



MFNZ '*Wings*' Proficiency Scheme

Jet Turbine, Basic and Advanced

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 hold the MFNZ '*Wings*' qualification, endorsed to one or more of 10 disciplines, plus 3 specialist qualifications.

1.2. To meet the requirements of Civil Aviation Rule 101.205 for flying within 4km of aerodromes.

1.3. To provide a way of demonstrating a higher level of skill by completing an advanced test, with '*advanced*' certification.

2. Method

2.1. MFNZ encourages all clubs to ensure that members follow this proficiency scheme and to ensure that 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 mandatory to fly at those sites. The qualification provides ready proof of the holder's skill level.

2.3. Within 4km of an aerodrome all pilots must either hold a '*Wings*' qualification or operate under direct supervision of a '*Wings*' qualification 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*' Qualification is compulsory for:

- (a) all new flying members joining MFNZ.

(b) all members who fly at sites within 4km of, or on an aerodrome.

Members are encouraged to gain '*Wings*' qualifications at the earliest time.

2.5. Clubs should keep records of all the members holding '*Wings*' qualification certification and forward to the MFNZ membership secretary the name(s) of members attaining the certification in the various disciplines.

3. Examiners and Instructors

3.1. Instructors

Instructors will be proficient '*Wings*' certified holders with the same discipline qualification that is being instructed. Instructors will be appointed by the club(s). Clubs will assess their membership and select their instructors to meet the above criteria. Clubs will forward the name and MFNZ number of each appointed instructor to the MFNZ membership secretary for recording in the Association's database and the issue of a Instructors endorsement to the instructors membership card.

Instructors should be:

(a) Experienced proficient flyers that exhibit well-disciplined flying and operate in a safety conscious manner and are committed to training students to '*Wings*' standard.

(b) Be willing to spend considerable time training without letting their own skills suffer.

(c) Have empathy with the student and be able to guide the student through the learning process.

The MFNZ Members Manual for the student is available 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.

3.2. Examiners

Examiners will be (at least) '*Basic*' *Wings* qualification holders. It is not required for the Examiner to be proficient in the skill being tested but they should be familiar with the requirements of the qualification being tested and may conduct '*dummy tests*' with a qualification holder to understand the manoeuvres fully. Clubs will assess their membership and select their examiners to meet the above criteria. Clubs should keep a register of '*Approved*' examiners and forward to MFNZ on an annual basis. To ensure a common standard among Examiners, Area Representatives will conduct Examiner workshops whereby methods and ideas can be exchanged. The membership secretary will issue an Examiner's endorsement to the examiners membership card.

4. Qualification

There are 10 disciplines of Qualification:

| | |
|--|------------------------------------|
| Basic fixed wing Powered (BP) | Advanced Power (AP) |
| Glider (GD) | Advanced Glider (AG) |
| Helicopter (HP) | Advanced Helicopter (AH) |
| Multicopter (MR) | Advanced Multicopter (AM) |
| Basic Jet Turbine (BT) | Advanced Jet Turbine (AT) |

There are additional specialist qualifications for the following categories:

Large fixed wing powered (**LM**)
First Person View (**FP**)
High Speed (**HS**)

5. Certification

5.1. The proficiency qualification gained will be issued by MFNZ in the form of an endorsement on the membership card. Applications should be made through Club Secretaries on the official form, signed by the examiner. Annual membership cards will show the details of all qualifications held, including 'Instructor' and 'Examiner'. Members attaining a new qualification within the membership year may request the issue of a replacement membership card.

5.2. A pilot must be a current financial member of MFNZ to be the holder of a Wings qualification and issue / retention of a 'Wings' qualification is at the discretion of the MFNZ Council.

5.3. Any qualification may be withdrawn by a club if the pilot is considered to be no longer able to satisfactorily meet the required standard. The 'Wings' qualification will be reissued upon the satisfactory passing of a full wings test. You can have your wings certification taken away if you become incapable of flying safely due to an ongoing medical condition such as failing eyesight.

5.4 If you do not renew your MFNZ membership for 3 consecutive years you will be required to retake your qualification upon re-joining.

