GFA AN 062
(ISSUE 6)

AIRWORTHINESS ADVICE NOTICE

TYPES AFFECTED: Grob G 109 & G 109 B Motor Glider

SUBJECT: Miscellaneous airworthiness information.

BACKGROUND: This AN records airworthiness information which is useful for the operator and maintainer.

MODIFICATIONS: 1. FUEL SYSTEM MODIFICATION (S/N 6001-6159). Grob T.M. 817-9 outlines an optional modification to the fuel system to improve fuel flow to the carburettors. A kit can be obtained from the type certificate holder.

2. USE OF UNLEADED FUEL (ALL S/N). Grob T.M. 817-46 describes the procedures to convert the engine for the use of unleaded fuel. The material required can be ordered from the type certificate holder.

DEFECTS: 3. SPINNER FAILURE. Hoffmann Propeller pointed out the problem of defects on the spinner backing plate of the VP30-82 spinner. The G 109 has spinner VP30-81 and this problem may not be relevant, but a check for cracks around the screw holes and every 50 hours is recommended.

4. DELAMINATION OF ELEVATOR SPAR AND TOP SKIN (G 109 B) There is a reported incident of the elevator top skin separating from the spar cap, at and either side of the cutout in the spar accessing the trim tab push rod. The cause is considered to be either Grob has cut away the spar web and spar cap to allow the pushrod to clear the structure, thereby weakening the elevator locally or ground impact on the tailwheel may cause bending at the cut out, eventually promoting separation of the top skin and the spar.

A. Annual inspection should include careful inspection of this area.
B. If the separation travels far enough the center hinge will become loose in the elevator - requires inspection, both annually and daily.
C. After any ground impact, inspection of the area is strongly recommended.
D. All defects found are to be reported to your RTO/A or CTO for possible further action.

SIGNED: 

GFA Chief Technical Officer

For and on behalf of:

THE GLIDING FEDERATION OF AUSTRALIA INC

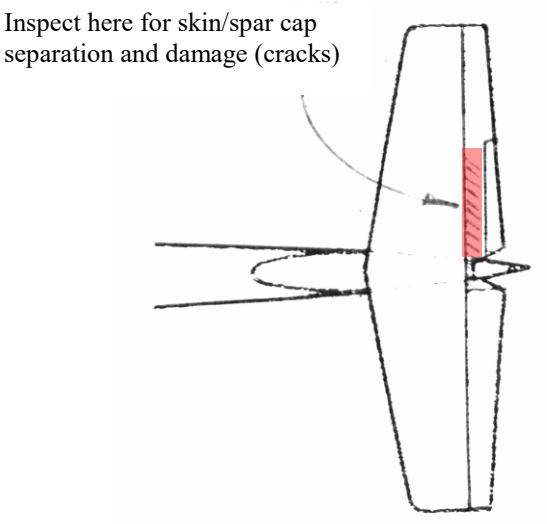

Figure 1: Elevator Spar Inspection Area.

5. HINGE ROLL PIN REMOVAL. The most common method of removing the ailerons and elevators is by use of a hammer and pin punch. This type of impact can be quite damaging to the hinge and its attachment to the main structure. The following sketches have been offered by one of our inspectors as an alternative tool for roll pin removal, which does the job quite well and may prevent delamination of hinge attachments. (See GFA AD 213.)

The main problem is that the holes in the pins are individually drilled and are at all sorts of angles, hence the curved arch of the tool and the bolt in the trunnion so that the individual roll pin angle can be duplicated by the tool.

A secondary problem is that not all the hinge pins are the same length so that the tool-must cater for differing spans of hinge. The feet of the tool must slip and hold under the different sized ends of the pins. One foot of the tool (the foot in the handle) has to be loose so that it can be inserted below the end of the hinge pin first and then the main body of the tool presented to it, the foot then being secured to the body by a pin (a bent nail in the prototype). It is fiddly as the aileron/elevator also has to be held at the correct angle so that the roll pin being removed does not pierce the control surface shell. Once the roll pin is moving it slides out very easily

