

MANOEUVRES EXAMPLE

8/11/2009



MAAA FLIGHT PROFICIENCY SCHEME

FLIGHT REQUIREMENTS & TEST CHECK SHEET

FIXED WING POWERED - BRONZE WINGS

This Test is to be assessed by an MAAA Fixed Wing (Power) Instructor.

The requirements specified have been determined by the MAAA and are not to be varied.

Bronze Wings (Power) are awarded when a member demonstrates, in the course of one session, that he/she has the skills to perform the manoeuvres listed in the tasks below, in a competent manner and to the required standard.

1. DEXTERITY

The pilot must be able to locate all the transmitter controls quickly without fumbling.

2. THEORY

The pilot must be able to name all major components of the aircraft and define functions, including effect of controls, and have a thorough knowledge of safety rules and regulations.

3. AIRFRAME & PRE-FLIGHT CHECK

The pilot checks the engine mounting, plumbing, centre of gravity location, security of under-carriage and signs of structural or covering problems that could affect flight eg. presence of warps which could affect trim. The pilot also checks that controls are neutral and control throws correct, and checks throttle setting, state of battery and performs a range check.

4. TAKE OFF

The pilot demonstrates gradual application of power while keeping the aircraft straight, and using a little elevator to lift off, makes a gentle climb out with wings level until safe altitude is reached.

5. TRIMMING

Pilot shows ability to trim the aircraft in flight. Displacement and re-trimming both the primary roll control and elevator should be demonstrated.

6. PROCEDURE TURNS - One in each direction

The pilot's ability to perform the following steps in the procedure turn will be assessed.

- Level flight segments should be straight and level.
- Aircraft should pass directly over the landing area.
- Turns should be at a constant altitude.
- Turns should be completed in order that upwind and downwind tracks are superimposed.

7. LANDING CIRCUITS

Pilot to demonstrate in both directions, as shown in the diagram in the MAAA Pilot Log Book, with all turns of 90 degrees. With high performance aircraft, the power needs to be reduced much sooner than at the turn onto base leg. The upwind and downwind legs are parallel to the landing strip. The first three legs are maintained at a constant height and a gradual approach angle is started at the beginning of the base leg.

