What the Ops Team is Talking About
Memo to Club CFI's and other interested parties - July 2018 - *please forward to your instructors.*

Here is a summary of the key items discussed at the Ops Team on-line meeting on 10 July 2018. David Moody (North), David Hirst (Central), Graham Erikson (South) and Martyn Cook (NOO).

1. Audits: Considerable discussion around the format of the Audit Report form, and clarification about what each item meant, and what counted as satisfactory. It was noted that the form would be improved if additional information was available to help ROO's and Clubs prepare for the audit to obtain maximum benefit. Clubs are being scheduled in for audits, with priority given to those who haven't had an audit in a long time.
Club records are important, especially if there is an accident. CAA will expect Clubs to be able to produce a copy of the pilot's medical, and the latest BFR or training status.

2. Recent Additions to Moodle: The draft training program is at gliding.moodle.co.nz.
Gavin Wills has agreed to develop a Study Guide on the subject of "task setting" for the new Training Program. This would be for personal tasks only (not contest tasks), and could include training in the use of software like SkySight and RASP. This is likely to be included in the Task Pilot section, but prerequisite material could be introduced in the QGP theory subjects in meteorology, glider performance, etc.
The concept of Airmanship is being reviewed. The model developed by Tony Kern (Redefining Airmanship) could be adapted to use gliding examples (as opposed to Air Force and Air Transport), as this seems to be a very sound piece of work. Most other writing on airmanship seems rather vague and waffly, so not easily taught. Likely to be kept as one of the QGP theory subjects.
A training exercise called "The Hurried Turn" has been drafted to illustrate the hazard of trying to lift a low wing with aileron when the glider is in a steep turn. See notes from the June memo under "stalling in turns". We received and discussed a response from James Graham, CFI Tauranga, which is reproduced below in full:

Thank you for your document and I would like to comment on the topic "6. Stalling in Turns". Over the past number of years I have made a point of checking pilot reactions to a wing drop and have been stunned to find that a large number of pilots, senior instructors included, that react to a wing drop by instinctively trying to lift the falling wing.
In fact one QGP pilot, in our Puchacz, moved the stick to starboard as a reaction to the falling port wing so rapidly that we were immediately in a very steep (almost felt inverted) spin. The pilot became disorientated and I had to take over, centralise the controls with stick full back and make a standard recovery. I have my doubts that this pilot would have recovered had he been on his own at a low level.
Since then on all check and BFR flights I have (and advised the instructors) to put the pilot into a slow shallow turn at height to gradually induce a wing drop to check that their instinctive reaction is immediate stick forward no matter the angle of bank i.e. not to correct the angle of bank first, ever. For the same reason we jump on pilots carrying out shallow turns at low level and expect well banked turns. The affect and recovery time of shallow turns vis well banked turns are demonstrated at height.
My concern is that GNZ tend to focus on spin recovery however good spin recovery at low level is of little help, it is the recognition and recovery at the incipient stage that matters most.

3. Instructor Training: The above response illustrates that all instructors need to be very clear about the fundamentals of flight, and how to check that pilots fully understand what is and is not possible. All instructors are therefore invited to submit to their ROO's (via the Club CFI) the subjects they would like to learn more about or receive further training in. This will then feed into preparation for Instructor Training workshops which will be held regionally.

4. Incident Review: No incidents reported in the last month! Might be the weather?

5. Guidance on BFR's and ICR's: It's possible that the "airmanship" model could be developed as a broader assessment of a pilot's currency and competence.

6. Aerobatic Instructor Ratings: With the lifting of the CAA restriction a number of aerobatic instructors have regained their ratings, and more aerobatic pilots and instructors are expected to be trained. It was suggested that some Clubs which have the right combination of keen instructors, suitable aircraft, aerotow launching and ridge or wave lift could make aerobatic training a feature of the Club and receive pilots from other Clubs. Pilots are encouraged to move around and fly or receive training at different Clubs.

The Hurried Turn

Try to turn a moving car too sharply, with the speed too HIGH, you will skid OUT from the turn. Try to turn a glider too sharply, at too LOW a speed, and you will stall and spin INTO the turn.

If attempted close to terrain, and not corrected, you will arrive vertically downward and be killed. Oddly, the point-of-no-return is not when you enter the turn, but when you try to come out of it.

Ground-based experience does not translate easily into how an aircraft needs to be flown. It's rather more complex than that.

Training Exercise: "Fly at calm-air circuit speed, and attempt to turn the glider through 180° as rapidly as possible, and at the same time make your turn with absolutely minimal loss of height."

This is the sort of turn you might hastily make to line up with a selected paddock at the last minute, or when suddenly finding yourself much closer to a hill or mountain-side than you intended.

How it Happens: The entry is usually fine. Roll into the turn, then pull back confidently on the stick to bring the glider around. Hmmm - nose has come up a little high, but not a problem. A touch of inside-rudder, which brings the nose down and tightens up the turn even more. Clever!

