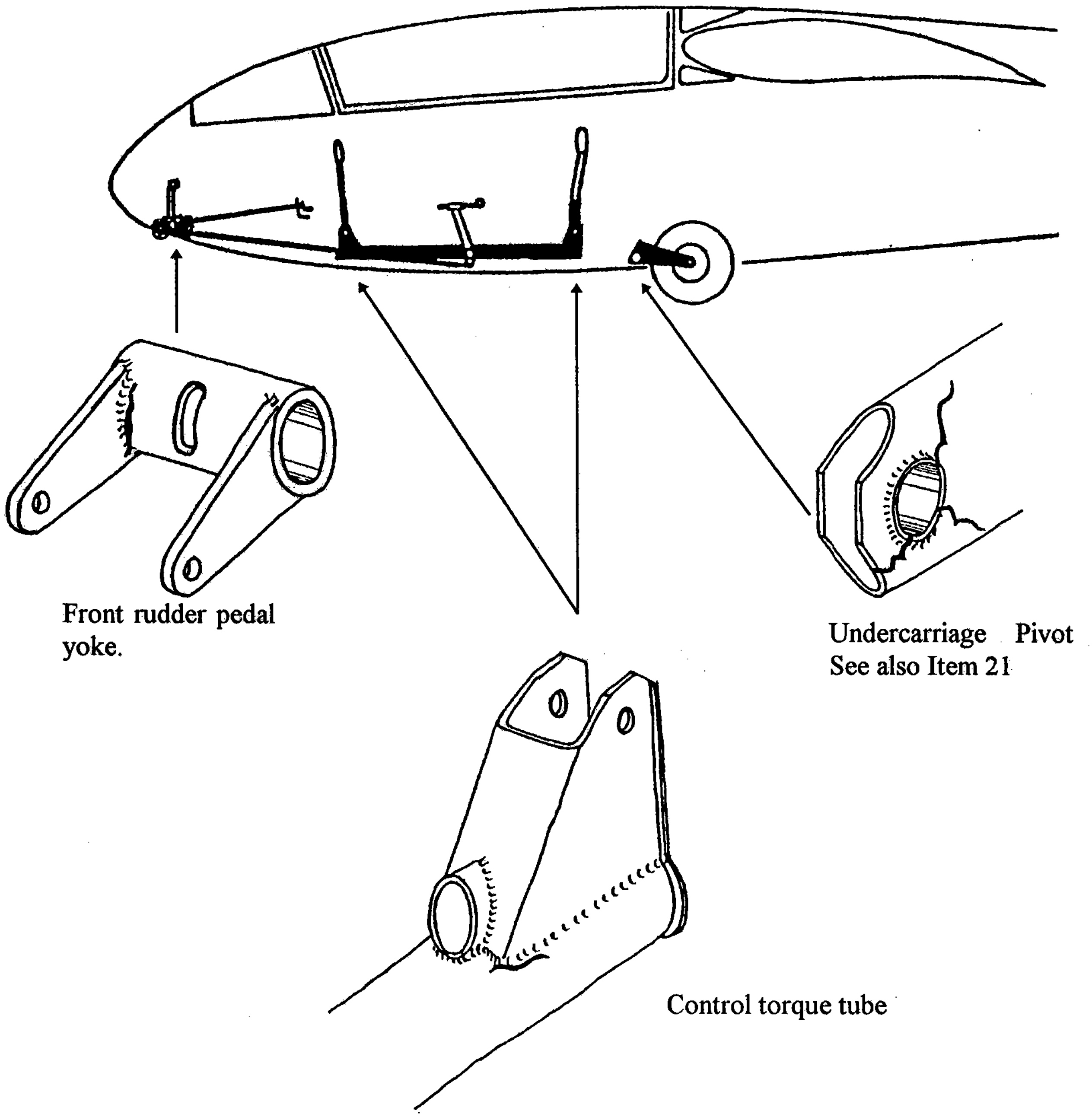

Figure 20 Known crack locations

ITEM 14. LOOSE WING SKIN RIVETS AT THE SPAR ROOT

GFA AD 53 requires among other things the checking of the rivets in the flangeplates of the wing spar (in the area about 200 mm from rib 1) for looseness.

Because the rivets are difficult to replace a GFA approved modification is available as MOD 86-2 available from the GFA Secretariat on request.