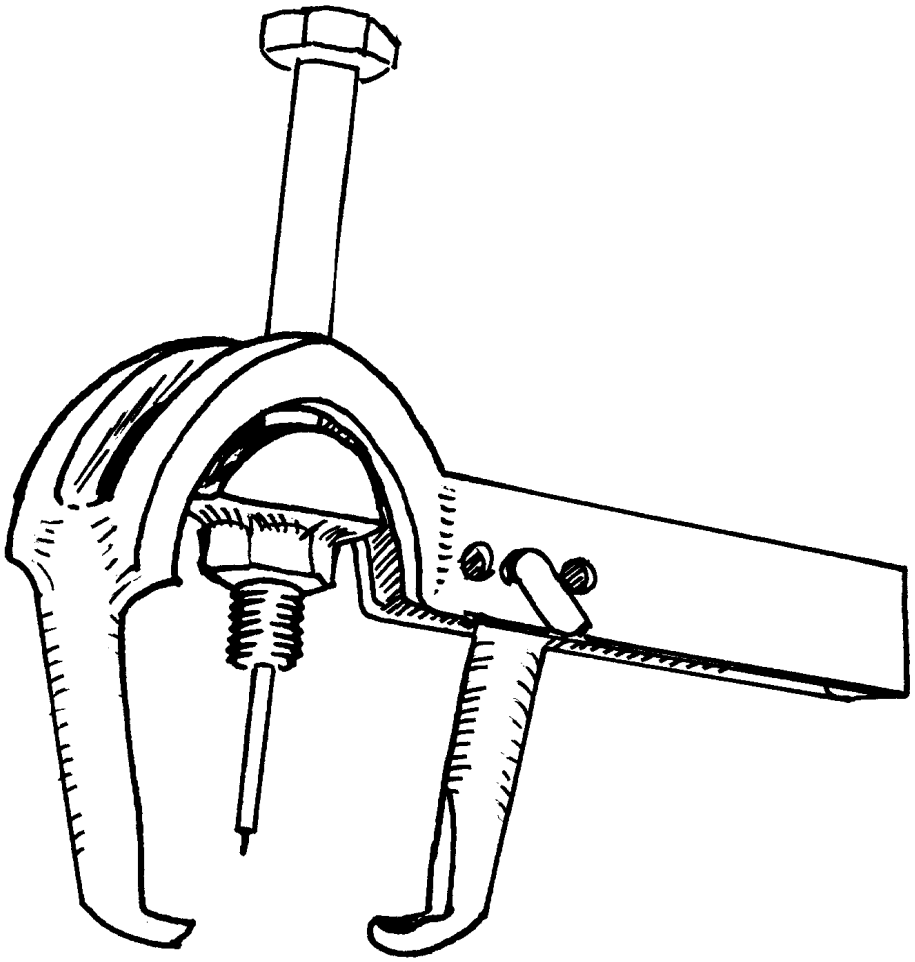

Figure 2: Hinge Pin Remover.

The tool has to span differing hinge lengths of 30 mm, 35 mm and 42 mm. The holes in the main body assembly are drilled to suit these spans.

The feet are chiselled out at the 'instep' to suit the diameters of the hinge pin ends otherwise they will slip off when the bolt is being wound down and damage the aircraft finish. For Roll Pin insertion use another bolt in the tool with a flat ground end.

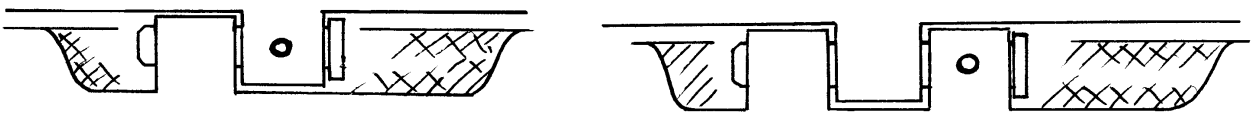

FIGURE 3. TYPICAL HINGE CONFIGURATIONS.

