Welcome to the Highbrook Aero Modellers introduction to flight training.

Objective.

Model flying is a skilled sport for everyone. In this introduction we will provide the tools and training to all a new fliers to become proficient pilots who can safely operate their aircraft without the need for supervision.

Introduction

It is a requirement that any model pilot who wishes to fly at Highbrook Field, within 4 Km's of an airfield or at most clubs unsupervised, needs to obtain the basic wings badge relating to their aircraft type. In this case, Basic Power, Fixed Wing or BP.

To be a proficient and safe pilot, you need to be in control. Control is defined as being able to reliably position your aircraft, both on the ground and in the air, where you intend it to be.

You will be able to fly a rectangular circuit, do a horizontal figure eight, land and take off smoothly, recover from a stall, return safely to the runway in the case of a motor failure (dead-stick) and position your aircraft with accuracy.

The Instructor's Role.

The job of the instructor is to explain how the aircraft works, what the different terminology we use means, what the aeroplane should look like doing these manoeuvres and most of all, how the box in your hands makes that happen. Don't worry, most people need practice at each part of the course and your instructor is there to encourage and guide you.

The Students Role.

The student needs to listen to the instructor's directions and follow them, study the wings badge requirements, seek out other study material and most importantly, have fun.

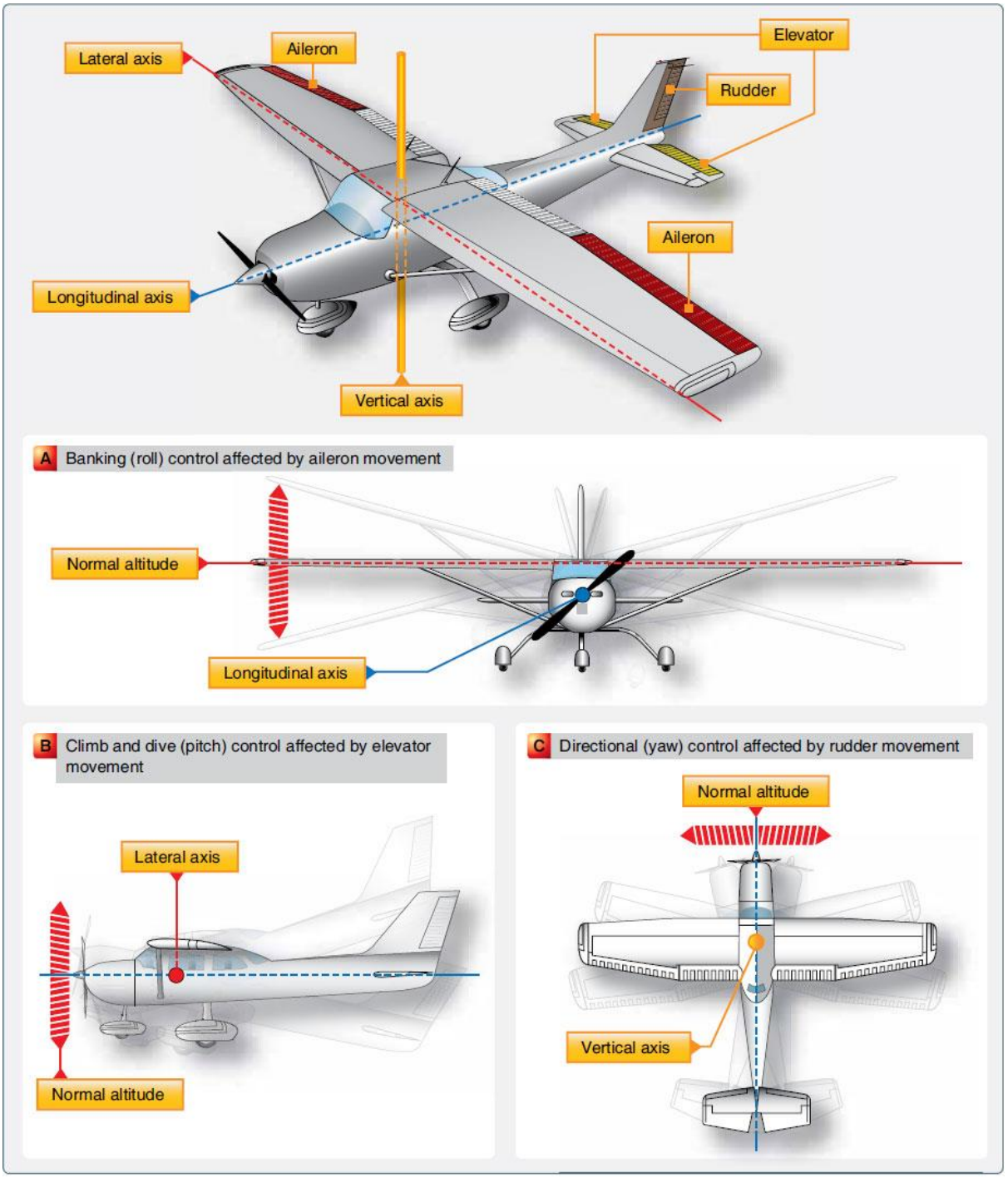
The Buddy Box.