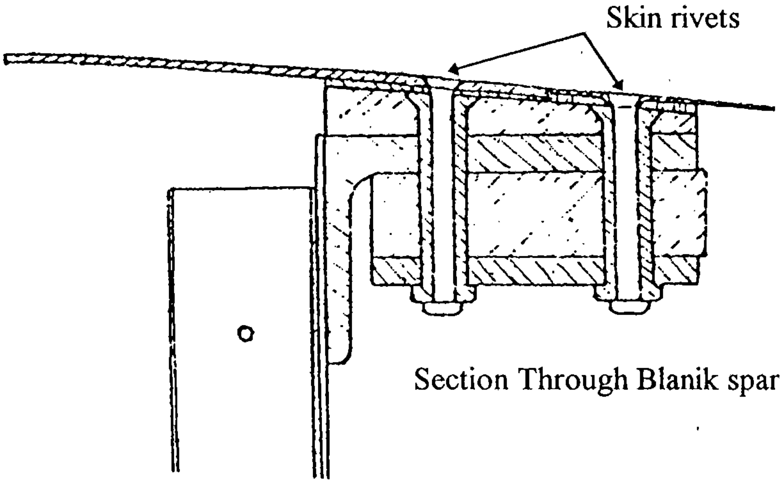

Figure 21 Rivets prone to looseness

ITEM 15. RUDDER BOTTOM HINGE CORROSION

Inside the rudder leading edge on the bottom rib severe corrosion has been found damaging the hinge pin. The rudder must have a drain/vent hole in the bottom rib to allow the rudder to breathe. To inspect inside the leading edge access will be required through the fabric covering and the lightening hole in the rudder spar .

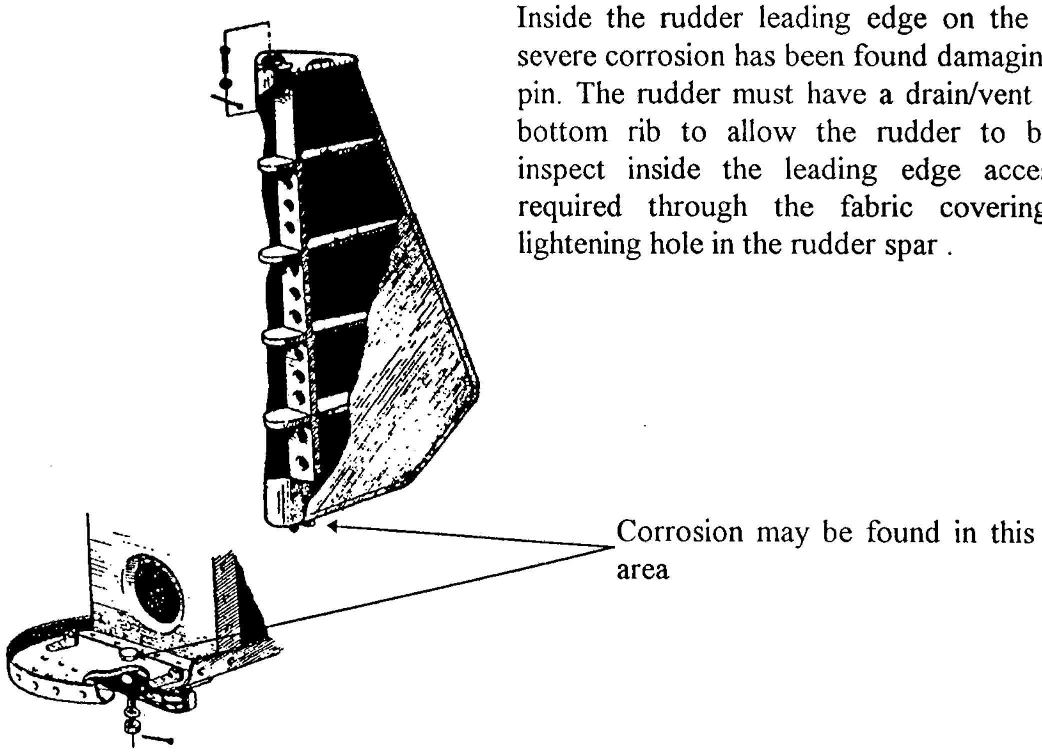

Figure 22 Rudder corrosion

ITEM 16. SEVERAL WING PROBLEMS.

