

Straighten up and fly right.

When a student pilot can perform a left and right turn at both ends of the field with no appreciable height loss and exit the turn on a certain heading, that person is ready to start landing. Although this is the hardest and most critical phase of flight, if the aeroplane is lined up with the runway on the correct glide slope it is not difficult to achieve a good touchdown.

Continuing the theme from last issue the aeroplane mentioned is a typical high wing, four channel trainer powered by a plain bearing forty engine that flies at 120 kph flat out, 80 kph at half throttle and approach speed of 60 kph at on quarter throttle. If your plane has a twin ball raced .46 engine add about 20 kph to the cruise and top speeds.

The elevator is trimmed so the aeroplane flies level at half throttle. The main reason for this is keeping the speed down usually results in longer flights before concentration overload sets in so for the student pilot, the workload increases dramatically with the speed. Another major benefit is the pitch trim will respond in an automatic fashion with changes to the throttle setting and reduces the workload but more on that later.

LANDING APPROACH.

The standard rectangular approach consists of four right angle turns, the last usually at lower altitude as it lines up on the runway. The upwind, crosswind, downwind legs are followed by the base leg and final approach.



On a go round the first thing to do is stop the descent with a dab of up elevator. Then release it and hit the throttle. To stay over the centreline the left wing has been lowered with a bump of left aileron followed by another bump to the right, a second later.



A slight correction to stay lined up, the right wing is level with the horizon. The model is ready to land so kill the power and hold the nose level.

Imagine a wire from the centre of the strip that heads downwind, rising at a three degree angle. We call this the glide slope and when it is twenty metres above the ground, it will be one hundred and sixty six metres away. This is where the aeroplane needs to be as it turns on to final and as any instructor will tell you "Landing is easy if you shoot a good approach." An expert can pick up the glide slope from any part of the sky but you should start with the standard rectangle.

Each right angle turn gives you time to assess if the plane is where it should be, giving you more time to correct if needed. Once you have learned and can perform the basics, then you can cut corners and see what happens. At this stage keep trying to do forty five degree banked turns and when you are able to consistently line up on the strip (three out of five) you can keep going or move to the next stage.

Later you will discover when the power is reduced, a gentle turn with twenty degrees of bank to final will work better.

DESCENDING DURING THE APPROACH.

To get the model down all you have to do is reduce the power. Pull back to ¼ throttle and as the model slows down it will start

descending. It descends because reducing airspeed reduces the lift, the weight is the same and so down it will come. You could leave the power at half and just push down elevator and keep holding it in and the plane will certainly come down, but it will be too fast for landing.

Instead of sixty kph the speed will be up around one hundred and although a jet can land at 100kph it is very hard to land a trainer softly at that speed and stop in time before the long grass at the end of the strip. The result is a landing number four, you can refer to these definitions in the previous edition. Pull the power back and the aeroplane will look after itself and just come on down, leaving you free to concentrate on another important part of the landing process, aiming for the runway.

(instructor) The model is too far off to the side of the runway.

(student) It looks to close.

When the model is descending and is about 50 metres away from touchdown, every person that I have taught always lets the aeroplane drift further away. If the model is approaching from the right, I am always telling the student to give it left. Coming in the other way I am asking for right. If it appears the plane is going to be too close that is your clue that everything is okay, so press on and see for yourself. Naturally you are too close if you have to duck, so if you survive that one remember to back off a bit next time. If an aileron correction is needed to turn the model you should only bank the model so the lower wing panel is level with the horizon. Imagine you have rolled out of the turn, reduced the power and lined up only to discover the model is in fact heading off line. The aeroplane is approaching from the left and it has to be turned to the right, a few degrees. You bank to forty five degrees (because that's what you have been practising) and the plane immediately starts turning, then the nose drops.

Oh Oh so some emergency up elevator is applied and suddenly the model has

turned ninety degrees off line. This is the biggest mistake most people make, over controlling the aileron and banking steeply, when all that is needed is a little dab here and there. Once it tips any over more than the lower wing level with the horizon, the turn rate is too fast and you keep chasing the heading. This is a rough guide so don't nail me on the maths but if the model is fifty metres away and ten degrees off line a gentle bank as described will have it back in the right place in probably twenty metres or less.

