4 - CHECK LISTS

As the pilot effectively in charge of checks, the instructor needs to teach the trainee the correct way to run through a checklist, the salient points of each item, why we do checks at all, and the clues which tell us if something is wrong and how serious it might be - and so on.

When the trainee does the checks the instructor's function is to monitor how well they are being conducted. For your own safety, not to mention your trainee's, the checks should be as methodical and thorough as if you were doing them yourself. Check lists are part of the mental preparation for flight; to help us focus our minds on what we are about to do, and to remind us of important actions. The trainee should understand the potential consequences of neglecting the checks. Only unbendable heroes in comic books leap straight into aeroplanes and take-off.

The main problem is that to a fatigued instructor well into a long instructing session, a check list can become boring and seem unnecessary (done it twenty two times today already - nothing wrong then, nothing wrong now!) Checks are an aid to awareness, not a clockwork substitute for it. Nevertheless, repeated often enough and with sufficient inattention, it is easy to say the checks and fail to do any of the related actions, which amounts to not doing the checks at all.

BRIEFING POINTS

Pre-Takeoff Checks CB SIFT CB E

Controls

Move each individual control slowly and smoothly to the limit of its travel, while watching the movement of the related control surfaces. The check is for full and free movement in the correct sense. If you cannot see all the control surfaces from the cockpit then either enlist the services of an outside observer, or check the correct functioning of the controls before you get in. Don't prompt any observer by saying *Elevator up?*, for example. Move the stick back and say, *Elevator?* The response should be *Up*, if it is, rather than *Yes*. *Elevator?* ensures that the observer has to look at the relevant surface and say which way it actually moved, and not just respond automatically with a *Yes* or *No*.

To ensure that there is no interference between the straps/pilots/controls, *Full and free* should only be done when both pilots are strapped in. Discourage trainees from whacking the controls against the stops. This doesn't do the controls or the stops any good, and is unnecessary.

Even after years of publicity and pleading, not to mention positive control checks being made a recommended practice for the first flight of the day and/or after rigging, accidents caused by mis-connected or unconnected controls still occur, and are usually fatal. If the glider has not been flown since rigging, or even if it has been rigged for some time and not flown, insist on a positive control check. Have an assistant hold each major control surface in turn while the pilot attempts to move it from the cockpit. Don't use excessive force on the stick as it is very easy to apply loads to the control surfaces that are way beyond anything they will experience in normal flight, or for which they have been designed. Ensure a positive control check is always carried out at the same time as the cable release check, before the glider's first flight of the day.

Ballast

This check is to make sure that the glider will be flown within the placarded weight limits. It should never be flown with the pilot(s) below the minimum placarded cockpit weight as the glider can become almost uncontrollable. If the weight of the pilot(s) is at or near the minimum cockpit weight, then add ballast until they are at least 30lb over it. There is no reason why experienced pilots should not fly near to the minimum, provided that they are aware of the handling changes that may result.

Ballast weights should always be secured with proper mountings. Lead seat cushions are fraught with dangerous possibilities unless they are very securely held to the seat by something other than the pilot.

Check if there are any ballast weights already installed, and if they are sufficient, or indeed necessary.

The check should also include water ballast; is the glider carrying any, how much, is it in the wings and/or the tail, and is the CG within limits? Is the glider within other loading limitations? An additional check would include 'is there an engine fitted?' - and for turbos, the slightly more crucial 'is there fuel in the tank' (and exactly how much)?

Straps

Show the trainee how to strap in. Start with the straps long, and fasten the lap straps first. Make sure they're close to the pelvis and as tight as possible; particularly important before a winch launch, to prevent the trainee sliding up the seat back. The rake of the seat and the position of the strap anchor points is not a problem in most two-seaters, but is in a few single seat gliders - the Junior being an example. Some gliders have a fifth, 'crotch' strap which can foul the stick if it isn't connected correctly. Do this one up next, and tighten it. Connect the shoulder straps last and adjust them until they are comfortable. With some types of strap connection you can't tighten any of the straps until they're all in place.

Whatever the system, once the straps are connected together, always tighten the lap straps first. Don't over-tighten the shoulder straps. The trainee's check should include him asking you if you are properly strapped in. If you're not, the checks should stop there until you are.