This wing station diagram is taken from the Blanik Overhaul Manual please refer to that manual for clarification.

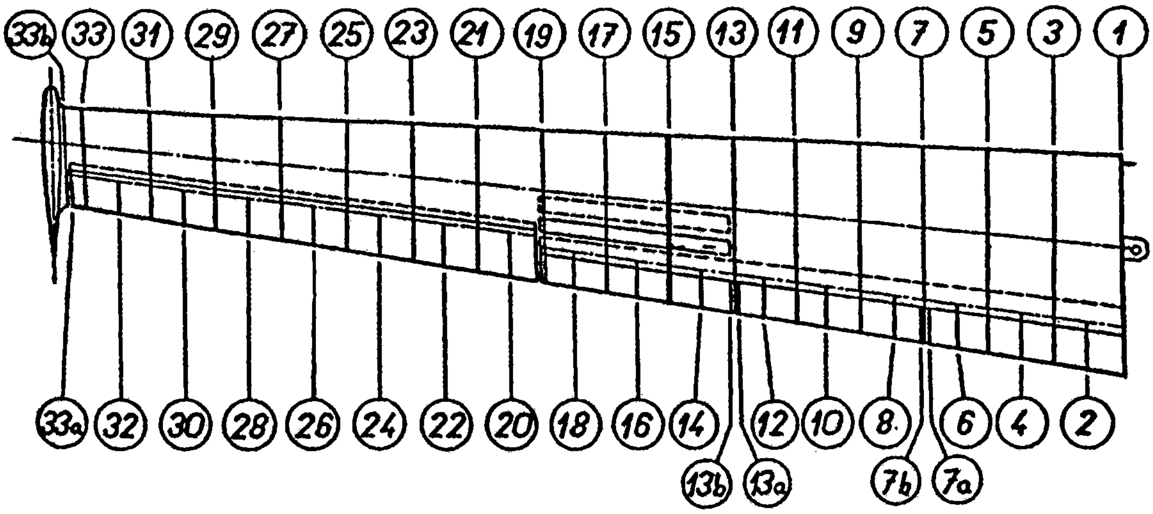

Figure 23 Wing Stations

STATION 25. Some Blaniks (but not all) have a butt joint between the leading edge skins at this station which has been found to have enough working rivets to reduce the wing frequency by 10 cpm (or more). The rivets were not obviously loose or working and they were only found after careful inspection which included lightly loading the wing tip with the wing on trestles (one at the root end and one just inboard of station 25) and using a magnifying glass to watch the rivet lines take load and noting the loose ones.

STATION 7. At this point on the top of both wings, over the main spar, three skins come together such that they make a small hole, over the spar, which will allow moisture into the wing, onto the spar cap and very severe corrosion has occurred in one case.

If corrosion has started in the top spar cap, or between the top cap and the inside of the top skin, it may be visible as a bulge in the skin between rivets. Bulge's between rivets can also be the result of manufacturing technique or flight overload.

Any spar cap corrosion is serious and may require a major repair to the cap. GFA approval must be obtained from the CTOA for any repairs to the spar caps.

Blaniks were originally manufactured with a "varnish" applied over the external skins and the skin joints sealed with the same material to keep moisture out. With time and use that varnish disappears and should be replaced particularly along all wing skin joints. If this is done be very sure that there is no corrosion already present which you may simply cover up.

ITEM 17. MOORING THE BLANIK

The Blanik has two tie down points per wing (4 total) one at each wing tip and one about half span in the underside of each wing which ensures that the sailplane can resist strong winds without overloading the wings which can occur if only one set of tie downs are used for anchorage. There have been cases reported where the outer wings of a Blanik were bent up in very strong winds because only the inner tie downs had been used.

The following diagram is taken from the Blanik Technical Manual illustrating the correct way to tie the sailplane down.

Obviously a little care should be exercised to have the rope tensions evenly balanced to properly share the wind loads.