The buddy box consists of two flight controllers. One in your hands and one in the instructor's. At any time during the flight, the instructor can take control. They would normally only do this to reposition the aircraft if it has flown too far away, or to avoid an accident. The buddy box allows a bit of extra control while you are finding you way and helps to keep the aircraft safe. There is no magic reset button to put the plane back together in an accident so you will find this feature very helpful.

Definitions

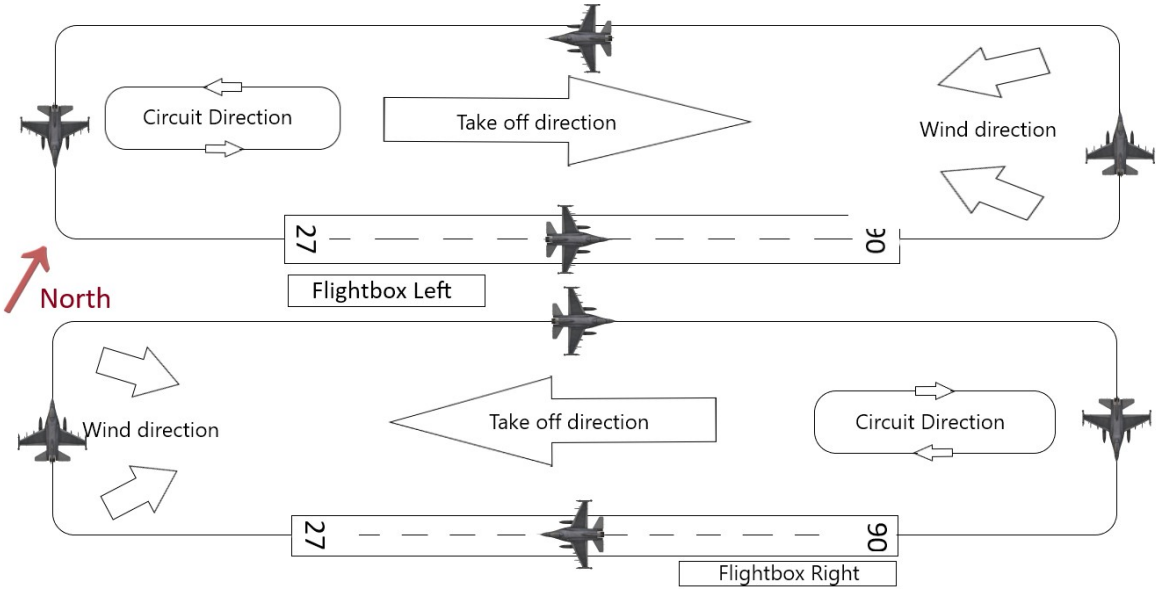
| | |
|---|---|
| Pits - | This is the place where you set up your aircraft and start it. For safety, all aircraft face away from the pits and there is no radio taxing. Any aircraft moving through the pits are to be carried or controlled by hand. |
| Taxiway - | The area that connects the pits to the runway. Aircraft can radio taxi here. |
| Runway - | The area of the field were aircraft take off and land. |
| Flight box- | This is the shielded area where the pilot and observers stand. We have two that can be used, depending on wind direction. Only one flight box can be used at a time, so the pilots can communicate with each other.<br>The flight box closed to the landing threshold will be used. |
| Landing - | The landing threshold is the first part of the runway a landing plane will cross before threshold it touches down. If you are landing from right to left, the landing threshold is the right hand end of the runway and you will be using the right hand flight box. The reverse for an approach from the left. |
| Upwind- | Anything that is further into the oncoming wind direction than you or a reference object. |
| Down wind - | Anything that is further away from the oncoming wind direction than you or a reference object. |
| Upwind leg- | The leg of a course that has your aircraft flying into the wind. |
| Crosswind - | The flight direction with the wind to either the left or right hand side of the plane. |
| Downwind leg- | The leg of a course that has your aircraft flying the same direction as the wind. |
| Base Leg - | The last part of the flight circuit before turning 90 degrees to line up with the runway. |
| Throttle - | The control that makes the motor or engine go faster or slower. |
| Elevator - | The tail control surface of the aircraft that makes the aircraft nose go up or down. |
| Rudder - | The tail control surface of the aircraft that makes the aircraft nose go left or right. |
| Aileron - | The wing control surface of the aircraft that makes the aircraft roll left or right. |
| Flap - | A wing control surface that increases lift. (Not all aircraft have these) |
| Take off - | A controlled ascent of the aircraft. |
| Landing - | A controlled return of the aircraft to the ground. |
| Crash - | An uncontrolled return of the aircraft to the ground. |
| Stall - | When the forward motion of the aircraft is no longer enough to provide lift and the nose of the aircraft suddenly drops. |
| Climbing - | Gaining height |
| Descending - | Losing height |
| Banking - | A controlled turn |
| Circuit - | A flight path of the aircraft in a circle, square or rectangle that brings the aircraft back to where it started. |

