



Radio Control

FIXED WING

STUDENT FLIGHT TRAINING MANUAL And LOGBOOK

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Model flying New Zealand (MFNZ)

STUDENT FLIGHT TRAINING MANUAL And LOGBOOK

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SECTION 1

INTRODUCTION

Welcome to the MFNZ radio control flight training scheme. The object is to guide the new radio flier through the following.

- To understand the radio frequency control system and local site safety rules.
- To carry out aircraft and radio safety checks before each flying session.
- To understand basic principals of flight and competently fly a model.
- To be able to fly basic maneuvers on demand and pass the MFNZ WINGS test on completion of training.

Whether you intend to fly competitive aerobatics, pylon racing, scale or sports models the disciplined and planned approach to flying experienced during training will make your entry and progress in these events much easier

Your instructor will guide you through the process of learning to fly radio controlled model aircraft. The training manual is split into sections each dealing with a specific topic. A check box is provided at the end of each section so you can keep track of your progress. This allows another instructor to carry on at the right stage should your regular instructor be away

It is important that once training commences you are committed and fly whenever possible. Any time lost between lessons wastes time going over previously covered material. Instructors give their time freely and are often in demand so please make their life as easy as you can.

SECTION 2

SAFETY ISSUES

THE HEAVY STUFF

As model aircraft can easily cause serious injury, or death, if operated incorrectly, every club must ensure a number of simple safety measures are in place. All members are expected to comply with the local clubs flying rules and the MFNZ Members Handbook.

The Club has formulated a set of rules/safety procedures which every member is expected to comply with. These are covered in the club's flying rule book. You will be given a copy of the flying rules and one of the safety officers will go through it with you. You will then be required to sign the club's records showing you have been given a copy of the flying rules and have had them explained and you understand them.

Your transmitter frequency will also be checked and a frequency flag ordered. The following key points of the rules will be explained to you

- Radio frequency control system
- Model pre flight checks
- Pit area
- Engine run up line
- No taxiing in the pits
- Pilots area and need for all pilots to be in touch with each other
- Calling take offs and landings
- Circuit direction
- No fly areas
- Maximum Height
- Engine stopped before entering pits after a flight
- Transmitter turned off, Frequency peg returned to peg board, Name peg returned to transmitter and return transmitter to pound

By now you should have:

	Date Approved	
Been briefed on the rules given a copy of the local rules		
Your transmitter frequency should have been checked and a frequency flag ordered		
You should have a black and white peg to attach your name to		
Understand the Radio Frequency control system		

SECTION 3

RADIO FREQUENCY CONTROL SYSTEM

A pegboard system is used to control radio frequency conflicts. The aim of the system is to insure only one transmitter can operate on any channel at once. Your instructor will explain the system to you. It works like this.

- On arrival at the field make sure your transmitter is switched off and placed in the transmitter pound.
- The frequency pegboard has a number of PINK pegs with an attached channel number. These are black on a blue background.
- If there is a pink peg on the pegboard with the same channel number as your transmitter remove it and attach to your transmitter.
- Place your **BLACK AND WHITE/ Personal** name peg on the pegboard in place of the **Blue tag** channel number peg.
- You can now turn on your transmitter.
- If you have one of the newer Spread-Spectrum (usually on 2.4 GHz but can be other frequencies) radios, there is no MFNZ requirement to take a channel peg. However, most clubs have slightly different arrangements for these. This will be explained to you.

***NEVER TURN ON ANY TRANSMITTER WITHOUT
FIRST OBTAINING THE TAG CHANNEL NUMBER PEG***

***AS SOMEONE MAY BE IN THE AIR ON YOUR CHANNEL TURNING YOUR
TRANSMITTER ON WILL "SHOOT THEM DOWN"!***

- When you have finished with the transmitter make sure it is switched off.
- Place the pink channel number peg back in the correct location on the pegboard and remove your personal name peg and return to the transmitter.
- Check again that the transmitter is off and return to the pound

SECTION 4

PRE FLIGHT CHECKS

As with full size aviation when things go wrong a disaster is just around the corner. 99% of problems can be found by constant checking and assuming nothing. Before each flying session a thorough series of checks must be carried out and any problems rectified.

If in any doubt DO NOT fly.

Your instructor will show you how to pre flight your model.

The main points of a pre flight check include

- Radio batteries charged
- Range check
- All controls have full and free movement and in the **CORRECT DIRECTION**
- Servos secure, all mounting screws tight
- Servo output arms secure and retaining screws tight
- Clevises secure
- Control surface hinges secure
- Each control system, from servo to control surface, is free from slop and is correctly sized for the aircraft size and speed.
- Batteries receiver and switch secure and correctly mounted
- Aerial secure and away from metal objects and anything that could damage it
- Wing mounting bolts all in place and tight or sufficient rubber bands in place
- Engine secure
- Propeller tight
- C of G correct
- All Plugs fully home and secure
- Nothing that could come off in flight, move or disintegrate
- Wheels secure and free to turn
- The transmitter battery is fully charged and the battery meter reading is normal
- The transmitter antenna is clean and free from kinks or other damage.