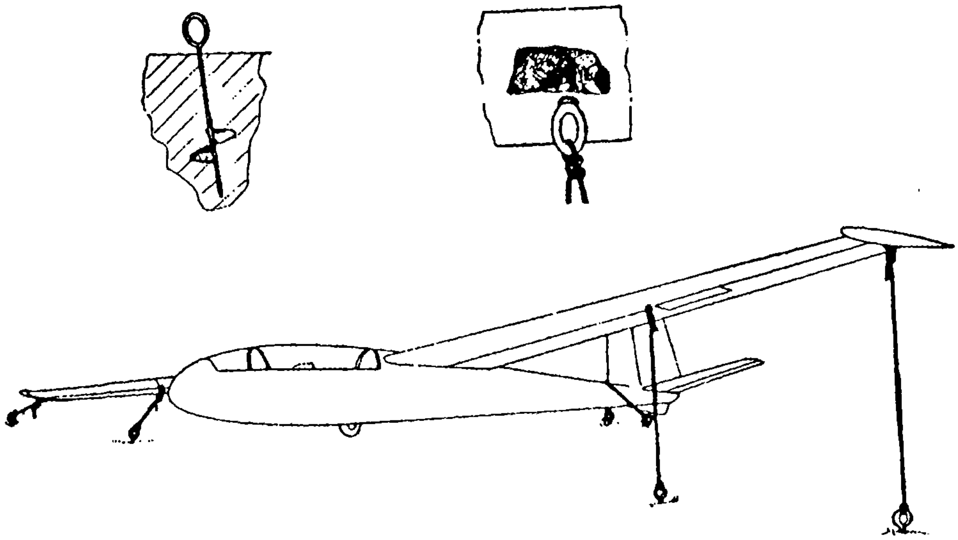

Figure 24 Tie down points

ITEM 18. UNDERCARRIAGE OLEO MODIFICATION. (GFA MOD 88/12)

Overhaul of the Blanik oleo strut often requires the replacement of the seals shown in the following diagram.

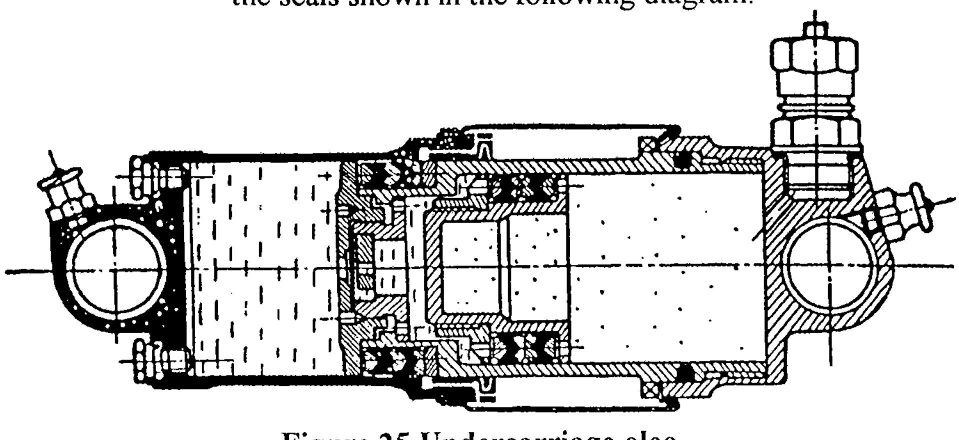

Figure 25 Undercarriage oleo

To allow the use of standard "O" rings instead of imported metric lipped seals, a modification has been developed by a Blanik operator involving the manufacture of a new piston and cap both machined to accept standard "O" rings.

Field experience to March 1988 has shown satisfactory service of oleos fitted with this modification.

For further details contact N. Harding.

ITEM 19. BLANIK MANUALS

The GFA can supply the three technical manual relevant to the Blanik.

1.	Technical Manual of the L13 Sailplane	4th Edition
2.	Overhaul Manual for type L13 Sailplane	3rd Edition
3.	Spare Parts Catalogue L13 Blanik	3rd Edition

Prices are listed in the current price list published by the GFA Secretariat.

ITEM 20. RUDDER REFITMENT AID. SUBMITTED BY DON MACMILLAN

Refitting the rudder on a Blanik can be tricky, since the surrounding structure shrouds the lower pintle as it enters its self-aligning bearing preventing manual or visual access. If the pintle does not enter truly it may tilt the bearing centre and damage the bearing.

I have found that the plastic tube that forms the bobbin spindle of a Johnsons 200m dental floss container makes a perfect tool to overcome this difficulty. Its outer diameter is a smooth push fit in the bearing centre, and its inner diameter accepts the threaded portion of the rudder pintle.