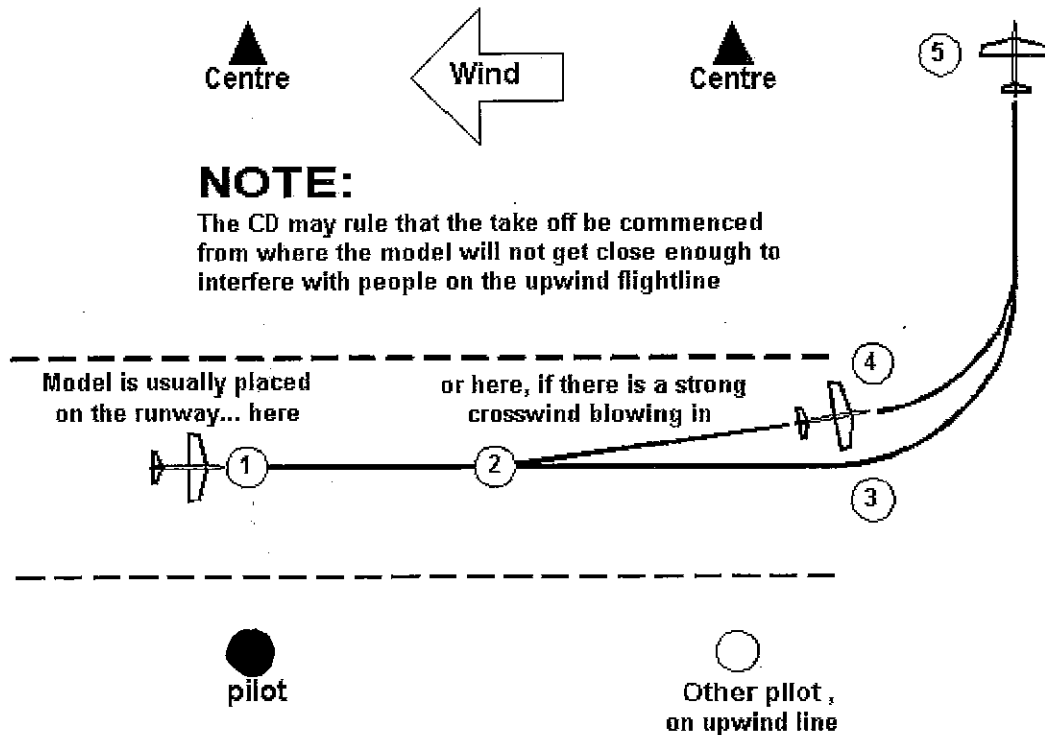
8. APPROACH & LANDING

Pilot demonstrates an engine assisted landing, using a suitable power setting that allows the model to descend, controlling nose attitude with elevators (airspeed), and using the throttle to stabilise the rate of descent. The aircraft should be flown over the threshold at an altitude of about 1.5 metres, the throttle closed gradually, and the round-off or flare initiated. The "hold-off" period is then commenced where the aircraft is gradually allowed to sink and settle on the ground in a slightly nose high attitude.

9. SIMULATED DEAD STICK LANDING

At a safe and high position, the pilot will reduce the throttle to idle and perform a descending circuit to show his/her ability to safely glide the model without engine power to a position where a landing approach can be executed.

1. THE TAKE OFF SEQUENCE



How To:

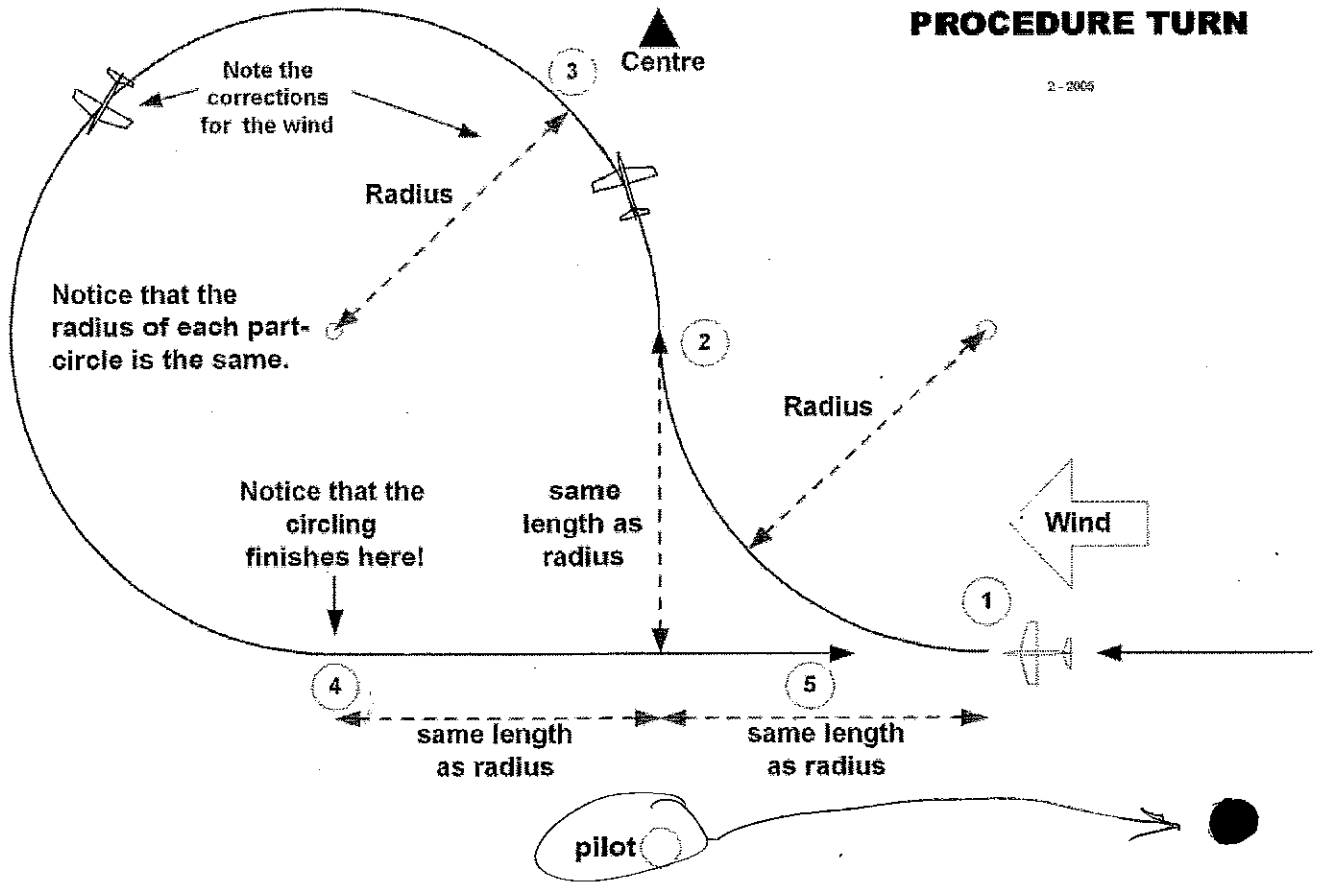
1. The aim is to demonstrate proper control of the model during the take off sequence, safety being paramount
2. The model is usually placed on the runway by your caller or other helper, approximately in front of you
3. **NOTE:** The Contest Director (CD) may, for any safety reason, rule that for any class the downwind pilot's model be placed on the runway in some other place, often between the two pilots, such as position 2, or even in front of the upwind pilot. This is to reduce any chance of the downwind pilot steering or flying the model into anyone on the upwind line, especially if the pilots are positioned close to a narrow runway, and/or there is a strong crosswind blowing in
4. The Take Off begins when the model starts to move forward. Ideally, the model stays parallel to the runway as it accelerates, takes off, and ascends to a reasonable height to position 3, say, 50 metres upwind
5. The model is turned away 90 degrees at position 3, and flies an ascending line perpendicular (at a right-angle) to the strip
6. The CD may also rule before-hand that a take off heading that deviates away from the upwind pilot, such as to position 4, is allowable without downgrade
7. The Take Off finishes at position 5

Watch for:

1. The model is not kept parallel to the runway during acceleration. However, maintaining a smooth, straight line that deviates away from the pilots may be deemed as being even desirable in a strong crosswind, and not cause for downgrading
2. The model oscillates from side to side during acceleration
3. The model does not rise smoothly into the air
4. The climb after take off is not maintained at a reasonable angle, especially too steep
5. The turn away at 3 or 4 is not performed smoothly, and/or with gallops in elevation
6. The climb out to position 5 is not perpendicular to the runway
7. Taking off in such a manner that causes the judges to believe that people's safety is being compromised, is a sure-fire way to get a score of zero for the take off!

PROCEDURE TURN

2-2005



1. The Procedure Turn.

When you are first learning to fly, the Procedure Turn is great for learning how to turn back again from each end of a long straight line of flight that passes over the runway. It helps you to learn where the runway is!

HOWEVER, in Sports Pattern competitions, it's positioning is quite different. You do the manoeuvre centred directly in front of you. This helps you to learn many other things!

Note that the manoeuvre can only be done correctly if you maintain constant radii for the entire manoeuvre.