In calm conditions reduce the power after turning base or if there is wind do it after turning final.

GOING ROUND.

When the model is two to three metres high approximately over the threshold it is time to go round. The first thing to do is stop the descent so pull in a touch of up to get the nose level. Then hit full throttle, let the up elevator off and the plane will accelerate away. When the airspeed increases past 80 kph the aeroplane will start to climb. Don't try to climb by pulling the nose up first. If the plane is not actually heading towards the deck there is no danger so let the up off and let the engine do the work.

Oh-oh, anyone need a free haircut? Don't pull in more up as it drops or you will fly straight through the pits. A sharp jab of left aileron will fix it in time, if not just let off the up and dump it in.



Remember it takes a of skill to accurately fly an aeroplane at slow airspeed with the nose up and mistakes are amplified rapidly. If you do it the other way and just open the throttle the result will be landing number 4 (the crash landing). By the time the model has accelerated to eighty kph and starts to level out the plane will already be on the ground because the that's where the nose was pointing.

Concentrate on keeping the wings level and remember to use low angles of bank near the ground. The secret to getting a straight climb out is small bumps of aileron, a little for each correction and never lower the wing more than the horizon. Once you can get three out of five

approaches over the runway with the model three metres high as it passes by, you can advance to the next stage.

LANDING.

At the point where you have been going round if you do nothing else and leave the throttle set at one quarter, the aeroplane is going to land. Unless you get a lucky gust of wind at the right time the landing will certainly not be types one or two. Type three, the hard landing will be the most likely or if a little unlucky you will get a type four result.

Type five (a crash) is most unlikely so now it is time to talk about the technique required to upgrade from three to one. I listed number one as a landing and number

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Once the power is cut you must hold some up elevator to maintain the glide slope. Most learners forget and let it off when correcting aileron so the model drops rapidly.

two as the perfect landing because it is more important to quickly learn how to perform good quality landings than perfect ones. Advance to shooting touch and goes you will discover as I have in my thirty years of model flying, that maybe one in twenty are perfect touchdowns. If you don't have previous edition you can email me for my landing definitions at info@rcmn.com.au.

Okay back at the go around point



Don't hold the aileron on, just bump it to lower the wing level with the horizon.

instead of opening the throttle, cut it. This does not commit to landing because you can go round at any time by stopping the descent with a quick dab of up, letting it off and applying power. Remember the glide slope? When the power is cut the aeroplane begins to slow down and what happens when you reduce the speed and not retrim the elevator?

The nose begins to lower automatically and the aeroplane will drop under the glide slope. If you do nothing else the plane will hit the ground short of the landing point at



When the model slows down so does the aileron response. The secret is a lot of control but not for long so give it a bigger bump to lower or raise the wing.

steep angle. A change of prop will be the most likely result from a type four landing (crash landing) or maybe a damaged firewall.

How do you upgrade from type four to one and continue along the glide slope? The big secret to learning landing is to keep slowly pulling the elevator up once the power is cut. Pull in some up elevator after cutting the power and hold it in, do not let it off. The model flies along, still

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descending and now it starts to slow down even more. Do nothing else and you will get a heavy landing (type three) Each time you pull in more up elevator to increase the lift and continue along the glide slope, the drag increases also. When there is no thrust the aeroplane slows down rapidly so the slower it goes the more up elevator is needed to keep the nose raised and generate lift to maintain the glide slope.

The higher the nose is up the more drag and higher deceleration. The minute the elevator is released the plane will flop onto the ground and there you are, back to a three or four rating. Pull in too much and the model will balloon up slightly and it is possible to find yourself wishing you knew more about the next subject.

STALLING.

When the airframe breaks because it was unable to withstand the load placed upon it, sometimes that is the end result after a stall at low altitude. Stalling is very safe up high, a non event and it really only becomes hazardous when performed at low altitude say during take off and landing.

When it is demonstrated how slow an aeroplane can actually fly by holding the nose up and dragging it along with some throttle (roughly 1/4), most people are surprised. Almost a taboo subject that seems to scare beginners unnecessarily, stalls are used in snap rolls and spins and can even help in an emergency situation.