In use, the tube is held vertically and its lower end inserted just through the bearing centre from the top. The threaded end of the rudder pintle is then inserted in the top of the tube. This is easy, since the length of the tube permits this to be done in the clear.

As the rudder is lowered, the tube slides smoothly through the bearing, preventing it from tilting and guiding the pintle accurately into place. As the rudder seats home, the tube is ejected into the fuselage cavity, where it is retrieved through the access hole used to fit the retaining nut.

ITEM 21. UNDERCARRIAGE PIVOT REPAIRS

If cracking of the undercarriage pivot as per Item 13 is detected and the damage is such that rewelding the cracks is not possible then a new steel fitting made from laminated steel in accordance with MOD 88/16 may be installed.

Copies of this modification are available from the GFA Secretariat on request.

ITEM 22. CRACKING OF FUSELAGE BULKHEAD 13

A number of Blaniks have experienced cracking of bulkhead 13 at the top of the frame directly under the fin. Because of the large amount of work necessary to repair this bulkhead in relation to the relatively light frame a repair scheme has been developed which places a doubler over the fin and fuselage to transfer the loads. The bulkhead is left in place without repairing the crack.

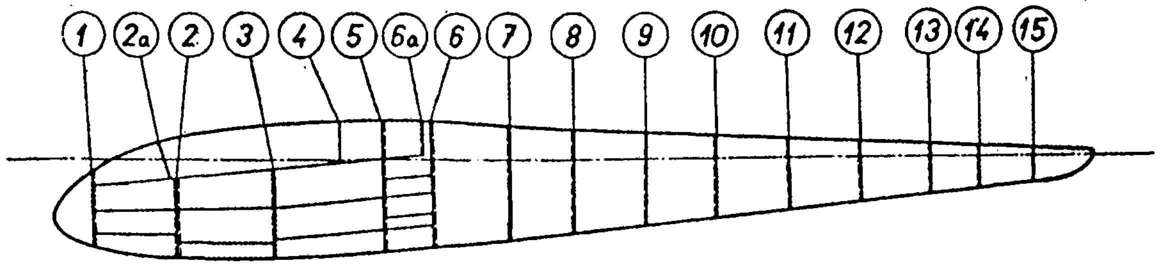

Figure 26 Fuselage bulkhead numbers

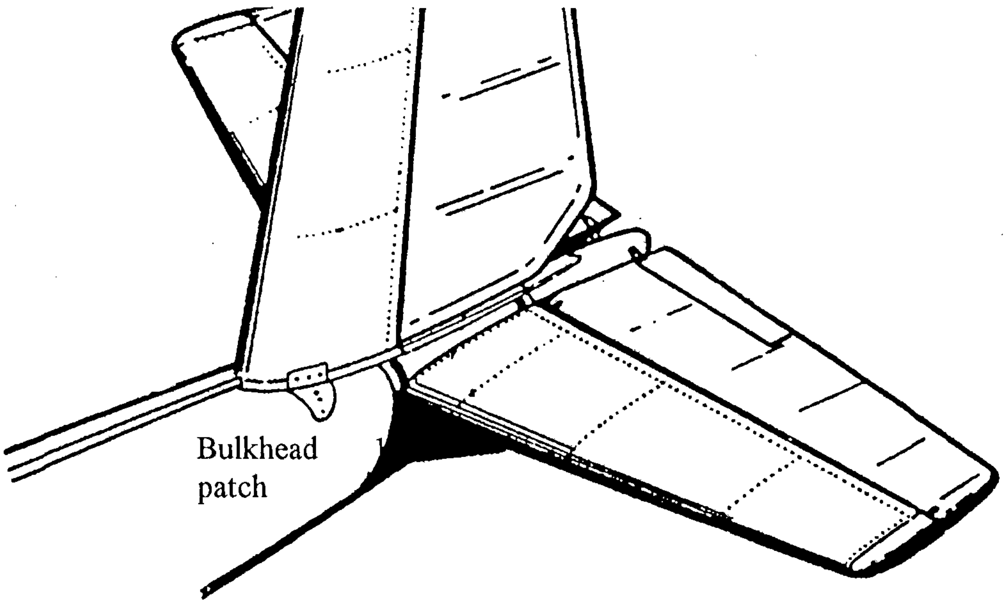

Figure 27 Patch for bulkhead 13

ITEM 23. CANOPY JETTISON MECHANISM

The canopy jettison lever on the Blanik is both prominent and effective however the mechanism design results in a number of traps which can result in either the canopy not jettisoning in an emergency or coming off in normal flight.