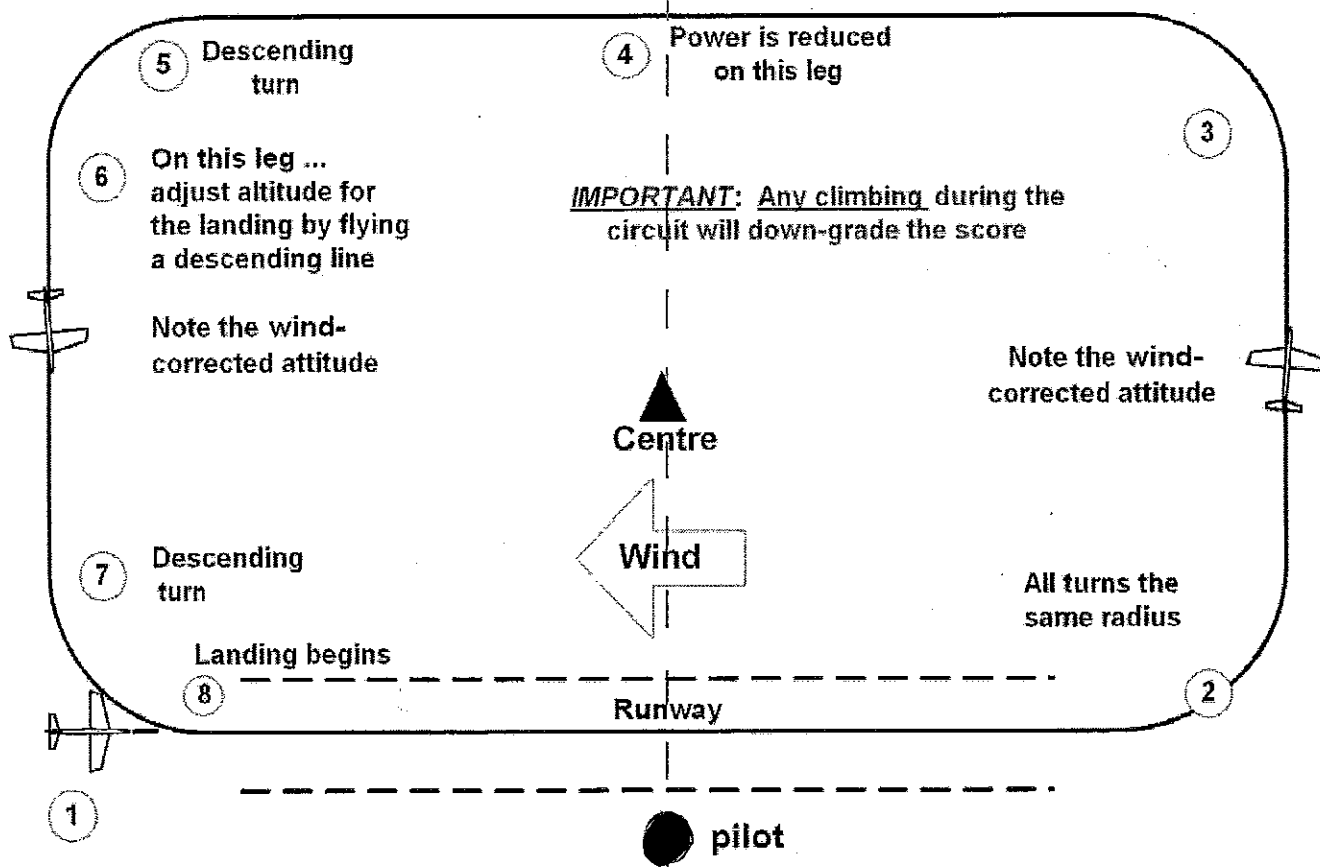
HOW TO...