Know you plane



The Airfield

The take-off should be performed into the wind for maximum lift. As the wind changes direction, we need to change the flight box we use and the circuit direction.




Flight commands and etiquette.

We share a flight box to allow the pilots to communicate.
The pilot is in front, and the observer is behind to give the pilot the clearest view.
The instructor will most likely be beside you.

Before take-off, your call is: "permission to take off?" You are waiting for all pilots to reply. If they do not, repeat you call.

You then taxi onto the runway, and prepare to take off. When ready, you call "taking off". You are not waiting for a reply. If the reply is anything other than positive, hold your take off and clarify what is needed.

You will then take off and join the same flight pattern as everyone else.

At least one complete circuit before landing, call out "landing!" If no one else is landing or on the field, begin you landing sequence.
Look out for planes in your way in the sky and on the ground as well as anyone on the field or approach line. Make sure it is clear.

Once clear of the field, call, "Field clear". Thank your fellow pilots and taxi away.

If you have a dead stick (motor failure), call "dead stick". Everyone will make way for your immediate landing. If you hear "dead Stick", maintain height and course to stay clear of the plane in trouble. This also applies for any other urgent landing requirement.

Take off.

The purpose of the take-off is to accelerate the aircraft to a speed where the wing will create lift, and the aircraft will lift off the ground.