With the nose going down, more back stick seems to be needed. The secondary effect of inside-rudder is to roll the glider more tightly into the turn - a touch of out-aileron will steady the bank.

You may (or may not) notice that the aileron and rudder controls are now "crossed" and being used independently, and the yaw string shows a slight "skid". But the glider should not be stalled - you know this because there is plenty of speed on the ASI and the nose is not above the horizon.

Now the interesting part: try to reduce the bank. Most pilots will attempt to lift the low wing with aileron - while keen to keep the turn going. With lots of back stick the glider is slowing down and feeling mushy. The tight turn means the inside wing is flying more slowly than the outside one. And at 60° of bank you are pulling 2-g so the stall speed has gone up by 41%.

Now add aileron to roll out of the turn. The down-going aileron on the low wing raises the angle-of-attack of that wing tip towards the stalling point. Instead of the lower wing gently rising upwards the lower wing tip gets dragged down and back as lift is destroyed and drag increases.

At this stage the glider is still mostly flying. Only the inside wingtip (with the down-going aileron) is stalled. The outcome depends completely on what happens in the next couple of seconds.

If the pilot instinctively applies a bit more aileron to lift the wing, and a bit more back stick to lift the dropping nose, then this will put the wingtip into a deeper stall, and the glider will very quickly enter a spin. If lower than 200 feet from the ground a vertical arrival is no longer preventable.

If the pilot recognises the *incipient* spin he/she will immediately *reduce the angle of attack*, even if this opens up the turn. Then use the aileron and rudder in a coordinated way to eliminate the skid and level the wing.

The accident statistics show clearly that opening up the turn and crashing into the ground (even rough or sloping ground) in a roughly horizontal attitude is often survivable, sometimes without injury, although the aircraft will be damaged. But trying to keep the turn going is invariably fatal.

Further Commentary

For the last 100 years pilots have been regularly killed this way, and it continues to happen today. The uncommanded roll-over when one tip stalls can be very vicious, to the point of rolling the glider completely upside down, and the glider may actually crash upside down.
This exercise can be hard to practice because modern gliders have control surface travel limited to help prevent this occurring, and most wings have a degree of washout. Sometimes a gust, wind gradient or wind shear (as often occurs near the surface) is needed to provide the tipping point.

Training Implications - Effects of Controls

The first place to start is with *Effects of Controls*. The so-called *elevator* may well appear to elevate the nose in level flight, but it would be more correct (albeit more difficult) to teach pilots that the elevator controls the Angle of Attack (of the wing to the relative wind). As a secondary effect it regulates the speed of the glider, so is more akin to the accelerator-and-brake in a car. If the glider is mushing along and sinking steadily then your foot is on the brake.

The second confusing control is the *rudder*. Most people know that the rudder in a boat is the primary control for turning left and right. The steering wheel in a car works on the same principle. But in a glider the rudder is not the primary steering control - its main use is to counter-balance adverse yaw from the ailerons. Birds don't have rudders - they are not needed for controlled flight. To further confuse the new pilot, the rudder *is* used to steer an aircraft on the ground, and when applied in straight and level flight it does turn the glider slightly, albeit clumsily.

I won't mention the *air-brake*, which is primarily used as a device to regulate rate of descent on landing, so maybe this should be called the *down-elevator*. But let's not go there right now.

Training Implications - Teaching the Stall

Most stall training involves slowing the glider with wings level, and then raising the nose. A gentle shudder and a slight feeling of weightlessness. Consider *primacy* (first learned = first remembered) and then ask yourself whether this is the best way to teach the stall. It may be useful as an exercise in *Angle of Attack Control* but no pilot spins into the ground from a 1-g wings-level stall.

Next up we have a helpful list of "symptoms of a stall" which can include high nose attitude, controls feel soft, wind noise is reduced, low-g sensation, high rate of descent. In the above example of a *hurried turn* none of these so-called associated symptoms are present, which must make it harder for the pilot to recognise the stall-in-a-hurried-turn.

A stall should be taught and demonstrated *only* as excessive Angle of Attack. The concept is easily demonstrated using a ruler and a bucket of water. The stall is always caused by stick-well-back, so speed will be reducing. Increasing g-load is another warning bell. Nose attitude is irrelevant.

Training Implications - Difference Between Slip and Skid

A new pilot might view slip and skid as two versions of the same thing - slip could be like veering to the left while driving a car, and skid would be to the right. Not much difference apart from direction, and either one easily corrected. But in aviation, *slip* is generally safe but *skid* kills.

Recommended Further Reading:
Stick and Rudder - An Explanation of the Art of Flying, Wolfgang Langewiesche, McGraw-Hill, 1944. Available as paperback or Kindle. Chapter 18: The Dangers of the Air.