R/C Proficiency Programme

The "Wings" Programme for basic R/C Flight qualification.

1. Aim

1.1. To provide certification of a basic proficiency level for Radio Control model pilots enabling them to operate unsupervised. Pilots achieving the required level are entitled to wear the MFNZ 'Wings' badge.
1.2. To meet the requirements of Civil Aviation Rule 101 for flying within 4km of aerodromes.

2. Method

2.1. MFNZ encourages all clubs to adopt this proficiency scheme and encourage all Radio Control pilots to obtain their "Wings".
2.2. Many club flying sites, rallies and contests are on or near aerodromes and this qualification is essential to fly at those sites. The badge provides ready proof of the minimum qualification.
2.3. Within 4km of an aerodrome all pilots must operate under direct supervision (of a wings badge holder or an approved Instructor), away from aerodromes trainees should not be considered safe to fly on their own until they have reached the wings standard.
2.4 The Wings Badge is compulsory for :
(a) all new members joining MFNZ are obliged to attain the qualification.
(b) all members including those who fly at sites within 4km of an aerodrome. This is to ensure compliance with CAA rule 101.
Members are to be encouraged to gain wings badges (if not already holding a wings badge) at the earliest time.
Note: To ensure compliance with CAA rule 101 any **trainee** pilot flying within 4km of an aerodrome should be directly supervised by a **Wings badge holder.**
Note: To ensure compliance with CAA rule 101 **all** pilots must fly with an **observer** when flying within 4km of an aerodrome.
2.5.Clubs should keep records of the members holding wings badge certification and forward to the MFNZ secretary the name of members attaining the certification.

3. Examiners and Instructors

3.1 Instructors

Instructors will be proficient Wings badge holders as appointed by the club. Clubs shall forward the name and MFNZ number of each appointed instructor to the MFNZ secretary for recording in the Associations database and issue of an instructor's certificate.
Instructors should be.

- Experienced proficient flyers who exhibit well-disciplined flying and operate in a safety conscious manner and are committed to training students to Wings standard.
- Be willing to spend considerable time training without letting their own skills suffer.
- Have empathy with the student and be able to guide the student through the learning process.

Further information on instructing is available in the Instructors guide available from the secretary or on the MFNZ web site.

A Fixed Wing Training Manual for the student is available from the secretary or on the MFNZ web site. This manual is structured to guide students through training to Wings standard and also acts as a prompt to instructors and has a check list for the student to keep as a record of training progress. All students should be issued with one.

3.2 Examiners

Examiners will be proficient Wings badge holders and may also be instructors. Examiners may also be members with competition judging experience familiar with the requirements of the Wings badge test. Examiners shall be proficient in the category they are testing.
Clubs shall assess their membership and select their examiners and instructors to meet the above criteria. Clubs should keep a register of Approved examiners and forward to MFNZ on an annual basis.

4. Qualification

4.1 There are 7 categories of Qualification
Basic Fixed wing powered (BP)
Large fixed wing powered, (LP)
Turbine / Jet (TJ)
Pylon (PN) (includes Hotliners –Typically high speed)
Glider (GD)
Helicopter (HP)
Helicopter Turbine (HP-T)

4.2 Any additional breakdown to cover specific competencies (e.g. Turbine, Large models, Vintage, Pylon, and Soaring) are developed and administered by the SIG responsible and detailed in their Code of Practice.

5 Certification

5.1 The Wings badge and /or a Certificate of Proficiency, listing the type(s) of qualification, will be issued by MFNZ. Applications must be made through Club Secretaries on the official form, signed by the examiner. There is a charge for the badge and certificate or any alterations to the certificate.
5.2 The badge may have the club name at the top, the MFNZ wings in between, with the letters R/C in the centre, and the name of the pilot at the bottom. If specifically requested, the club name may remain blank.
5.3 All wings badge issue applications must be made to MFNZ secretary through the club secretary / SIG secretary on the official form. MFNZ will maintain a register of all certificate holders.
5.4 A pilot must be a current financial member of MFNZ to be the holder of a Wings badge and issue / retention of a wings badge is at the discretion of the MFNZ executive
5.5 Certificates (and Badges) may be withdrawn by a club if the pilot is considered to be no longer able to satisfactorily meet the required standard.
The certificate (Badge) will be reissued upon the satisfactory passing of a full wings test.
Clubs may refer such issues arising from such actions arising to MFNZ area councilors for assistance