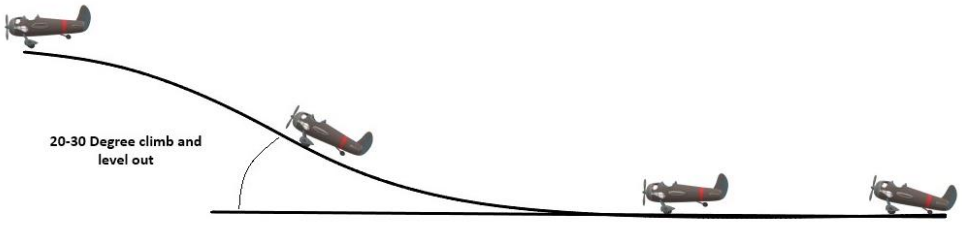
The rudder control is used to keep the aircraft tracking straight down the runway.

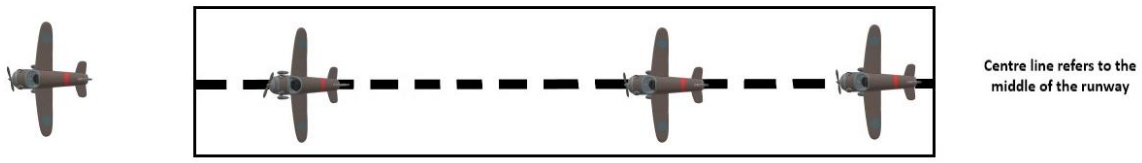
Once the aircraft is ready to fly, gently pull back on the elevator control stick, just enough to allow the plane to climb.

Use the aileron control to keep the wings level.

A maximum climb rate will be less than 30 degrees from the ground.

Once at the required height, reduce throttle and push the elevator stick forward.



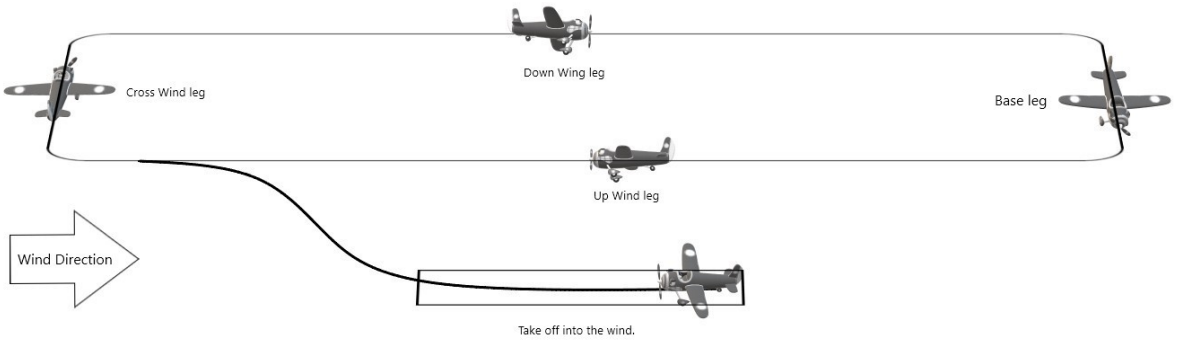

Flying a circuit

A circuit is any course that makes the aircraft come back to where it started. A very casual course will have not specific corners and may appear elliptical like a rugby ball.
The course type we need to perfect for the wings badge, is the rectangular course.

The key to executing this manoeuvre correctly is to have positive course changes, level the wings after each turn, retain a constant height and learn what the plane looks like when it is flying in a straight line.

As you fly the downwind leg, you should be able to see the underside of both wings.