1. The model is flown downwind on a straight & level entry line of flight, parallel to the runway, only about 30 or 50 metres out from the pilot, and at about 30 to 50 metres up. The model should be at 45 to 50 degrees up in elevation from the pilot. At a chosen distance before reaching the centreline (which sets the radii for the whole manoeuvre) bank the wings to turn outwards of constant radius until it has completed a quarter of a circle. At this point, the model will be directly in front of the pilot, who will be looking straight down the model's fuselage from the tail-end.
2. Bank the wings immediately the other way, and maintain the same radius as the first quarter-circle.
3. The turn is maintained for a total of 270 degrees, or three-quarters of a circle. Adjust wing-banking as required to allow for the wind, to achieve a circular path.
4. Note where this circle finishes... the same distance from the centre-line, as the first quarter-circle started.
5. The model is flown out on the same heading, and at the same height, as the entry line
6. During the manoeuvre, smoothly adjust the wings' angle of bank if required, to keep the circles rounded.

DOWNGRADES...

1. Changes in altitude
2. Changes in radius during any part-circle
3. All radii not the same
4. Entry and exit lines not parallel to the runway
5. Gross changes in the model's speed
6. Flown too far away, making it difficult for the judges to determine the positioning of the model, especially the entry and exit lines coinciding

Rectangular Landing Approach



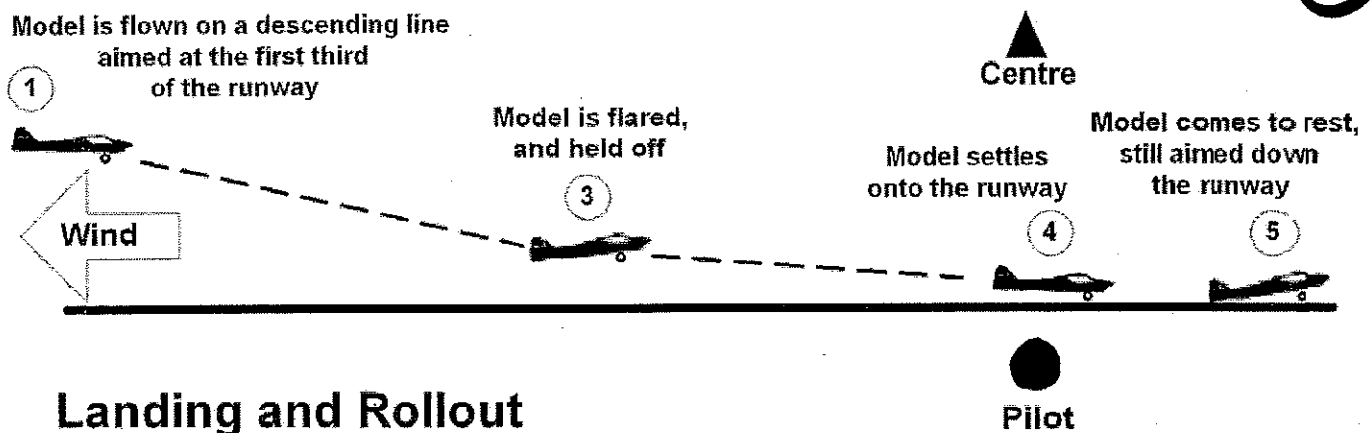
10. Rectangular Landing Approach

HOW TO...