Testing Procedure
5.5 There are four parts to each basic proficiency wings test:
a) Pre-flight inspection of model. b) Oral
Test.
c) Pre-flight procedures test. d)
Flight Test.
5.6 Each part is marked on a pass/fail basis and total mastery is required to qualify.
5.7 Retesting is permitted. The examiner may decide if a retest can be carried out on the same day or if there needs to be some retraining or consolidation before the retest.
Test sheets and Oral questions are included elsewhere in this Annex C / Manual

6 Pre Flight inspection of model

6.1 Checks include:
a) All radio equipment is secured in the model and protected against engine vibration.
b) Pushrods, ball links clevises and other fittings are secure.
c) All controls are effective, check especially for binding links or slowing of servos.
d) Engine is mounted securely and propeller has no cracks or damage.
e) Wings are firmly mounted and any bracing wires secure.
f) There are no loose or missing nuts and bolts.
g) Receiver battery pack is suitable (single replaceable cells are allowable but definitely not recommended).
h) All hinged flying surfaces secure.
i) CG is in right position.
j) Critical structure is of adequate strength with no cracks or significant warps.
k) The radio and switch free of fuel and oil.

And for *Helicopters only* checks include that:
l) The gyro is correct and secure.
m) Wiring is clear of mechanics.
n) The receiver aerial is in good condition with no chafing or damage and aerial cannot become entangled with any moving or rotating part.
o) All main and tail rotor blades are not damaged, checking root at blade pivot hole and the tip weight installation.

6.2 Additional preflight inspection requirements for Large Fixed Wing powered models are outlined in the Large model SIG code of practice on the Large model SIG/MANZ website www.manz.org.nz (accessible from the MFNZ website also)

6.3 Any additional checks to cover specific disciplines (e.g Turbine, Large models, Vintage, Pylon, and Soaring) have been developed and are administered by the SIG responsible and detailed in their Code of Practice.

Oral Test

The Oral test may be examined at time differing from that of the actual practical flight test.The candidate must display a good knowledge of:

a) Local flying and field rules, for example flying times.
b) Local no-flying zones.
c) Emergency landing areas.
d) Maximum altitude.
e) Local maximum noise levels.
f) The frequency control system in use. g) The importance of charged batteries. In addition the pupil should be asked approx 15 (on a random choice basis) of the questions below prior to a wings badge test. Pass rate is 80 % of the number of questions asked.

1. Explain why models should be restrained whilst starting
2. How should the receiver battery status be checked before flying
3. What is the purpose of a transmitter "range" check before flying
4. Describe the frequency control system in common use
5. Describe two safe tools that can be used to start an IC engine
6. Describe the preflight checks that should be done on an airframe before flying
7. Why do we check the control surface integrity and direction before flying
8 Why is it good practice to disconnect the motor battery on an electric model whilst in the pits.
9 Why is it good practice to test a receiver battery using a load tester
10 Explain why it is good practice to cycle NiCad or NiMh receiver battery packs
11 Describe black wire rot
12 Why do modelers "pin" the control surface hinges
13 When checking a model prior to flying describe the aspects you would be looking for or checking
14 Why do we not fly behind the flight line or over the pits
15 Describe two types of control clevis retainers
16 Describe flight line etiquette
17 Describe Pitch and Yaw of an aircraft
18 What happens when a model stalls and the best way to attempt to correct a stall
19 Describe the role of an observer
20 What is the best action to take when experiencing an engine failure on take off
21 Describe the importance of the correct centre of gravity on an aircraft
22 How do you check the centre of gravity of a model whilst on the ground
23 What is the best action to take when an engine stops in mid flight
24 Describe the function of a glow plug in a glow engine
25 When starting an engine (IC or electric) where should you insist bystanders position themselves in relation to the model
26 What is the function of after run oil
27 Why is it good practice to balance propellers
28 What do you look for when checking the condition of a propeller
29 How do you find out if a receiver battery pack has reduced capacity
30 What is the likely consequence of too steep a climb out during takeoff
31 What happens to the speed of a model if it is commanded to "nose down" (e.g. using elevator)
32 What is aileron differential
33 Explain what is meant by dual rates on a transmitter and how does this affect the control surfaces
34 Explain what is meant by exponential function on a transmitter
35 What is the effect of low airspeed on rudder and aileron control.
36 Explain the precautions associated with charging Lithium Polymer Batteries
37 Explain the issues around Battery disconnection prior to switching off the model receiver or Transmitter

7 Pre-flight Procedures check

The following checks must be made:

a) Non 2.4 GHz radios- Correct frequency peg attached to transmitter.
b) Radio switches on, battery OK.
c) Basic Radio Range check (Tx aerial collapsed or reduced range selected on 2.4 GHz radio)
d) Check controls for full and free travel, and in the right sense.