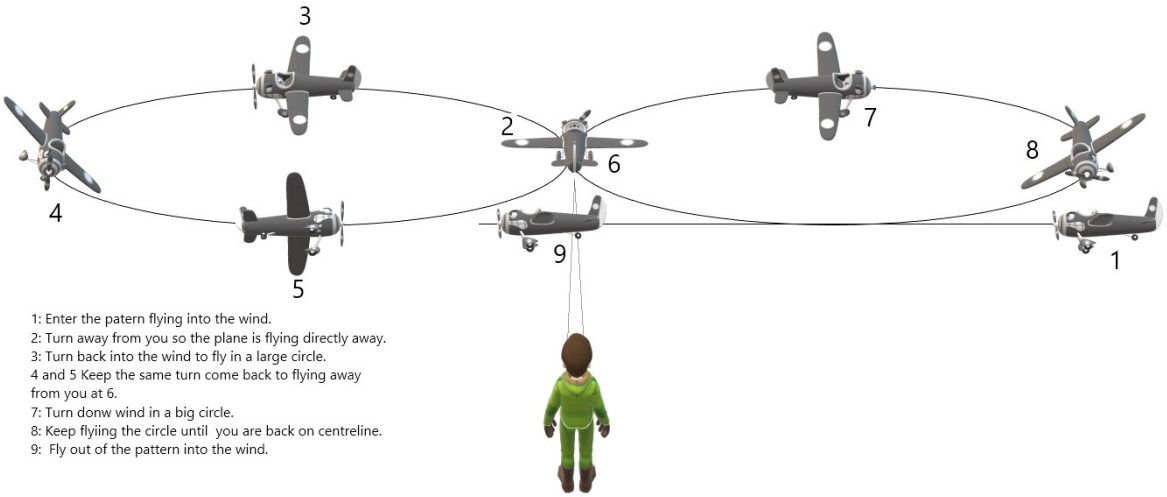
Takeoff, climb at 20-30 degrees, level out and make the first turn into the retangular/square circuit.



Flying a flat figure eight.

This manoeuvre is designed to test your ability to maintain height of the aircraft with throttle control and stock control. At the same time, you will fly away from yourself in some parts of the manoeuvre, and towards yourself in other parts.

When flying away from you, the controls are direct. Left is left, right is right, up is up and so on.
When you fly towards yourself, the left and right movements of the stick seem to be opposite to what the plane does. This is a skill you will learn to master.



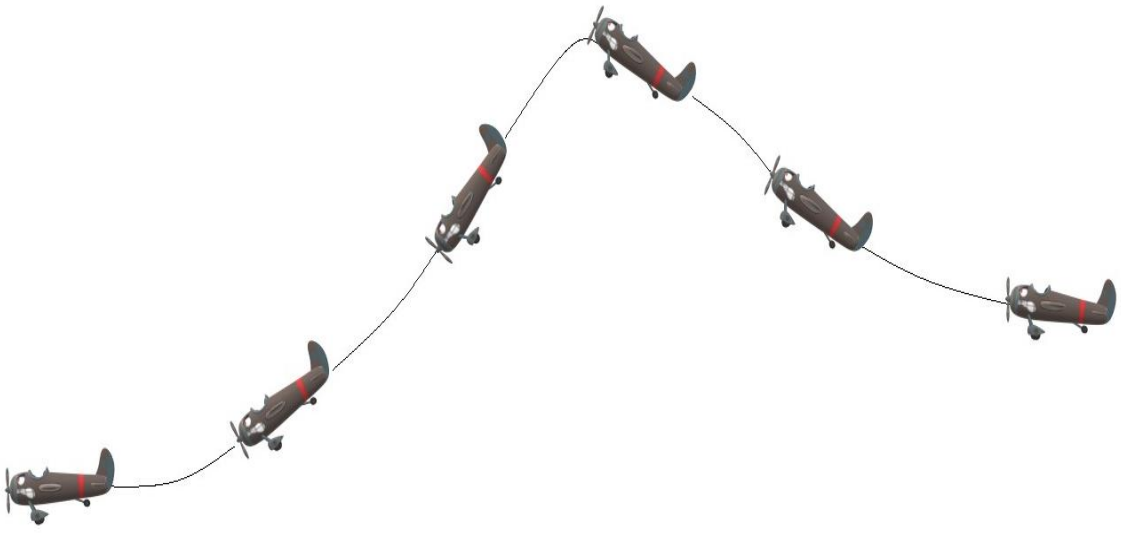

Stall and recover

The term stall means that the air has stopped flowing correctly over the top of the wing, and that the wing is no longer providing lift.

This will happen either because forward velocity is not enough to create lift. This will happen if the nose of the aircraft is too high for the forward speed.