SECTION 5

BASIC CONTROLS

The basic controls used to control any aircraft whether full size or radio control are;

- Elevator
- Rudder
- Ailerons
- Throttle

A number of trainers may have no ailerons fitted. In these cases there is an aerodynamic phenomena that allows the rudder to simultaneously yaw and roll the aircraft. Your instructor will go over this in more detail with you.

Your instructor will demonstrate the use of the correct stick inputs to move each control surface. Note only small gentle movements are required when flying otherwise over control results.

You are now ready for your first flight but before this happens its time for a test. The object of this test is to identify anything you may have missed or misunderstood. You will be asked to demonstrate and explain the following.

	Date	Approved
Frequency Control System		
Local Site Safety Rules		
Pre Flight Check Model		

SECTION 6

FIRST FLIGHTS

Before taking to the air your instructor will demonstrate

- The use of the controls and how the buddy box system works
- Refresh your memory about flying only in front of the flight line, pits, run up and taxiing
- Demonstrate the start up and run up procedure
- Drill of Vital Actions **E.C.T.T**
 - **E** Engine run up and idle OK
 - **C** Controls Full and correct movement
 - **T** Trims set for take off
 - **T** Transmitter aerial up and meter OK

You might find it very useful to print out these vital actions as a checklist on a small card. This is a much more positive and reliable last-chance check than one's memory.

Before each flight the instructor will brief you on the aim of the flight and spend a little time "Ground Flying" the model with you using the buddy box so you know what to expect during the flight.

When airborne at a safe height your instructor will demonstrate the effect of each control and talk you through using each one.

Ailerons	left and right	roll the aircraft
Elevator	back and forward	climb and dive
Rudder	left and right	yaw the aircraft
Throttle	controls engine revs.	

Having done this you are now totally over loaded and wondering if you will ever grasp the basics of control so we do things in stages one thing at a time from here on.

The next thing your instructor will get you to do is to keep the aircraft flying straight using the ailerons only. This will get you used to which way to move the stick and how far to move it. Once you start to get the feel you will get to turn the aircraft away from the strip. Notice how the nose drops in the turn so a little up elevator is introduced to keep the nose level through the turn. Too much and the aircraft climbs. Too little and the nose drops. Applying elevator before the ailerons and the nose goes up without turning. All turns are kept very gentle at this stage with small gentle control inputs.

Further flights will continue until you can keep the aircraft airborne and fly round without the instructor having to take over control. During these flights you will also get to fly round using the rudder instead of the ailerons and taxi on the ground also using the rudder. It is vitally important that you become familiar with the rudder as later when learning to take off, you will find the rudder is the only control which controls the models direction.

By now you should be able to

	Date	Approved
Fly the model using aileron and elevator		
Fly the model using rudder and elevator		
Taxi using rudder and throttle		

SECTION 7

DISCIPLINED FLYING

Now you can keep the aircraft airborne, it is time to start flying with discipline and getting used to controlling the model when it is facing you, going away, turning left and right and flying straight up and down the strip as well as maintaining a constant height.

By now you will have discovered that if you fly too high and loose sight of the ground you soon get disorientated and start to loose control.

We now learn to fly procedure turns and figure eights both in and out and when you have the sky to yourself fly straight up and down the strip with a procedure turn at each end and then with a figure eight thrown in the middle.

The object of all this is to get to the stage where you can position the model where you want if from anywhere in the sky and being familiar with it at all angles coming and going.

You will learn to use the trims to keep the wing level, maintain a constant height and eliminate any yaw.

You will also learn to fly a rectangular circuit with four equal radius right angle corners and four straight sides at a constant height with one leg right up the middle of the strip.

By now you should be able to

	Date	Approved
Fly straight up the centre of the strip		
Fly procedure turns at each end of the strip		
Fly figure 8s in and out		
Fly left and right hand rectangular circuits at constant height with one leg up the centre of the strip		

SECTION 8

LANDINGS

The key to a good landing is a good approach. The key to a good approach is to position the model at the right height at the right airspeed and on line with the runway centre line at the start of the final leg of the landing circuit

Landings introduce the use of the throttle to maintain height and elevator to control air speed and rate of descent.

Before we land we need to learn how to slow the model down and experience the effect of slow speed flight on the controls. Stalling and stall recovery should be well practiced and understood.

If we can exit our last turn on line with the centre of the runway all we need to do to land is control the rate of descent. If you can not line up with the strip you are not ready to attempt landings as trying to control the descent **AND** find the strip requires two operations resulting in a mental overload.

Commencing with a circuit we aim to fly at a constant height and exit our final turn into wind lined up with the centre line of the strip.

The circuit is flown at medium power using the elevator to maintain height.

Before the final turn reduce power and the model will start a rapid descent.