And for Helicopters only:

e) Start engine, one hand holding rotor head.
f) Run engine up at least 10m from pits. Check blade tracking and vibration.

8 Flight Test

The Wings proficiency flight checklists for each of the categories of wings badges are included elsewhere in this Manual

8.1 Basic Fixed Wing Powered (BP) and Large Fixed Wing Aircraft (LP)

Model Criteria:

BP – Suitable models are 40 size sport type models with a minimum wingspan of 1350mm AND minimum 1.2kg in weight with rudder, elevator and throttle control, (aileron not mandatory but strongly recommended, either Glow, petrol or electric powered and with an undercarriage

LP – Models as defined in the Large model Sig code of practice. Generally 2metre minimum wingspan (not gliders) (rudder , aileron , elevator and throttle control) ,either Glow , petrol or electric powered

The general flight test maneuvers include:

a) Take off
b) Level flight
c) Procedure turn
d) Horizontal figure of eight
e) Left hand circuit landing approach
f) Overshoot
g) Right hand circuit landing approach
h) Landing, power on
i) Takeoff
j) Left hand circuit
k) Landing, power off

The flight test check list is included elsewhere in this Manual

8.2 Pylon (PN) (includes Hotliners –Electric or other)

The basic Fixed wing powered test applies as a prerequisite to attaining this classification . Further requirements are outlined in the Pylon flight test checklist included elsewhere in this Manual

8.3 Turbine /Jet (TJ)

The basic Fixed wing powered test applies as a prerequisite to attaining this classification. Further requirements are as required by the Turbine / Jet SIG and /or as reflected in any code of practice of this SIG

8.4 Gliders (GD)

This category includes for electric motorised gliders type models which are generally hand launch with a wingspan 1200mm or greater

The general flight test maneuvers include:

a) Launch (electric powered, bungee, discuss, winch or hand tow)
b) Straight flight for 30 seconds, stall then recover to level flight
c) Procedure turn
d) Horizontal figure of eight

e) Right hand circuit landing approach
f) Landing within 10 metres of a spot

The flight test check list is included elsewhere in this manual.

8.5 Helicopters(HP)

The general flight test maneuvers include

a) 10 Second Hover b) Hovering M
c) Tail in Circle
d) Take off, circuit and landing

The flight test check list is included elsewhere in this manual.

8.6 Helicopter Turbine(HP-T)

Pre-requisite being Helicopter Wings certification.
Test to address practices
required in a Heli Turbine situation.

9.0 R/C Proficiency Test Manoeuvers

It is important the pilot under test show complete control of the model throughout the test and that if at any time safe flying is compromised, the test is terminated.

9.1 Basic Fixed Wing Powered (BP) and Large Fixed Wing Aircraft (LP)

The pilot should safely start the model and deliver it to the takeoff point.

a) Take off

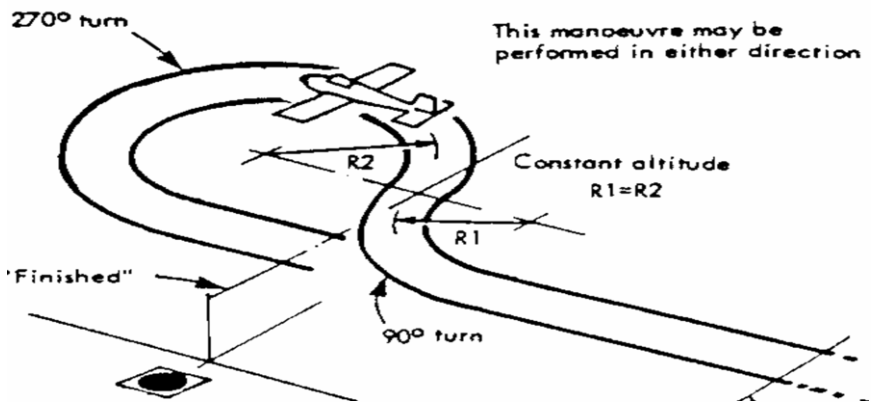
The model should stand still on the ground, with the engine running. The takeoff should be straight and into wind and conclude with a 90° turn away from the pits. Some swing is acceptable as long as it is clear that the pilot has control over the model.

b) Level flight

The model should make a straight and level flight upwind of 100 metres or 10 seconds whichever is of least duration. The model should pass over the landing area or as directed.