Once an aircraft stalls, the nose will drop. The plane now needs to be allowed to pick up speed in a shallow dive to create lift. Wings are kept level and the elevator neutral.

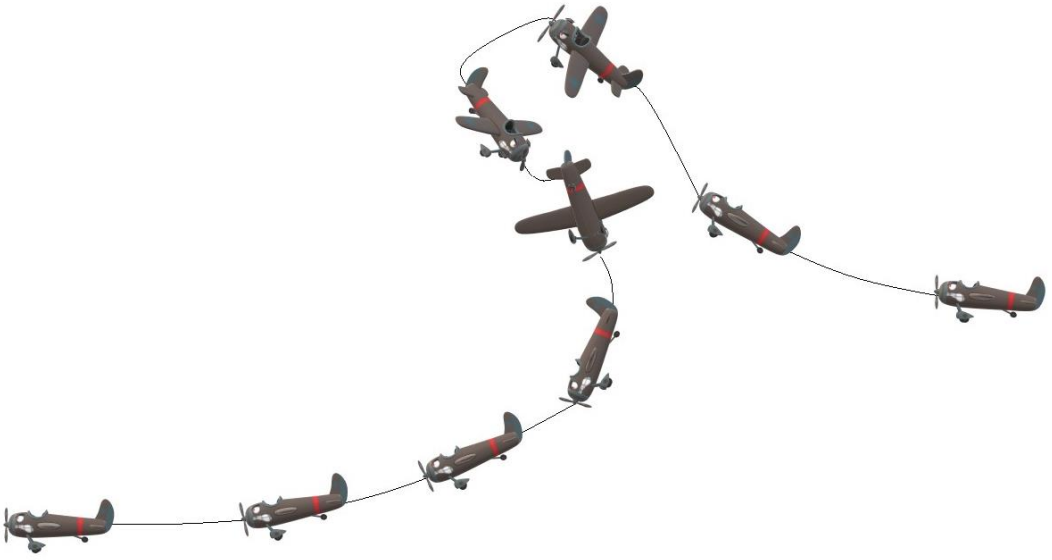
Once some speed has started to be gained, start to apply throttle slowing while also pulling back on the elevator slowly, until the aircraft is back to level flight under power.



Stall Spin and Recover

With some aircraft and in some circumstances, as the aircraft starts to stall, one wing tip may suddenly drop. If this happens, the aircraft will stall then start to spin. This manoeuvre is not a requirement of the Basic Power Fixed Wing Wings Badge. It is, however, a good skill to be aware of in case your aircraft drops into a spin during the previously described Stall and Recover which is a requirement of the exam.
Allow the aircraft to continue to fall with the controls neutral, (elevator, rudder and ailerons) neutral and the throttle closed.
If the aircraft is still spinning, use the ailerons only, in the direction opposite to the spin, to stop the spin.

Once the spin has stopped, begin gently applying up elevator and throttle to bring the aircraft back to level flight.



## Examiners and Candidates Checklist

The following is a short checklist of matters to discuss with the candidate taken from this document. This checklist can be used to ensure that all points raised above have been discussed with the pilot prior to any flights:

1. **Has the candidate read the Members Guide** ☐

   **and aware of any 'Local' site rules (if applicable).** ☐

2. **Discuss whether the model is suitable in 'these conditions.'** ☐

3. **Any 'no fly zones' need to be identified.** ☐

4. **Remind the candidate to talk you through anything that the helper/observer** ☐

   **may do for them as the test progresses.**

5. **Agree any Airspace requirements that need to be pre-determined by** ☐

   **Both Examiner and Candidate prior to the commencement of the test flights.**

6. **Clearly identify the landing area and agree with the candidate the required** ☐

