

## TAKE-OFFS and LANDINGS

Your model will not respond to the Aileron controls whilst its little wheels are fixed on the runway, so all ground steering is done by the RUDDER. This is one good reason for having an effective ground steering system, either a castoring tailwheel, or a steerable nosewheel. The amount of travel on these wheels need only be a few degrees, the rudder helps as the speed increases.

**For Take-Off**, Check full and free movement of all controls, the model should be pointed away from the pilots' box. Ensure the model is placed exactly into wind, check with your personal windsock on your aerial. Any mis-alignment will cause the wind to deflect the upwind wing away from the wind, and be very difficult to control.

Before your take-off, ask the other pilots '**OK FOR TAKE-OFF?**' Dead-stick and then normal landings have priority on the runway.

Let the model gain flying speed in a flat climb before pulling up for more height, and then step back into the pilots' box once you have gained circuit height, and throttled back to level flight.

**For Landing**, you need to call "**LANDING!**" to the other pilots, and step out to the runway edge. Trim your throttle trim for the landing setting, and you may need to add Up trim to bring the speed down. You can fly it down to about 100 yards before the runway, but give yourself enough time to reduce the speed and height. Once sure of making the runway, reduce the throttle to a minimum and glide onto the runway. Always pull Up Elevator to slow the plane, and give it a little extra just as the main-wheels touch. A good landing keeps the nosewheel off the deck, whilst the main-wheels touch down and taxi.

## STRUCTURED LEARNING

In your early days of flying you will not be expected to do anything more than the really easy bits. Your instructor will do the Take-Offs and landings and take over from you if and when you make a mistake. Also wind conditions will have to be suitable. Initially this means less than 5 knots straight down the main runway. Later flying in winds of up to 10 knots will be possible, with maybe some cross-wind component. Even for your Test you will not be expected to take-off and land if there is any appreciable crosswind.

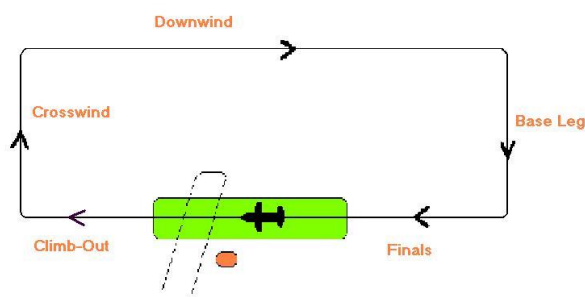
So in the early days you can expect to be restricted by the weather. Conditions at Nant-y-Garth are often better or worse than at Wrexham, it is a bit of a lottery really. This is because Wrexham is on the East side of the Llandegla / Minera Mountain, and Nant-y-Garth is on the West. So the two weather systems can be diametrically opposite ! Check the Site Weather Station on-line.

## HOLDING YOUR HEIGHT

One of the most important thing that your examiner will check is that you can maintain your height in level flight. For the corner turns it is just a law of aerodynamics that your plane will require some UP elevator to correct for the loss of lift from the wing. In a full size plane you may also require some rudder for 'co-ordination', to stop the passengers feeling the effects of Skidding or Slipping. You have no passengers to worry about, so forget the Rudder! Just use the Ailerons and Elevator.

## CIRCUITS

The circuit that you fly, for model or full-size aircraft, is a rectangular circuit into wind on the part over the runway. The Climb-out and Crosswind legs are climbing so that you reach 'circuit height' for the downwind leg. This is at about 200ft agl for models, (1000ft agl for full size.) You need to be straight and level for all the Downwind Leg.



If you are not landing, then continue at circuit height to over-fly the runway. The Finals and Climb-Out then become what is known as the 'Upwind Leg.'

**At No time are you to fly behind the Pilots Box or runway edge.**

If you are making a landing, then the descent needs to start at the start of the Base leg, to loose half your height before Finals.

## **CLIMB AND DESCENT**

It is well worth practising climbs and descents, when travelling in a straight line. The controls that are used are the throttle and the elevator trim. Once you have the plane trimmed for level flight, at say 50 knots. Closing the throttle will cause you to descend at 50 knots, and opening the throttle gives you the climb at 50 knots.

*You note that the speed stays the same, at the trimmed air-speed.*

If you had trimmed for 40knots then that would give you a slower speed for landing. Or trim for 80knots if you want to go places!

Some fliers never understand that opening the throttle will cause the airplane to climb, and think of it as some defect. It is just basic physics that once trimmed for a certain angle of attack; any excess of power goes into climbing the aircraft, not speeding it up. Several methods have been suggested to reduce this climb effect; One is to angle the motor thrust line downward. The other method is to use the transmitter mixer control to mix a bit of Down onto the throttle channel.... This is doomed to fail, as throttle does not directly control speed. As soon as the throttle is advanced the model dives before the speed increases... Not what is required for a throttle-controlled landing. Think about it !!