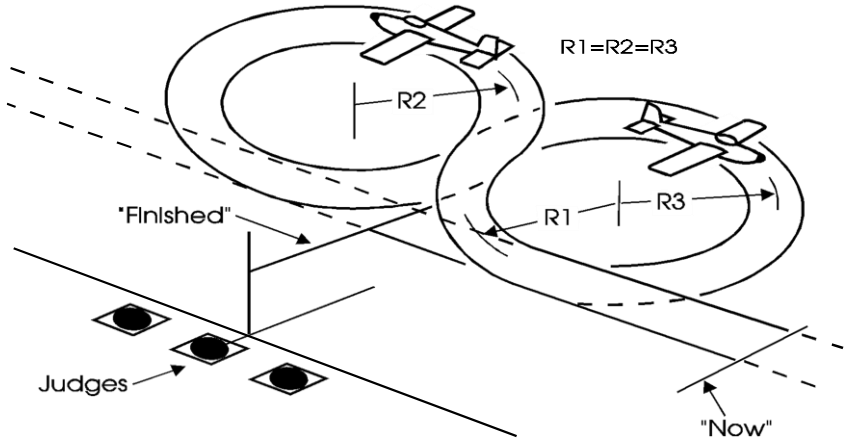
c) Procedure turn

Commencing from straight and level flight the model is turned 90° away from the pits, and then through 270° in the opposite direction resuming straight and level flight on the opposite heading to that of the entry. The manoeuvre must be commenced in order to place the point where the model changes from the 90° turn to the 270° turn on a line which passes through the centre of the landing area or as directed, at right angles to the direction of entry.



d) Horizontal figure of eight

Commencing from straight and level flight the model must turn 90° away from the pits, followed by a 360° turn in the opposite direction, followed by a 270° turn in the first direction completing the manoeuvre on the original approach line. The intersection (mid point) of the maneuvers shall be on a line that is at right angles to the direction of entry and passes through the centre of the landing area.



e) Left hand circuit landing approach The rectangular approach is commenced with the model flying from left to right above the landing area followed by a 90° left turn, a crosswind leg, a second 90° left turn, a downwind leg, a third 90° left turn, final cross wind leg, a final 90° left turn, then a final descent towards a final touch down point. The model should commence descent no earlier than the downwind leg.

f) Over-shoot

The model approaches as for a normal landing, and over the landing area at a height of approximately 3 metres, power is applied and the model climbs straight ahead.

g) Right hand circuit landing approach

Same as the left-hand approach except that all turns are 90° to the right.

h) Landing, power on

The model approaches with power reduced to idle then rounds out smoothly, adopting the three point attitude applicable to the specific type and touches down with a minimum of bouncing and roll to a stop.

i) Takeoff (within 15 minutes of landing)

j) Left hand circuit; and

k) Landing, power off

Power is cut to a low idle or complete stop when the model is overhead the landing area. A landing follows a rectangular approach with steady descent on each leg. Power should not be applied during the approach or landing.

9.2 Gliders (GD)

a) Launch

Using bungee, hand tow or winch ,hand launch ,discus, electric powered, the pilot must control the climb of the model without excessive weaving or stalling on the line then release smoothly into gliding flight.

b) Straight Flight & Stall

The model is flown straight and level in a prescribed direction for 30 seconds then stalled and recovered smoothly on the same heading as the straight flight.

c) Procedure Turn

d) Horizontal Eight

e) Right Hand Approach; and f) Landing
The rectangular approach is commenced with the model into wind above the landing area followed by a 90° right turn, a crosswind leg, a second 90° right turn, a downwind leg, a third 90° right turn, final cross wind leg, a final 90° right turn, then a final descent towards a final touch down point. The model must come to rest upright, complete and within 10 metres of a pre-determined spot.

9.3 Helicopter (HP)

The flight test should be completed on a standard F3C competition square which is a 10 metre square with a flag at each corner and two central flags. The two central flags may be omitted for this flight test.

In the following sections, hovering the model at eye level means that the model's landing skids must be at the same altitude as the pilot's eyes.