5.5 Holders of qualifications from overseas organisations must take the MFNZ 'Wings' qualification in order to comply with CAA regulations to be familiar with NZ airspace law.

Testing Procedure

There are four parts to each basic proficiency 'Wings' test:

- (a) The oral test
- (b) Pre 'flight inspection' of the model

- (c) Pre flight procedures test
- (d) The 'flight test'

It is suggested that the 'oral' testing be done first.

Each part is marked on a competent/not yet competent basis and total mastery is required to qualify.

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.

A full guide to each test as well as test sheets and oral questions are included elsewhere in this manual

6. General test guidance

6.1. The 'Wings' Proficiency Scheme is run by MFNZ as a National Scheme and it is open to all financial MFNZ model flyers.

6.2. The 'Basic' Certificate is a measure of flying ability and safety which may be equated to a safe solo standard of flying and an increasing number of clubs use it as their 'solo' test. The level of competence expected of a candidate should be based on the criterion; 'is this person fit to be allowed to fly unsupervised'.

6.3. A candidate wishing to take the '**Advanced**' qualification must have already passed the '**Basic**' qualification in that discipline.

6.4. The candidate should have studied the MFNZ Members Manual; any local site rules (if applicable) and be familiar with the MFNZ Safety Code. Besides being an excellent guide to the safe flying of model aircraft, most of the questions asked at the end of the test will be from these sections of the MFNZ Members Manual.

6.5. Also, Examiners may ask questions on any local site rules that the candidate should be aware of and these may form an important part of the test questions.

7. Buddy Box Systems

Buddy leads and other dual control training aids must not be used during any proficiency scheme test.

8. Consistency

The combination of reasonable height and good use of the throttle should mean that the model will be flying at constant height throughout most of the test and it should be noted if the height flown varies significantly.

It is a requirement that 'all manoeuvres are carried out in front of the pilot' with the implication that the model will be crossing in front of the pilot just beyond the take-off and landing area on several occasions during the flight. Care should be taken by the pilot that the line of approach each time is consistent.

Slightly varying height and somewhat inconsistent lines are not necessarily reasons to fail the candidate but they do give a good indication of the pilot's general level of competence and could influence the final decision. Very poorly flown height or lines are a sure sign that the pilot has not practiced the test and are a legitimate reason to fail them.

9. Continuity

Although the manoeuvres are set out in such a way that they can be flown one after the other as a schedule, this is **NOT** what is expected. The normal flight will have at least one positioning circuit between each manoeuvre and the examiner should discuss this with the candidate before the flight. He/She, of course, should be watching any extra circuits just as carefully as the rest of the flight as they can tell a lot about the competence of the flyer. A pilot who transitions directly from one manoeuvre to the next is attempting to fly to a higher standard than required. This is quite acceptable if they are competent but watch out for the pilot who hasn't practiced enough. Trying to fly the test in this way can get them into some very awkward positions.

10. Trim

10.1. It is expected that the candidate will start the test with a model that has been trimmed out previously but they should be able to trim the model out in the air if necessary. If there are obvious signs that the model is out of trim and the candidate does not make any attempt to rectify the matter the examiner should seriously question their basic competence.

10.2. On the other hand, if they do need to re-trim and are making attempts to do so, allowances should be made for a short time of flight with a somewhat erratic flight path. This should not be penalized unless it puts the model in any danger or unless the model flies behind the pilot or in any other unsafe area.

11. Nerves

Quiet competence is what is required during the flight but most candidates will be nervous and allowance should be made for this. If the flyer is very nervous the examiner should seriously consider abandoning the test for the time being and offering the candidate a coaching flight or two to settle them down before re-taking the test. This can be done on the same day and can really help those candidates who have trouble with nerves when flying in a test situation.

12. Repeating Manoeuvres

12.1. At 'Basic' certificate level the manoeuvres are simple and the candidate should be competent to fly them with very few errors. If there are any major faults the test should be taken again. It may be, however, that the candidate will make a minor mistake on a manoeuvre and if the examiner is not fully satisfied, he may consider asking for the manoeuvres to be repeated.