If packing is needed, make sure that any 'cushion(s)' underneath the pilot are made of impact absorbing foam, and that any behind him is either non-compressible, or very difficult to compress to any great degree. Soft cushions are potentially dangerous, for two reasons:

- (1) if the packing behind him compresses during the initial take-off acceleration of a winch launch, the pilot will instinctively try to stop himself from sliding backwards, or pull himself forward by hanging onto the stick and inevitably hauling it onto the back stop. The moment the glider becomes airborne it will pitch up rapidly and there is a very real danger of it stalling and flicking. Even if the stick is not fully back, the pilot may still slide far enough back to be unable to reach the rudder pedals. Such situations are usually irretrievable

- (2) in the event of a heavy landing, say, the interaction between a soft cushion, the glider, and the pilot, can result in the pilot sustaining crippling injuries.

Instruments

Where appropriate, set the instruments to zero. Check they are reading correctly and that the glass faces are not cracked or broken. Most of the flight instruments are pressure operated, so broken or cracked glass will mean leaks and inaccurate readings. Check the correct operation of any electrically powered instruments.

Additionally, are all the instruments secure in the panel, and is the panel itself secure.

At some stage in the training you will have to explain each instrument's function, and the basic principles behind its operation. Point out any shortcomings. For example, an ASI connected to a pot pitot can read backwards if the glider is flying sideways. A formal briefing or lecture is probably best for all this, but a short briefing prior to the flight - out of the aircraft and off the launch queue - can cover the most relevant points.

Encourage the trainee to always make a mental note of the panel position of critical instruments like the ASI. In the event of a launch failure you don't want to be checking your airspeed on the variometer!

Flaps

If they are fitted, two separate actions are associated with checking the flaps. The actions can be done separately or together - the procedure adopted varies from club to club. Flaps need to be checked for full and free operation, and set for take-off. '*Full and free*' can be done as part of **C**ontrols, and setting them for take-off, under **F**laps. Alternatively, both actions can be done under **F**laps.

Altering the flap setting during the ground run is a recommended and often necessary procedure in high performance gliders, but may be inappropriate in ab-initio training. If the instructor decides to take charge of the flap's operation - allowing the trainee to concentrate on the take-off - it's important that the trainee is well briefed on the likely effects.

Trim

To be able to see the operation of a tab type trimmer, keep the stick back during the check. The movement of the tab is in the opposite direction to the elevator. Moving the trim lever forward raises the trim tab; moving the trim lever back lowers the trim tab. The dual function of the anti-balance tabs on aircraft like AS-K13s will need explaining. Spring trimmers can only be tested by feel.

When setting the trim, take into account the circumstances. For a winch launch, the trim lever would normally be set for the approach speed - usually a little forward of neutral. For an aerotow it would be set for no load at the anticipated aerotow speed ie., further forward still. These initial settings are close approximations only, so re-trimming may be necessary later. However, discourage trainees in the early stages of training from trying to re-trim shortly after take-off as this can lead to Pilot Induced Oscillations.

Canopy

Canopy closed and locked can be confirmed in most gliders by a visual inspection. Even so, a physical check with upward pressure on the canopy frame is a must. Gently close the DV panels before take-off. When the front and rear seats have separate canopies, each pilot should verbally confirm that their canopy is closed and locked with the words *Canopy closed and locked*.

Brakes

The brakes should be checked on both sides, above and below the wing. Make sure they close together. Locking is critical. If the over-centre lock is particularly strong and the pilot isn't, he may be unable to lock the brakes shut (rare), or may assume that they are locked shut because the lever won't apparently go any further. The instructor should always check that the airbrakes are locked shut by pushing forward on the lever shortly after the trainee has done the same.

Eventualities

The 'E' isn't supposed to mean everlasting. Its main focus is as a memory jogger, so it can stand for '*Engage brain*'. In practice the check might be a very brief resume of points related to the launch, containing some reference on what to do in the event of a cable break, and a reminder of the speeds required to be able to cope with the eventuality - for example, what is the minimum speed required before we can start to manoeuvre, should we need to. Likewise, if we're landing straight ahead, what's a sensible approach speed. The check can also include noting where other gliders are in the circuit, whether there are any objects (tow-car, a group of people etc) likely to be unwitting targets if the glider swings off-line during the take-off run, or anything else immediately relevant. It is NOT the time for a re-brief, so keep it short and to the point.

Pre-aerobatic Check HASSLL

This check applies equally to the more obviously aerobatic manoeuvres such as spins and loops, as to stalls and demonstrations of reduced 'g'. Any manoeuvre likely to result in a rapid and significant change of height - deliberate or inadvertent -, should be preceded by a HASSLL check.

Height

Make allowance for the height used during the manoeuvre, and allow sufficient to return afterwards to the airfield. Many manoeuvres end with a climb to convert speed back into height, so the total height required can be considerably more than the difference between their start and end; a critical difference if the aircraft recovers from a spin, say, but the subsequent recovery to level flight bottoms out 50' underground. Set a minimum height for entry to any manoeuvre, and don't be tempted to make it any lower. Some account should be taken of the height of the terrain below as it may be higher or lower than the point of launch.