For example if you happen to forget to plug the ailerons in on a low wing model that has neutral stability and with out a preflight check, you proceed to take off.

It becomes an emergency situation as it is very hard to turn the aeroplane and get the wing level again so a series of part snap rolls did help me get down again in one piece.

The stall is controlled by elevator, never exceed the stall angle and you won't ever stall. Most modern training aeroplanes available in today's market have very gentle stall characteristics but when given enough elevator movement, even a docile model can be made to develop a vicious stall. For beginners I usually set the elevator travel in the air so when holding full up with the power off, there is just enough to keep the nose high and the model will drop the nose a tad then it pops back up and it keeps on repeating this process. It is possible to set up most modern day trainers so that it is nearly impossible to stall when the power is off, say when on short final. This can easily be done by reducing the amount of up elevator movement so once the speed has reduced, so even with full up elevator the model will not reach the stalling angle. This is okay to

reduce the possibility for training purposes the reality is you should have enough elevator to be able to stall, then learn not to.

The only major problem with this set up is that full up elevator is usually required to flare, so if the timing is late the model with touch nose wheel first and most likely bounce. With a computer radio some reverse expo can be set to trick the pilot about the elevator response so they get a lot more around neutral and progressively less at the extreme. I have used this a number of times when the student has reached a mental block about over flaring and dialled it out later. Whichever way you go will most likely depend on the preferences of the person teaching you. Another thing that can help is mixing 3% up elevator trim at low throttle and active it through the airbrake function. Depending on your radio it can be switched on by the instructor on final or be automatic with throttle. When the throttle is opened, the elevator trim returns to normal. If the radio does not have these features another way is for the instructor to apply up elevator trim for the approach and shoot a few till you get the idea.

Back to the approach and if too much up elevator is applied when rounding out the aeroplane will climb above the glide slope. A ham fisted application will require fairly quick action so let the up off; briefly. As soon as the aeroplane stops ascending pull the stick back again to where it was and the model will follow the glide slope although a bit above it. If you pull in just a bit to much do nothing and the model will balloon up slightly then return to the original attitude and then start coming down again. The most important point is not too let the elevator off once the power is cut because the wing is relying on the angle off attack to generate the lift required.

The second you do the model will just drop and although it may look like a stall what has happened is you just reduced a substantial amount of lift. The aeroplane still weighs the same so it simply went down. Most people have this problem until they remember to not let off the up when making an aileron correction. Model planes do not have stall warning instruments to warn the pilot (not yet) but if the aileron response is getting sluggish and you are holding a lot of up elevator, chances are it is near a stall.

THE FLARE.

This is when the nose is raised to stop the descent with the model close to the ground say 15-30 cm high. Keeping the nose up without power the speed drops off quickly.



Advanced high performance aeroplanes are actually easier to land than a trainer and this is certainly true. Mistakes just cost a lot more.

The speed really drops so rapidly the elevator has to be continually pulled back to stop the nose dropping so keep doing it and in a flash the model will land on the main wheels, real slow. This is when the aileron response drops off so a lot of control for a short space of time, so just bump the stick on and off.

Remember your trainer is designed with beginners in mind, stability and a gentle stall being the main criterion. As per the previous article when you move the control always assume you have moved it the correct way. The more flying you do increases the likelihood you have done the right thing. If the model does not appear to respond instantly, that is a clue the correct control was applied so resist the temptation to move the stick the other way. Just wait a moment and see what happens. You should know by now that wrong way tells you straight away.

Now that you have taken all of this in here is a tip. Always start with a gentle turn to final, say twenty degrees and when the nose is pointing straight at you start rolling out, slow in fast out. On the way in make the aileron corrections gentle and only lower the wing so one side is level with the horizon. When flying around at half power the aileron is held on for a few seconds to get the model to 45 degrees. On final we don't want 45 degrees, five is enough so bump the ailerons stick, don't hold it on. Do this and the whole process becomes much easier. If you find yourself making lots of aileron corrections, usually the result of overbanking so go around and start again and hey, you have just practised a go round. Concentration levels are just like your first few flights so don't fly for too long, as soon as lots of mistakes are being made, take a rest.

Next issue is the take off with circuits and bumps plus dead stick landings.

Stephen Green. ●