   **landing pattern that he will be flying and you will being looking for.**

**Examiners Check List. Basic Fixed Wing Power (BP)**

| **Candidates Name** | **MFNZ Number** | **Date** | **Signature** |
|---|---|---|---|
| **Examiner's Name** | **MFNZ Number** | **Date** | **Signature** |

| | **FLIGHT TASK** | **COMMENTS** |
|---|---|---|
| (a) | Carry out pre-flight checks as required by the MFNZ Safety Code. | |
| (b) | Take off and complete a left (or right) hand circuit and overfly the take-off area. | |
| (c) | Fly a 'figure of eight' course with the cross-over point in front of the pilot, height to be constant. | |
| (d) | Fly a circuit and approach with appropriate use of the throttle and perform a landing on the designated landing area (wheels to touch within a pre-designated 20 metre boundary). | |
| (e) | Take off and complete a left (or right) hand circuit and overfly the take-off area | |
| (f) | Fly a circuit at a constant height in the opposite direction to the landing circuit flown in (d). | |
| (g) | Perform a stall and recovery. | |
| (h) | Perform a simulated dead stick landing with the engine at idle, beginning at a safe height (approx. 200 ft.) over the take-off area, the landing to be made in a safe manner on the designated landing area. | |
| (i) | Remove model and equipment from take- off/landing area. | |
| (j) | Complete post-flight checks required by the MFNZ Safety Codes. | |
| **Answer five questions from the list of mandatory questions on legal aspects of model aircraft flying.** | | |
| **Answer a minimum of five questions on safety matters from the MFNZ Safety Code and local flying rules.** | | |

# Annex I Oral questions

## Mandatory Questions for all Disciplines (1-15)

1. Describe the airspace class you are currently flying in?
2. Where would you find information about the airspace class?
3. What are the requirements and limitations of the airspace?
4. What is the altitude limit for the current site?
5. Explain the requirement of consent from the property owner prior to flying
6. What are the requirements for flying with 4km of an aerodrome?
7. What are local flying field rules? Noise Requirements?
8. What would you do if a person walked into the flying area?
9. What frequency control, including for FPV, is currently in place?
10. What are the requirements for an observer? What is their role?
11. Describe “Line of Sight” operation
12. What is required for flying in controlled airspace?
13. Describe the legal requirement s for aircraft between 15-25kg? 25kg+?
14. Can you fly at night?
15. How would you respond to a manned aircraft entering the airspace you are operating in?

## General Questions (16-29)

16. What is the purpose of a transmitter range check before flying?
17. Describe the pre-flight checks that should be done on an airframe before flying
18. Why do we not fly behind the flight line or over the pits?
19. Describe the importance of the correct center of gravity on an aircraft
20. Why is it good practice to balance propellers/blades/fans?
21. What do you look for when checking the condition of propellers/blades/fans?
22. Explain the precautions associated with charging batteries

23. Describe the power on/power off sequence of your model
24. How do you check the center of gravity of a model whilst on the ground?
25. What is meant by dual rates on a transmitter and how does this affect the control surfaces?
26. What is meant by exponential function on a transmitter?
27. Describe the failsafe function of your radio/flight controller
28. What are the hazards associated with carbon fiber used in construction?
29. Describe Pitch / Roll / Yaw of an aircraft

# Pilot Specific Questions (30-44)

30. Why models should be restrained whilst starting?
31. How should the receiver battery status be checked before flying?
32. Describe safe tools that can be used to start an IC engine
33. Why do we check the control surface integrity and direction before flying?
34. Why is it good practice to disconnect the motor pack on an electric model whilst in the pits?
35. Why is it good practice to test a receiver battery using a load tester?
36. Why it is good practice to cycle NiCad or NiMh receiver battery packs?
37. Describe flight line etiquette
38. What happens when a model stalls and the best way to attempt to correct a stall?
39. What is the best action to take when experiencing an engine failure on take-off?
40. What is the best action to take when an engine stops in mid-flight?
41. When starting an engine (IC or electric) where should you insist bystanders position themselves in relation to the model?
42. How do you find out if a receiver battery pack has reduced capacity?
43. What is aileron differential?
44. What is the effect of low airspeed on control surfaces?