Any pre-flight briefing should contain a discussion of the reasons for choosing these heights, and what they will be (specific numbers).

Airframe

Check that the glider is certified for the intended manoeuvres. Maximum airframe G loading should be

noted, and the accelerometer reset. Get the trainee to tell you the values of the maximum manoeuvring (V_A) and never exceed (V_{NE}) speeds. Ensure he understands their implications. If flaps are fitted, check the settings. The limiting speeds will probably differ for each setting, and there are very likely to be specific speed and G limitations for some of the higher positive settings.

Straps

Make sure that all the straps are fitted into the buckle, and still tight. Before the flight, check that the strap attachments to the airframe are also secure, and that the straps are in good condition.

Security

Check the cockpit to ensure that no loose articles can fly around and damage either the glider or the pilots. Lumps of mud and small stones can be a real hazard if thrown against the canopy. This check is best done before take-off so that likely 'missiles' can be removed, but make a second check in the air.

Location

Make a visual check outside the glider to ensure that you are not over towns or active airfields, nor in controlled airspace. After release from a limited height winch launch it may be necessary to undertake some manoeuvres almost immediately, directly over the airfield. In such cases, brief those pilots waiting behind you in the launch queue that this will be the case.

Lookout

Execute two well banked 180° clearing turns, one in each direction, to check that the airspace you'll be using is clear of other traffic, and will remain so long enough for the manoeuvre(s) to be completed. This 'S' turn will also signal to other gliders that you are NOT thermalling and that they should steer clear because you are about to do something unusual! Remember to look beyond the immediate area in anticipation of potential traffic flying into your 'manoeuvring zone'. Look above and below. Repeat the lookout check if you are in any doubt as to whether the area is clear or not, and for safety, repeat it at intervals during any extended series of manoeuvres.

Cable Checks

Check that;

- each cable release hook for tension, back-release and free-drop (not all clubs do the last item) the first time the glider is used each day
- the correct weak link is being used for the type of glider you are flying
- the cable is attached to the appropriate hook
- the positive control checks are done, if this is the first flight of the day, or the aircraft has only just been rigged.

Pre-circuit Checks

WULF is the recommended pre-circuit (rather than 'downwind') check.

- **W**ater - dumped
- **U**ndercarriage - down and locked
- **L**oose articles - this includes the pilot ie., tighten the straps
- **F**laps - if fitted, set appropriately. They may need adjusting later in the circuit. Avoid adjusting the settings while turning onto the final approach.

The pilot is better off flying the glider correctly, in the right place, and looking out during the circuit. The use of a **pre-circuit check**, as opposed to a down-wind check, is mentioned also in chapter 14.

ADVICE TO INSTRUCTORS

Pay attention to the trainee's conduct of the checks, and to the glider. If distracted for any reason, ask the trainee to begin the check again, or do the check yourself to switch yourself on.

If a launch is going to be delayed for a short while, the check can be held at 'Canopy' - with the canopy left open and the brakes out. If the delay is inordinately long, however, restart the check from the beginning.

At some clubs the person attaching the cable says *Airbrakes closed and locked?*, and requires a positive response from the pilot before putting the ring anywhere near the hook. Such a double check does not remove from the pilot the responsibility for the safe conduct of the flight.

Allow sufficient time for the trainee to run through the check list. The first few times this may be a long drawn out affair, and you need to allow for that. Pressure from other gliders waiting to launch behind you must be avoided. If necessary pull your glider off the launch grid for a while.

In most cases it is possible to do some of the HASSLL check while still on the ground, or during an aerotow, leaving only Height, Location and Lookout to be done after the launch.

COMMON DIFFICULTIES

In the early stages trainees have difficulty remembering the check list letters, never mind their meaning. Encourage them to learn the lists by heart *before their next flight*.

Largely due to the added work load of flying the glider, trainees can waste considerable time and height trying to recall a check list in the air.

Working through check lists becomes habitual and potentially boring for trainee and instructor alike. It is all too easy for trainees to forget why the check is being done; they may remember the list but not necessarily what it means. It is also all to easy for the instructor's concentration to wander, wearily, as the familiar litany is recited for the umpteenth time.

As solo pilots' become more experienced they speed up the checks, sometimes so much that little remains except a quick stir of the stick round the cockpit. Though more of a common problem than a common difficulty, it is one with potentially dangerous consequences. Make sure the checks are done correctly.

