British Gliding Association

Notes and advice on inspecting wooden gliders.

I asked a member of the BGA Technical Committee, well experienced in inspecting wooden and vintage gliders, if he could offer some advice to those among us with little experience of inspecting wooden structures.

This is his advice…

"Ply and fabric covered aircraft structures do not lend themselves to easy detection of internal glue failure, or delamination as we increasingly call it these days. However, apart from a very thorough and detailed inspection of the structure, there are one or two techniques, which may be worthy of reiteration.

Rattles: Does your structure rattle? Are there any loose bits inside? Pretty obvious, but it is worth subjecting your components to gyrations which they do not normally experience during rigging and de-rigging.

Through all available inspection holes and apertures: use your torch, look for missing biscuits. Check the security of those biscuits to which you have access, but be careful, don't apply too much pressure, you are looking for signs of failure, not trying to induce failure. Remember that flight loads are trying to slide the biscuit off not pill it off.

Gently squeeze between your two hands on opposite sides of ply covered fuselages and "D" boxes at the location of frames and ribs. Listen for creaks and groans, feel for lock of rigidity.

Tapping on a ply covered structure can reveal delamination of the ply from its supporting structure. I use a light tack hammer, holding this lightly at the end of its shaft, I let it gently bounce – almost dance – across the ply surface. If the bond between the ply and structure is sound, there is a distinct change of note between the unsupported and supported areas. If there is a defect in the bond, the change in the note will be less evident or nonexistent. Try it, it is very easy.

Look for small wrinkles in the fabric; these may indicate a defective joint. Trailing edges often give an early indication of glue failure. Look for wrinkles here. Very carefully, see if there is movement between the trailing edge and ribs to which it is attached.

Another area worthy of special attention is the rear fuselage. Is the fin securely attached? Apply gentle pressure to the upper fin in all directions while holding the fuselage, needs two people.

Most wooden fuselages have a hole at the back through which passes the elevator drive. Rain also passes through this hole into the dark voids below. This is a favourite location for glue failure because everyone assumes that the

drain holes will do their job. Well they don't always; often they only drain some of the water. If your glider has been out in the rain, always ensure that these and any other similar voids. Are dry before you put it away.

A damp structure will eventually degrade the best of adhesives; a musty smell within a structure is a sure sign of degradation.

Forgive me for trying to teach most of you to suck eggs. However, for the last bit I make no apologies.

Good, dry, well ventilated storage of your aircraft should be a No 1 priority. Is your trailer/hangar waterproof? Do you check it regularly, not just the roof, but do the doors allow water under in certain wind conditions. Is there adequate ventilation?
Neglect these things, and you will not need to look for glue failure, it will stare you in the face!"

Sound advice, I am sure you will agree.

You will notice that gentle force has been indicated several times during the above passage. It is worth remembering that wooden and more modern aircraft structures are fragile. They are designed to take flight loads and not over stressing by burly engineers or over exuberant control checks by novice pilots during the Daily Inspection. As a consequence, fragile structures will not tolerate damage or deterioration well, so close and careful examination is needed.

The storage issue has been raised here, suitable storage is fundamental to maintaining airworthiness. There have been too numerous to mention, instances where poor storage have degraded the structural integrity of all types of aircraft. How many aircraft have been scrapped because the underlying root cause has been poor storage.

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22/07/04