A Guide to Carrying Out Daily Inspections

by Paul Gentil.

Introduction

You might ask, 'why do we carry out daily inspections?' I know that many, if not most, private owners at other clubs don't even have a DI book in their glider; "I've rigged it, therefore it's OK to fly" seems to be the mentality. Really? I can think of numerous instances where controls have been left disconnected and the glider flown with varying consequences. The one benefit of doing this is it scares the wits out of the pilot when he/she realises their mistake, so that he/she will probably, if he/she has any sense, carry out a proper DI in future if he/she wants to fly again the day after. Just to remind everyone at CGC, **all gliders must carry a DI book which must be completed before flight at Aston Down.** I would also remind instructors to carry out spot checks of DI books at the launch point. ***The BGA has also recently mandated that all gliders must have positive control checks carried out and recorded in the DI book.*** **No DI and PC checks, no launch.**

The purpose of a DI is to ensure the glider is fit to fly. This means ensuring it is rigged correctly and completely, and that the structure is not damaged. It also must ensure that all the controls and other mechanisms are functioning properly, for example, wheel brake and instruments. This means carrying out a **systematic and thorough inspection.** It is not a C of A or an ARC and should take around fifteen minutes – fifteen minutes that could be the difference between life and death. All the above requirements are carried out on Club aircraft before flying every day, and ***there is absolutely no reason not to apply the same requirements to private aircraft.***

Method

After I went solo back in 1973, the first thing I did was to get signed off to carry out a DI. The instructor who oversaw my first DI signed the back page of my logbook. Ever since then I have carried out DIs using exactly the same systematic routine for any glider with type-specific variations to cover the details. I commend my method to everyone because I have noticed that every person carrying out a DI does it in a different way, and probably does the job in a different way each time. This is not a very good approach because things are more likely to be missed if the method is not systematic. My method is as follows:

1) Check that the ARC or C of A is still current. If it isn't, there is no point in continuing.

2) Check the DI book for previous comments and whether there have been any significant issues which required fixing and signing off by an inspector.
3) Remove any loose cushions.
4) Start by going through the pre-flight checklist;

C – Hold the stick (both sticks if it is a two-seater) and move it/them fully back and forth, and side to side, and for full and free movement by moving the stick(s) in all directions. Also check whether there is any play in the stick pivots – if there is significant play, get it checked by an inspector. While you're doing this, check externally that the control surfaces are moving fully and in the correct sense, including the rudder.

B – Look for attached ballast and remove it if found.

S – Check the straps are securely attached to the structure in the correct way and the straps are in good condition. Connect the straps to the buckle and then check the release works properly.

(I also check that they hold – I have seen the wire springs come out and the adjustment slip)

I – Check the instruments are set correctly or to zero and there is no damage. If it's your glider you might set the altimeter to airfield height rather than zero if you plan to fly cross-country. You can check the ASI is working by placing the palm of your hand over the nose pitot and pressing your palm against it. This should show a small positive deflection on the ASI. This is easy to do on the K-13 , SHK and many other gliders. Don't blow down the pitot!
Ensure the batteries are in place and secure, connected and charged.

F – Check the flaps operate correctly from full positive to full negative, and are symmetrical.

T – Hold the stick central and move the trim lever through its full travel. On the K-13, Skylarks and many other gliders you can observe the movement of the trim tab.

C – Examine the canopy for damage and check the locking mechanism functions properly.

B – Check the airbrakes open and close properly and are operating symmetrically. Check the locking is secure.

Cable release – Check the cable release knob is secure, the cable is not frayed and opens the release hooks properly, both winch and aerotow (if fitted).

Now look below the instrument panels for extraneous objects, frayed cables, etc.

K-13

In the K-13, check under both seats for loose objects. Recently I found a gentleman's wrist watch under the rear seat of a K-13. (More on this later).
Now look down the inside of the rear fuselage. Check all nappy pins are in place in the main pins, aileron and airbrake linkages. Operate the ailerons and airbrakes and check there is nothing obstructing the linkages. Check the drag pins are secure.
Move the stick and look down the rear fuselage as far as you can at the push-rod to the tailplane and make sure it's moving freely and not damaged. Check the trim cables and rudder cables along the rear fuselage are not broken or frayed or fouling on anything. Follow the cables back into the cockpit and check them over.
Other gliders don't have such an open control system, so you can only check what you can see. Some gliders have inspection covers over the control linkages; it's a good idea to take a look inside – more later.
If all is satisfactory, put the cushions back and close and lock the canopy.

External Examination - General

Left front fuselage: Look over the left front fuselage, Check the release hook and back-release, and the skid on the K-13.

Left wing: Move to the upper surface of the left wing and walk along and check the surface forward of the mainspar for damage. Go round the tip and then look along the upper surface behind the mainspar along to the root. Move the aileron and the upper airbrake, if open. Now look at the under-surface of the wing behind the mainspar out to the tip. Check the lower airbrake for security and, on the K-13, open the inspection panel next to the aileron operating arm to check the linkages and mounting brackets are secure. When you've finished, make sure the panel is closed properly. Move on towards the tip and then check the under-surface forward of the mainspar back to the wing root.