Ease in a small amount of up elevator and note the rate of descent reduces as well as the airspeed.

Keep the wings level and model aligned with the runway with very small aileron movements.

Continue the descent to about 2m -3m above the ground then apply a little more power and maintain this height and over fly the strip maintaining a straight path on the centre line of the strip. Increase power allow the model to gain airspeed then climb out and continue with the next circuit making sure it is at a constant height, has square corners and straight sides.

Practice until this can be achieved every time.

Then, on the final descent, close the throttle when the model is about 2m and over the strip. Very gently apply a touch more up elevator to reduce the rate of descent and airspeed.

When the model is about 500mm off the ground apply more and more up elevator so the rate of descent and airspeed continue to reduce,(over applying elevator will cause the model to climb and stall). Just before the wheels touch the ground the stick will be hard back. Keep the model rolling straight up the strip using the **RUDDER**, then taxi off the strip.

Stop the engine before crossing the pit run up line.

SECTION 9

TAKE OFFS

Take offs are very simple procedures if done correctly. Any number of things can go wrong and cause a disaster but when you understand what's going on you can apply the right correction.

For a successful take off the model must

- Have plenty of speed
- Be tracking straight down the centre of the strip

Before attempting a take off you must be able to taxi up and down the strip in a straight line. Until you can do this at a good rate of speed there is no point even thinking about a take off. Hence all the taxiing and flying with the rudder your instructor has had you doing.

REMEMBER THE RUDDER IS THE ONLY CONTROL WHICH CONTROLS THE DIRECTION OF THE MODEL ON TAKE OFF THE AILERONS DO NOTHING

To take off

Obtain take off clearance from all other pilots on the flight line

Check up and down the strip for approaching models and lost people

If all is clear taxi out and line the model up on the runway centre line into wind

Fully open the throttle and using the **RUDDER** keep the model tracking down the centre of the strip. Engine torque, gyroscopic precision and the left blade of the prop on a tail dragger having less pitch than the right hand blade relative to the approaching air all make the model swing to the left. Use the **RUDDER** to keep straight. Cross wind conditions also affect rudder use.

If you cannot keep the model straight **CLOSE THE THROTTLE** and try again. When the model is blasting along nice and straight and has gained plenty of speed gently ease in a small amount of up elevator to rotate the model and climb out gently.

A good dose of right rudder may be needed at this point to keep the model on track.

Don't pull up into a steep climb as air speed will drop off, one wing will stall and a flick spin will result with no chance of recovery.

The model must be allowed to gain speed in a shallow climb.

Use the **RUDDER** to keep on track and elevator to control the angle of the climb.

AS already experienced when learning to fly slow and at high angles of attack the ailerons become less and less effective the slower we go.

Some models will yaw in the reverse direction instead of roll. This is why we use the rudder to maintain heading until speed has built up.

When at a safe height gently turn away from the strip.

Take off complete.

SECTION 10

PRACTICE EXERCISES

- Landing from left and right hand circuits
- Flying up and down the strip with a procedure turn at each end reducing power and flying an approach from the exit of the turn. Over fly the strip at 2m add power climb out do a procedure turn reducing power and speed (elevator) and fly an approach and over shoot from the other direction.

This assumes there are no other models in the circuit or the instructor has arranged with the other fliers to keep clear of the strip.

- Procedure turns
- Figure eights
- Rectangular circuits
- Slow flying
- Stalls and spins
- Fly touch and go

Always plan each flight and try to fly with as much discipline and precision as your experience allows.

By now you will be flying solo with an instructor standing along side.

You should now be able to

	Date	Approved
Take off (including cross wind conditions)		
Fly straight up the strip		
Fly left hand and right hand circuits		
Fly procedure turns		
Fly figure eights left and right approaching and departing		
Fly slow		
Touch and go		
Stall and spin		
Land		

SECTION 11

WINGS BADGE

The final stage of training is to pass the **MFNZ WINGS BADGE** test. Details of the test are found in your **MFNZ** members manual. When you study the requirements of the test you will find everything you have learnt while training has got you to the point where you should be able to complete the test with ease. Your instructor will run through what is required and make sure you can fly the flight section requirements. One of your non regular instructors or safety officers will then put you through the test. This is done to not only check you out but also make sure the training you have had has not left anything out.

Once passed your formal training is complete.

SECTION 12

TRAINING CHECK LIST

TASK	DATE	APPROVED
Briefed on club flying rules, have copy of rules and signed club records		
Transmitter frequency has been checked		
Frequency flag on TX		
Name peg		
Can demonstrate Peg board use		
Pre Flight Checks		
Fly with rudder and elevator		
Fly with aileron and elevator		
Taxi		
Fly straight up centre of strip		
Fly procedure turns at each end of strip		
Fly figure 8s in and out		
Fly rectangular circuit at constant height with one leg up the centre of the strip		
Land		
Take off		
Stall and recover		
<u>WINGS TEST PASSED</u>		