1. This is a very simple and straightforward manoeuvre, but very few pilots get good scores, simply because they don't follow the directions! The manoeuvre is a rectangular *landing* approach, so don't make the mistake of flying it as a rectangular *take-off* approach. Establish an entry line to position (1) at an altitude chosen by the pilot. From position (1) if the model climbs anywhere at all during the manoeuvre, points are lost according to the severity of the gain in altitude. For example, if the manoeuvre was otherwise flown perfectly, but the pilot chose to pass over the strip at say 10 to 20 metres (as is so commonly seen) and then the model climbs during the manoeuvre to say 100 metres on the downwind leg (usually so they can still land if a dead-stick occurs), then many points would be lost. It's not a take-off manoeuvre!
2. Position the model so you're looking up at 50 to 60 degrees as it passes in front of you. An entry-line of about 30 metres to position (1) should be flown over the far side of the runway, or even a bit further out (don't fly overhead... remember those poor old judges' stiff necks!) at a height that will be safe for the model for the whole circuit without any need to climb. This may be about 40 to 100 metres up, depending on the size chosen for the circuit, determined largely by how strong the wind is blowing.
3. At (2) (3) (5) and (7) the model makes turns of equal radius. (2) & (3) should be at equal height.
4. At (4) on the downwind leg, the power is reduced. *Where* exactly depends on the individual model's characteristics (heavy/fast, or light/slow etc.). The turn at (5) may be a slightly-descending turn, since it's safer to have the nose down a little during a turn when the power is down.
5. The leg at (6) is the descending leg, where height is reduced sufficiently for a final slightly-descending turn at (7), but leaving enough height for a controlled descending trajectory for landing.
6. NEVER fly in such a position that you couldn't land safely if the motor stops. If you realise your entry line at (1) is lower than you had planned, just make the circuit smaller. In any event, you shouldn't really need to fly more than about 150 metres away from yourself at any point for this manoeuvre.

DOWNGRADES...

1. Any climbing at all after the entry line at (1)
2. Turns not of equal radius
3. Respective opposite legs not the same length
4. Deviations in lines



Landing and Rollout

11. The Landing

HOW TO...

1. From the final turn, the model is flown on a descending line that is aimed to contact the runway at a point that is about one-third the way up the runway. The model should be flying quite slowly at this time.
2. Ideally, the model should be kept in a flat attitude (1) horizontal with the runway. If there were no power available, the model would keep slowing down in this attitude, making more and more drag, until it stalled. If just a 'click or three' of power is left on during this approach, the descending path shown (2) should be achieved. However with some 'slippery' models, just two clicks might let the model fly on forever until the fuel is all gone! Achieving the model's attitude shown, using a tiny amount of power as described, has to score better than a 'simulated dead-stick' style, so it's worth practicing!
3. If it looks like the model is going to land short, add a click or two more power to 'drag' the model a little further along the strip. The model's attitude should not alter at all.
4. If the model looks like it's going to overshoot, then back off the power, and let it slow down some more.
5. When the model is about half a metre above the runway, the 'flare' (3) should be started to slow it down more. This means simply adding and maintaining a touch more elevator to lift the nose a 'degree or three', which will cause more drag. Be careful to not add too much though, or you might force a stall...
6. The model is then 'held off', maintaining the slightly nose-high attitude. This causes drag, and the model keeps slowing down until it loses enough lift that it settles to the runway by itself (4).
7. The power can then be set to idle, and the model is allowed to roll to a stop (5) still parallel with the runway. Allow your caller to retrieve the model for you.
8. If you choose to taxi the model back, don't turn the model towards the pits or people. Instead, turn it outwards, away from everyone, and taxi back parallel with the runway. Steering an unrestrained model at people with the motor running, especially where the model is close, and most especially if those people are the judges, is a sure-fire way to score zero for your landing. Remember commonsense and safety.
9. Never stop 'controlling' the model until your assistant/caller has got the model restrained.

DOWNGRADES...

1. Landing path not maintained straight in relation to the runway
2. Bouncing at touchdown (usually a result of still too much airspeed)
3. Loss of heading after touchdown, during the roll-out
4. Proper control not being shown (the landing is an 'arrival')
5. Not following commonsense safety issues, especially after coming to a stop

Please note... in some of the HOW TO's above, more issues are discussed other than the basic manoeuvre geometry, etc. such as where it says don't point your model at people, don't do the two rolls too low, etc.

These words have been included for the benefit of budding aerobatic pilots, as they are an accumulation of observations and knowledge from many experienced people. We hope they help you avoid some potential problems along the way.

Fly for fun, and make it fun for others, too!