Rear fuselage: Now check the fuselage under the left wing root and the main wheel (and undercarriage doors where fitted). Look over the left side of the rear fuselage back to the tailplane. Remove the tail-dolly if fitted and look over the fin, particularly where it joins the

fuselage, and upper and lower surfaces of the left tailplane. On the K-13 check the tailplane operating linkage moves freely and the elevator bearing is properly located in its slot. Check the rudder movement and security. Check the K-13 rudder connections and that the split pins are in place. Examine tail wheels for smooth running, flat tyres and damaged rims. If a tail-skid is fitted, check it is secure and not damaged.
Look over the right side of the rudder, fin and tailplane. On the K-13, examine the trim connection and for security and free movement. On the K-21 check the elevator push-rod connection is secure with its R-clip correctly located – more later.
Move along the right rear fuselage to the wing root, examining it as you did with the left side.

Right wing: Follow the upper surface of the right wing behind the mainspar out to the wing tip, and continue to check the remainder of the wing in the same way as you did the left wing.

Right front fuselage: Look under the wing root, and examine the undercarriage as before. Look alongside the cockpit and under the nose for damage.

All gliders are different in the way they are designed, constructed and assembled for flight. The number and location of inspection hatches vary widely, but if there is a hatch, open it and check that whatever is inside is properly connected and secure.

Positive Control Checks

It's always been a good idea to check the positive security of the flying control surfaces and the airbrakes, but now the BGA has made a PC check mandatory, so when you've finished your inspection, get someone to help by holding the control surfaces while you try to move the stick, rudder pedals and airbrake lever. It 's recommended that the ailerons and elevator should be held in a full deflection position during the PC check. There should be no free movement until they let go of the control surface. If there is, then there is an internal connection problem which needs to be investigated.

Now you have checked the complete structure you can sign the DI book if everything is OK. I usually write under the 'Work carried out' column, 'DI and PCC'. If you find anything you're not sure about, you must get it checked by an instructor who may refer the issue to an inspector. If it's not serious they can sign it off, if required. If it's serious, the DI should be completed as 'U/S' until the problem is fixed.

This procedure may seem long-winded, but in practice it only takes about fifteen minutes to cover everything written above, without

rushing. It's important to take your time and don't let anyone distract you. If someone starts talking to you, just hold up your hand, don't say anything, and continue with the inspection. They will quickly get the message.

On recent DIs on my duty instructor day, we have highlighted three significant issues;

1) Alex found that a K-21 hotelier connection on an aileron linkage was incorrectly fitted because the R-clip was through the wrong side of the linkage, not through the locking hole. This meant the linkage could have come detached in flight. He discovered this by untaping the fuselage inspection hatch behind the rear canopy and checking all the connections. Obviously, this had been incorrectly connected when the glider was last rigged. If you connect hoteliers, get the connections independently checked before flight. Also, **never assume** that because an inspection panel is taped up that all the connections are securely connected.

2) I found a man's wrist watch under the rear seat of a K-13. This was a loose article, something which could find have found its way into the control mechanism if the glider had been subjected to reduced or negative-g. Loose articles have caused loss of life in gliders, so be vigilant!

3) Steve found the R-clip for the K-21 elevator push-rod, not through its locating hole, but hanging on the end of the push-rod by the piece of string attached to it.
Gliders have flown with disconnected elevators, but it really is not recommended! **Always check the elevator connection for security**.

4) During a PC check on the DG-500 elevator, Matt Pateman noticed a slight clonk in the drive as I moved the stick fore and aft. Subsequent examination revealed a small plug from the overhead charging system had fallen into the tailplane mechanism and was fouling, maybe slightly, but it could have developed into a much more serious problem.

5) On the same DI as above, I found that the canopies could not be closed easily. The glider was made U/S until the problem was resolved.

In summary, **a DI is an extremely important procedure**, which should be carried out carefully and thoroughly. The inspection can be broken down into several broad but distinct areas;

1) DI book and ARC or C of A currency

2) Cockpit and fuselage internals
3) Left front fuselage externals
4) Left wing –
    a. upper area forward of mainspar
    b. upper area behind mainspar
    c. lower area behind mainspar
    d. lower area forward of mainspar
5) Left fuselage below root, and undercarriage
6) Left rear fuselage, left side of fin, and left tailplane
7) Right tailplane, right side of fin, and right fuselage
8) Right wing – similar method as for left wing (above, items 4a, b, c, d)
9) Right fuselage below root, and undercarriage
10) Right front fuselage externals.

Any issues must be highlighted and dealt with before the aircraft is flown. Always sign the DI book each day before flight. Any pilot flying a glider without carrying out a DI is taking a big risk in not spending fifteen minutes ensuring the glider is safe to fly. **Don't take that risk!**

Paul Gentil,
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