During servicing it is possible to remove the canopy from the fuselage without actuating the jettison mechanism. Despite the requirement in the Technical Manual that the mechanism must be actuated at each annual inspection the Mechanism is often ignored in annual inspections and this has resulted in the pins corroding due to lack of lubrication. This would prevent the canopy from jettisoning in an emergency.

The jettison mechanism is secured by an aluminium shear pin which fails when the mechanism is actuated. This has caused problems because if the mechanism is accidentally operated returning the lever to the locked position does not resecure the mechanism. Once the lever has been actuated the entire mechanism must be reset which involves making sure that all pins are reengaged correctly.

To show when the mechanism has been actuated and to reduce the chances of inadvertent operation most Blaniks have an extra safety wire installed between the lever and the canopy frame which is visible and must be broken to acuate the mechanism.

The usual material for securing the mechanism is either fuse wire or copper wire which can be readily broken by the pilot however there have been instances where, because the glider is never flown with parachutes, a stainless steel lockwire is used. If a lockwire which cannot be broken by the pilot is installed then the Maintenance Release should be endorsed that the lockwire must be removed before flight with parachutes is permitted. In all other instance the inspector should check that the wire installed can be broken by a test of the wire as installed.

ITEM 24. REPLACEMENT MATERIALS

Because the original materials used to manufacture the Blanik are not readily available in Australia it is often necessary to use standard American aircraft sheet aluminium.

According to a report by G. Sunderland prepared in 1979 it is safe to make the following substitutions:

2014 T6 for complex formed parts (ribs etc.).
2024 T3 for sheet and simple folded parts.

Major extruded sections and obviously heavily loaded massive parts will need positive identification. Replacement of these parts with factory parts is preferred to substitution of materials. eg Spar booms and fittings.

AN solid AD type rivets and Avdel L169 blind rivets may be substituted in sheet skin areas only.

Whenever substituting sheet then the next thicker imperial size should be used to replace the metric thickness sheet originally used.

ITEM 25. EXCESSIVE FLAP CLOSING LOADS

Over the years Blaniks have been prone to high closing loads on the flaps. The problem is caused because the mechanism overtravels allowing the torque tube to take the flap pushrod overcentre.

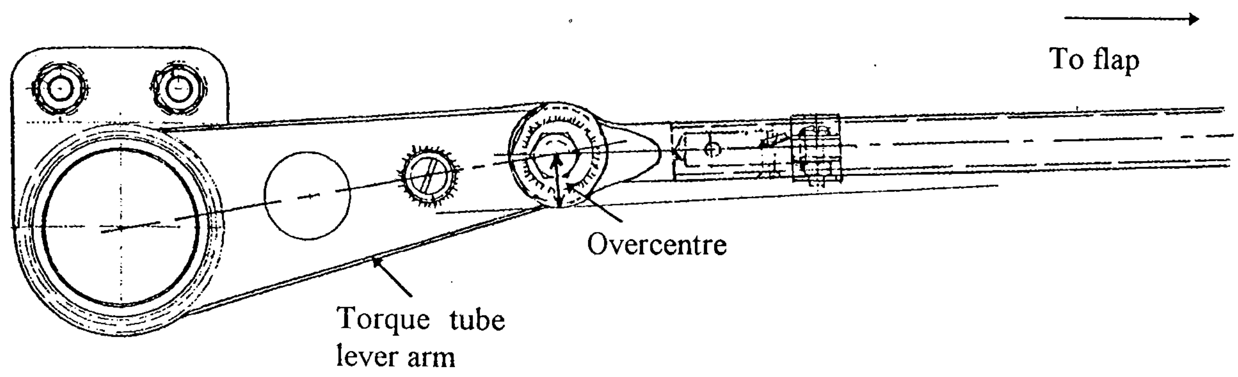

Figure 28 Flap drive mechanise full extended

The overtravel of the system should be adjusted out if possible or a stop may be fitted to the wing which prevents the torque tube lever arm from going over centre.