## **STALLS**

Once you have learned the basics, you could ask your instructor to take you through the stall procedure. Any aeroplane will stall if the speed is reduced below the point where the wings fail to provide sufficient lift. As the speed decreases, you will need more and more Up Elevator to maintain level flight, When the wing reaches about 16 degrees angle of attack, the lift breaks down quickly, and the plane will start to descend.

If you want to avoid stalls (during landing) avoid moving the elevator all the way to the bottom stop.

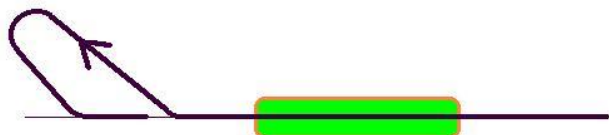
## **URNS**

The test requires you to do several different turns. Square turns at each corner of the rectangular circuit. Long turns during the figure of eight manoeuvre; and some turns of your choice at the change from RH to LH circuit, and during the dead-stick test.

The more you bank the wing, the less lift you get, so the more UP elevator you need to apply. 15 degrees of bank will hardly need any UP elevator, where as 80 degrees of bank angle will need ALL the UP and maybe MORE!

To change from LH to RH circuit, you need to reverse the direction of travel, and come back along the same path Several aerobatic manoeuvres will do this...Climb to a Stall Turn, Roll Inverted for a Split S. Immelman Turn, Half Cuban Eight.. etc

However a more leisurely 'Procedural Turn' is easier to get right. Here you fly level at 45 degrees from the runway for about 200yards, then a half circle on the opposite bank, to bring you back to intercept the extended runway, finally turning onto the runway heading



The Dead-stick turn can be the classic Break-Evasion escape move, where you roll 90 degrees or more then pull maximum Up. This gives you a boost of speed and turns you to the runway threshold in next to no time! Other more sedate flat turns, either

outwards or inwards, need to have the height well-judged to get the glide length right, and avoid a stall caused by low air speed.

### **IN THE HANGER**

This is where you need to prepare for your next day's flying, don't wait until you are on the field before you bolt the wheels back on... You are sure to miss something, and have a wasted trip.

Charge and check all of your flight batteries, and get your flight box filled with all the right bits. However remember that some on field repairs may be necessary, so pack the undercarriage wire straightener, and the fabric repair tape.

If you have a non-located wing, that is held on by elastic bands. To avoid having to trim the ailerons each time, put a joining mark on both fuselage and wing.

It is a good plan to adjust the mechanical servo / clevises, to reduce the electrical trims to zero for each control.

On all the places where grub screws are tightened in collets, grind small flats on the rod / axle so the grub screws have a better grip.

The throttle link needs to be a plastic adjustable clevis at the carburettor arm end, and a simple Z bend at the servo end. This is to avoid a metal to metal contact, which will cause radio interference.

If you have the C of G position marked on the fuselage, you can test its position easily before flying

### **IN THE PITS**

The first thing to do when you set out your model is to put out your personalised peg on the frequency board. If someone else is on your channel, then discuss the days flying with him, and arrange a rota between yourselves. Put the un-used peg on the throttle lever of the un-used transmitter.

Choose your pit spot and insert your model restraint.

After starting the engine, stand behind the propeller, and move anyone else who is standing in front of your plane before you rev the engine.

The engine needs to be run at 100% throttle as soon as possible to get the engine up to heat, and so give it the correct operating clearances. Any throttle high-end adjustment should be done beyond the max point until it leans out, then return past the max point to a point equidistant into the rich side. Slow running adjustments are more complicated, and need to be independently done ¼ turn at a time.

Taxying out; With large models this is necessary, but they must still be held. The aerial should not be erected until you have reached the runway edge, and you then check with other pilots if it is safe for you to take-off. Also check the wind direction with your aerial flag.

After the flight, if the trims are a long way out, use the mechanical clevises to get the controls centralised.

### **STRAIGHT AND LEVEL**

Sometimes this is the hardest part to get right, especially when you have adverse wind conditions.

For the A Test, you will need to show the examiner a perfectly trimmed plane.

**Elevator trim....** The throttle and elevator work together to control the rate of climb or descent. So choose a brisk 40% throttle opening, and trim the elevator for level cruise flight. Any higher than 40% will need more DOWN trim, or any less than 40% will require more UP trim to remain level.

**Aileron Trim...** Put the model exactly into wind and release the sticks, note which wing drops if the plane slowly rolls. Then add aileron trim against that direction.

**Rudder Trim...** Unfortunately this can give almost the same result as Aileron trim, especially with high dihedral wings. The only difference is that the plane will not be aligned with the direction of flight when straight into wind or downwind.

**Throttle trim...** This is best checked in the pits, the max setting needs to uncover all the carb venturi hole, and the minimum needs to almost let the engine idle to a stop.

Having set all these controls, you should be able to fly straight and level for ten seconds with HANDS OFF.