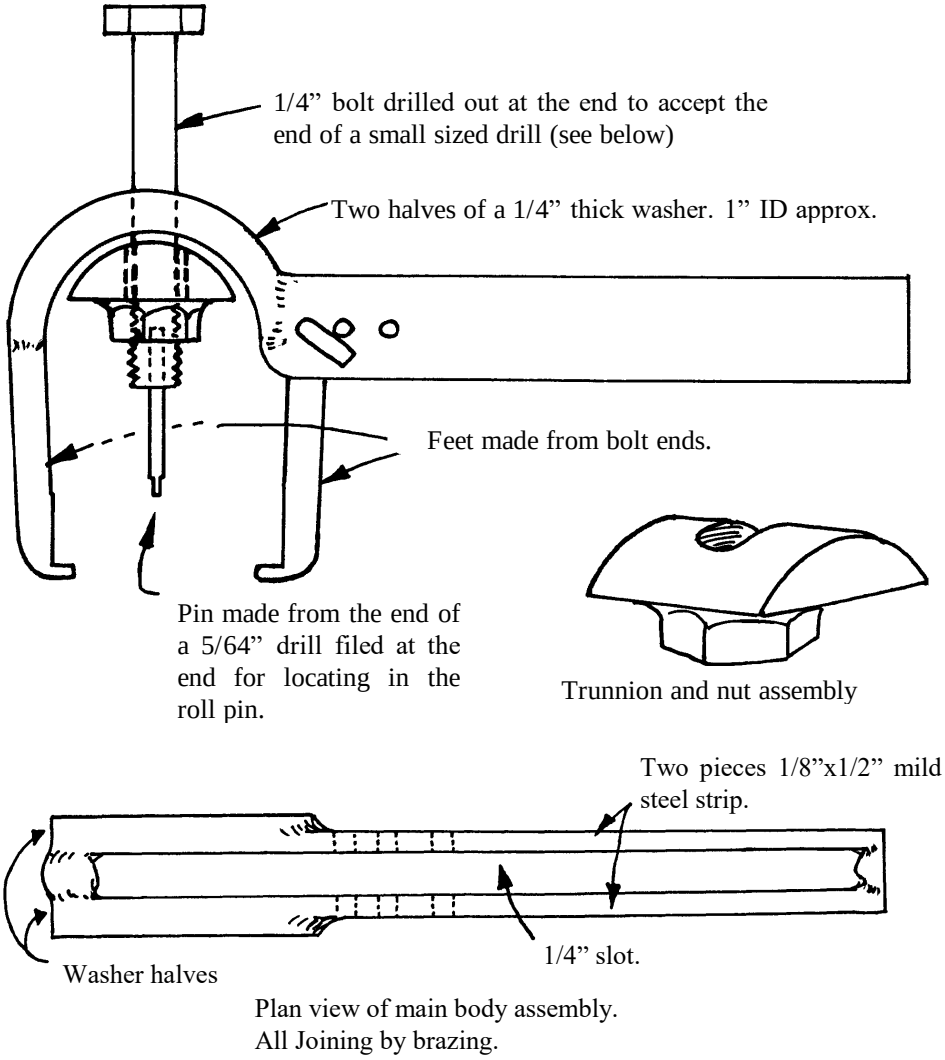

Figure 4: Removal / Insertion Tool.

6. LOOSE ELEVATOR PUSHROD ENDS. A number of cases have been reported of loose elevator pushrod ends. The original design only used one tubular rivet to secure this part and so to remove slop a design involving the installation of two monel pop rivets has been developed by G. Sunderland.

Note: This repair scheme was developed for an Astir CS and if any difficulties are encountered then the CTOA should be contacted so that any necessary variations which may be required are recorded in this AN.