For the first three hovering maneuvers, the pilot must stand within a radius of 0.6 metres of one of the centre flags. The pilot must then stand in any position outside the square to complete the Take Off and Landing manoeuvre. The pilot may move between these two maneuvers but not during them.

a) 10 Second hover
Model takes off from central helipad, climbs to eye level and hovers for 10 seconds. Model then descends to a landing on the central helipad.

b) Figure M
Model takes off vertically from central pad and stops at eye level. While maintaining a heading parallel to the examiner's line and a constant altitude, the model moves along a diagonal line to the left or right near corner flag and stops. The model then moves forward to the second corner, stops, then moves sideways to the third corner and stops. The model then moves backwards to the fourth corner, stops again, then proceeds to move along a diagonal line back to the central helipad where it stops again. The model then descends to land on the central helipad.

c) Tail In Circle
The model ascends vertically to eye level and stops. The model then flies in a circular path to the left or right while maintaining a constant altitude and distance from the pilot finishing back over the central helipad. The tail must always point towards the pilot. The model then descends to land on the central helipad. (Pilot then moves to a nominated pilot position outside the square)

d) Take off, circuit and landing
The model lifts off from the central helipad, rises, and accelerates to forward flight.
The model then flies a circuit around two of the corner flags, descends, and decelerates to land on the central helipad. The model may fly around the pilot.

10.0 International visitors

Currently there is no formal internationally agreed protocol for recognising qualifications/Competencies' of overseas modelers.
Visiting modelers should contact the MFNZ secretary to arrange assessment of the international visitors' competencies.
Evidential confirmation of competency (e.g. produce evidence of wings badge type competency from their home base and details of the proficiency scheme prevailing in their home base) is desired but not mandatory.
Reciprocal insurance cover needs to be arranged by the MFNZ secretary as part of this accreditation process.

WINGS FLIGHT TEST CHECK LIST Basic Fixed

Wing powered

(BP) (LP)

		PASS	FAIL
1.Pre start checks	Understanding of Frequency control measures		
	Can describe the functions of a flight line observer		
	Check of control surface integrity - Hinges / pushrods etc..		
	Check of control surface direction when operating Transmitter		
	Check of correct model on Transmitter		
	Student able to talk about the importance of Centre of Gravity		
	Student able to discuss disorientation and correction		
	Student able to talk about flying etiquette		
	Range check undertaken		
	Battery charged check and student able to describe battery care / cycling / testing		
	Describe the isolation/starting precautions if an electric model (battery disconnect , throttle back, battery safety)		
2. Starting	Model restrained		
	Priming of engine / enabling of battery(electric model)		
	Application of Glow source		
	Awareness of propeller arc whilst running (observe the level of caution)		
3. Take off	Student able to describe the procedure for "Flame out" on take off		
	Model maintains straight path down runway and gains plenty of speed before takeoff		
	Model gained plenty of speed for takeoff		
	Climb out not be too steep. Straight directional heading maintained.		
	Constant rate of climb maintained and then gentle turn into circuit		
4. Level flight	Model must pass up centre of runway maintaining constant heading		
	Constant speed and height maintained		
5. Figure 8	Model approaches straight and level		
	Cross over point is in front of TX		
	Turns are of approx equal radius		
	Manoeuvres does not move down wind		
	Exit is at same height and opposite heading as entry		
6 .Stall	Angle of attack is increased until model stalls		
	Nose is dropped and speed increased before returning to level flight		
	Any loss of heading is corrected		
7. Left Hand Circuit and Landing approach with overshoot	Minimum 2 circuits Model straight and level		
	Model approaches straight and level		
	All turns are 90 degree		
	All sides are straight		
	Descent doesn't start before down wind leg		
	Model maintains constant rate of descent and constant heading		
	Model is lined up on strip at exit of final circuit turn		
	At approx 3m above ground power is applied and climb commenced		
	Heading remains constant through out decent power change and climb out		
	Climb out is at constant rate of climb		