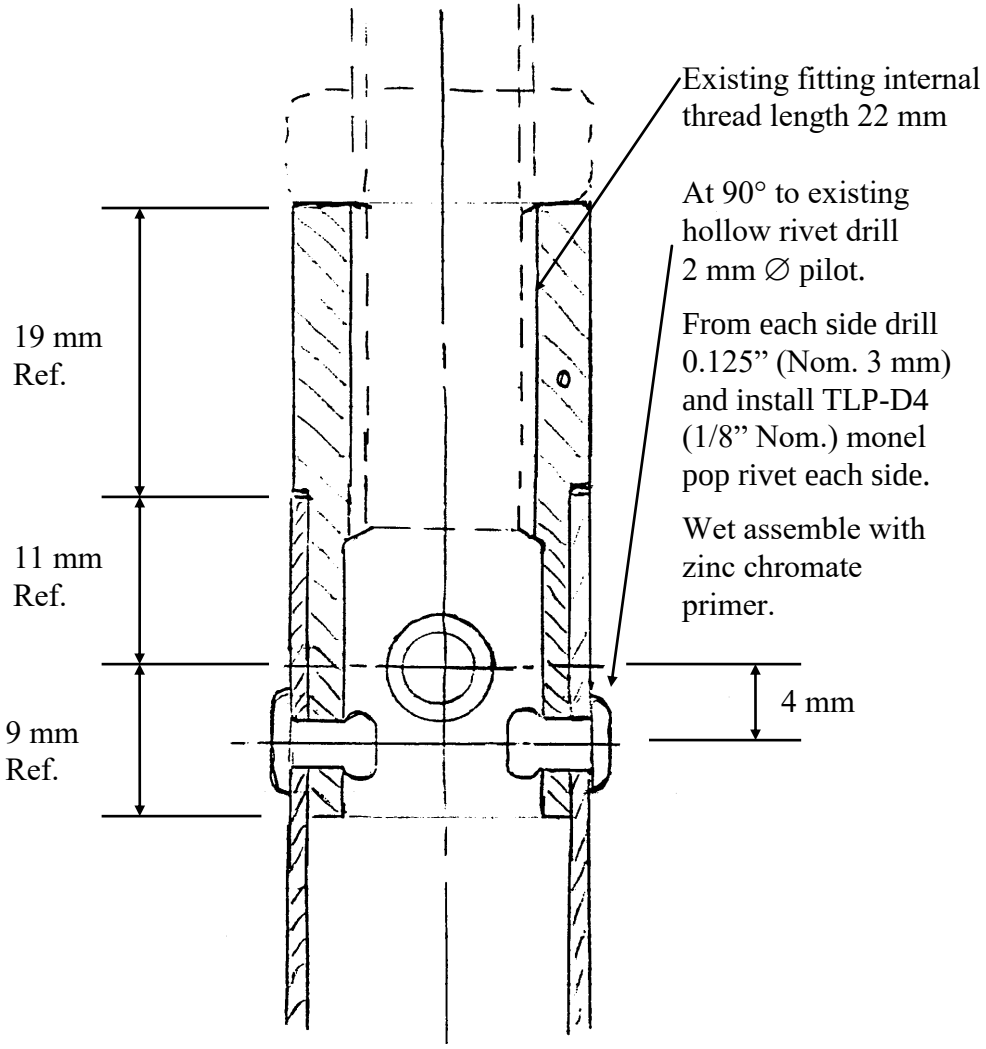

Figure 5: Loose Rod End Repair Scheme.

GENERAL:

7. TAKE OFF WITH WET WINGS. One operator has found that takeoff performance is markedly affected by water droplets on the wing. Take off in rain should be performed with great care and wings should be dried if possible.

8. AIR FILTRATION. High engine wear was found in a Grob engine from a G 109 B. This could apply to Limbach engines as well. The damage was due to sand ingestion due to an inadequate, although normal, filtration of the heated alternate air system to the carburetors.

Sand collects in the alternate air system inlet around the exhaust system. When the carburetor heated air valve is opened, even at altitude, the carburetor sucks in this accumulated sand with the heated air. This sand has scored the cylinders and worn the engine badly.

This is a similar poor design in all General Aviation aircraft operating in sandy environments. Recommend if operating in sandy environments to

consider improved filtration of the heated air for the carburetor. However, safety of the alternate air supply is required, ie must not risk blockage. Consider diverting the hot air inlet to a more protected location where it will not pick up so much sand.

Extra maintenance is required in a dusty or sandy environment. Keep engine bay clean including the exhaust cuff. Ensure alternate air valve works well and doesn't leak to ensure air normally goes through the air filters.

The GFA can assist you to obtain approval of modifications for these improvements, if required.

9. CANOPY AND SYSTEM MAINTENANCE. The Grob G 109 canopy at speeds approaching Vne is known to unseat around the sides. The condition is caused by the shape of the canopy and resultant lift placing the canopy under considerable pressure. An increased in angle of attack when recovering from a dive at or close to this speed places added strain on the canopy and it's attachments.

This occurrence may be exacerbated by a worn attachment of the canopy / jettison system, an ill-fitting canopy frame as a result of a previous repair, replacement of the clear view Perspex resulting in poor fit of the frame, worn and rounded fuselage locating rails, poorly repaired fuselage rails and/ or canopy seal condition. The 'unseat' condition at speed results in a loud 'pop', the canopy remains unseated until being opened on the ground.

Figure 6: Canopy Rail After Recent Repair.

Figure 7: Canopy Seal In Good Serviceable Condition.

The silicon seal is hard to see in the frame and it does wear and deteriorate with use. It should be inspected annually at the same time as the canopy jettison function is tested.

The canopy jettison test is very important if for no other reason than to check the canopy locking pin condition and bush embedded in each canopy hinge arm. The locking pin has known to shear on the G 109 which can result in an uncommanded canopy jettison.

When closed, the forward canopy hinges mate closely with a section between both instrument panel coamings. Two counter sunk screws orientated near vertically attach a strut cover plate under the instrument panel. The cover is additionally secured by 4 threaded bolts at the firewall and 2 PK screws under the canopy rail. The cover locates and separates an electrical loom and two canopy gas strut units. It also acts as a water sump and drain when flying through heavy rain. The two countersunk screws, if fitted, must not contact or interfere with the canopy when closed. Check for marks on the underside of the forward canopy hinges. It is noted that many G 109’s do not use these screws leaving the countersunk holes unused.

Figure 8: Canopy Strut Cover Removed from Aircraft.

Figure 9: Canopy Strut Cover In-situ (View Looking FWD)

Figure 10: Example of Screw Head Interference With Canopy Hinge

In summary:

A. Ensure the canopy attachment and jettison system are in good order and tested annually. The jettison handle stowed and locked closed with frangible lockwire. The frangible lockwire should be of a gauge that it will hold closed but break in the event a jettison is required. The lockwire additionally assists in holding the jettison handle closed against vibration.
B. Ensure the canopy is inspected and lubricated annually
C. Ensure the fuselage rails and canopy seal are serviceable,
D. Be aware of the aircrafts condition, idiosyncrasies and limitations and fly accordingly.