		PASS	FAIL
8. Procedure Turn	Model approaches straight and level		
	Turns are of approx equal radius		
	Maneuver does not move down wind		
	Exit is at same height and heading as entry		
9. Right Hand Circuit and Landing	Minimum 2 circuits Model straight and level		
	All turns are 90 degrees		
	All sides are straight		
	Descent doesn't start before downwind leg		
	Model exits final turn lined up with runway		
	Rate of descent and heading remain constant		
	Model is gently flared and touches down with a minimum of bounce.		
	Model maintains heading while rolling to a stop.		
10. Landing Power on into wind	Procedure turn if necessary to ensure landing approach into wind		
	Rate of descent and heading remain constant		
	Model is gently flared and touches down with a minimum of bounce.		
	Model maintains heading while rolling to a stop.		
11. Take off Within 15min of landing	Model maintains straight path down runway and gains plenty of speed before takeoff		
	Model gained plenty of speed for takeoff		
	Climb out not be too steep. Straight directional heading maintained.		
	Constant rate of climb maintained and then gentle turn into circuit		
12. Left Hand Circuit and dead stick Landing	Throttle pulled back to idle		
	Model turned into wind		
	Rate of descent and heading remain constant		
	Model is gently flared and touches down with a minimum of bounce.		
	Model maintains heading while rolling to a stop.		

Note : Large fixed wing powered(LP) proficiency is similar to Basic Fixed Wing Power (BP)

with the additional criteria below

1. The student is able to discuss: the contents in general terms of the Large Model SIG Code of Practice including such aspects as
control linkages , weight categories , certification requirements ,dual control systems , scrutineering requirements ,engine disabling

2.Demonstrate the (BP) flight test routine on a model with a wingspan of at least 2 metres.

WINGS TEST CHECK LIST
Pylon/Hotliner

Before a Pylon Wings is approved the candidate shall already have passed a powered model wings test in any category.
To then obtain a Pylon Wings
A potential wings badge candidate is watched during a Pylon SIG approved race meeting
The wings badge for pylon be given in two categories. i.e. A rating and B Rating, this will differentiate between fast and very fast pylon planes, or sport and expert races.
That the wings badge be re-sat in the pylon category every two years

WINGS TEST CHECK LIST Turbine/Jet

Before a Turbine/Jet Wings is approved the candidate shall already have passed a in any category powered model wings test.
To then obtain a Turbine/Jet Wings
A potential wings badge candidate is to complete a schedule of manoeuvres as defined by the Jet Special Interest Group.

WINGS TEST CHECK LIST
Helicopters (HP)

The flight test should be completed on a standard F3C competition square which is a 10 metre square with a flag at each corner and two central flags. The two central flags may be omitted for this flight test

		Pass	Fail
1 - 10 Second hover	Model climbs smoothly to where skids are at eye level		
	Hover is maintained for 10 secs		
	Model descends smoothly to touch down		
	Heading is maintained throughout		
2 - Hovering M	Take off vertical		
	Heading parallel to examiners line is maintained		
	Height maintained with skids at eye level		
	Model stops at each corner		
	Decent smooth		
3 - Tail in circle	Take off vertical to eye height		
	Constant height maintained		
	Tail all ways points to pilot		
4 - Take Off Circuit And Land	Model lifts off and accelerates in forward flight		
	Circuit flown smoothly round two corner flags		
	Model slows and descends landing on central helipad		

WINGS FLIGHT TEST CHECK LIST
Gliders (GD)

		Pass	Fail
1.Pre Launch Checks	Understanding of Frequency control measures		
	Check of control surface integrity - Hinges / pushrods etc..		
	Check of control surface direction when operating Transmitter		
	Check of correct model on Transmitter		
	Range check undertaken		
	Battery charged check		
2. Launch	Climb is smooth without stalls		
	Climb straight without excessive weaving		
	Release from line and transition into glide is smooth		
3. Level flight and Stall	Model is flown straight and level for 30secs		
	Model stalls and recovers smoothly on same heading		
4. Procedure Turn	Model approaches straight and level		
	Turns are of approx equal radius		
	Manoeuvre does not move down wind		
	Exit is at similar height and same heading as entry		
5. Right Hand Circuit and Landing Approach	Model approaches straight and level		
	All turns are 90		
	All sides are straight		
	Model comes to rest upright, complete and within 10m of pre determined spot.		

Radio Control

FIXED WING

STUDENT FLIGHT TRAINING MANUAL AND LOGBOOK

NAME…….

Model flying New Zealand (MFNZ)

STUDENT FLIGHT TRAINING MANUAL AND LOGBOOK

Contents

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 principles 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 preflight 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 ((non 2.4 GHz)		
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 preflight your model.

The main points of a preflight 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 it's 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 lose sight of the ground you soon get disorientated and start to lose 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 cannot 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** member's 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 of 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		
WINGS TEST PASSED		