12.2. Some judgment is called for here. A major mistake is grounds for failing the candidate, especially if loss of control has occurred or a dangerous situation has arisen. The

examiner should definitely not let them have multiple attempts at each manoeuvre until they get it right but must give themselves the best chance of assessing the competence of the pilot being tested. Examiners should be extremely careful about using this option, however, as it could very easily be degrading the worth of the test. It must not, under any circumstances, degenerate into a series of 'practice' manoeuvres.

13. Repeating the Test

There maybe two attempts at the test in a day. If the candidate fails the first of these the examiner must consider their performance in deciding what to do next. Many failures will be reasonably good pilots or they could be borderline cases. In these circumstances it might be appropriate to offer one or two coaching flights and then a repeat of the test. Remember that many of the candidates will be unfamiliar with flying under pressure and might do very well on the second test.

On the other hand, it will probably be obvious that on many occasions that the pilot being tested is simply not ready for the test they are taking. In this situation it is better that to tell them so quite clearly. It could then be extremely useful to offer to fly a demonstration test for them so that they can gain an idea of the standard of flying required, especially if they have shown a lack of understanding of the manoeuvres and positioning. This, possibly along with a little coaching, is far more useful to everyone than simply telling the candidate that they have failed.

14. Interruptions to the Test

14.1. A possibility that may occur during a test is an engine failure part way through which could very well lead to a damaged model. If this is the case then the test obviously cannot continue and the examiner should invoke the rule that the test should be performed in one flight and count the flight as one of the two attempts allowed during the day.

14.2. Genuine engine trouble or even engine-out situations during the test may be dealt with in one of three ways.

14.3. If the test was being generally flown in a satisfactory manner and the problem can be rectified quickly then the candidate may be allowed to continue the test from the start of the manoeuvres in which the problem occurred.

14.4. If the problem cannot be rectified quickly but it is considered that it was a genuine unforeseen occurrence, the examiner may annul the test and not count it as one of the two attempts.

14.5. If the test up to the point of failure was not satisfactory, the examiner has the option to cancel the rest of the test and count the flight as one of the two attempts allowed during the day. Obviously, the examiner will have to use judgment on this matter as there will rarely be black and white situations but how they handled the emergency should be of great interest when reviewing the candidate's overall standard of flying.

15. Helpers for Disabled Candidates, Young Candidates and Others who have requested help During the Test

15.1. When disabled or young candidates present themselves for the test it may be that they will not physically be able to perform all the actions that most candidates can. At times, other candidates may also request help with certain physical aspects during the test (they may, for instance, have an injured finger). There will be times when the Examiner, will think 'how much can the test requirements be relaxed for this person'.

15.2. Some Examiners make the decision to make no allowances at all but this effectively bars many people from attempting the tests. If we think of the Proficiency scheme as a true national scheme then we must consider how we can accommodate candidates, not how we can stop them from participating.

15.3. The answer, of course, is that the Examiner, must make on-the-spot decisions about what will be allowed during the test and, in such cases, the examiner is within their authority to take such decisions. The guidelines set out below may help but at all times the two items at the end of this section must take precedence. They are not negotiable and mean that, whoever the candidate is, they have to convince the examiner that they know what they are doing or what is happening for the full duration of the test.

15.4. For instance, a disabled flyer may have difficulty handling the model and may not be able to carry it out to the strip, release it for launch or retrieve it after the flight. The sensible use of a helper is certainly allowable in such cases but it is essential that they only do what the candidate asks them to do. Pre-flight checks and engine starting may be another problem area that can be overcome by a helper but the candidate should be expected to do as much of the work as possible themselves and they should be able to talk through anything that the helper does for them. Examiners should be sure to discuss all this with the candidate before starting the test.

15.5. All of these comments can apply to younger flyers too but there is an added complication with engine starting. Many parents are unhappy about letting their children near a running engine and will not allow them to start their own engines. This is a perfectly valid view and is a case where a helper can be used. If this situation does occur with younger candidates however, the examiner should insist that they do all the pre-flight and preparation work themselves, up to applying the starter to the engine. If they cannot do this then they should not pass.

15.6. After engine start, the helper can adjust engine controls and carry the model but only on the instructions of the candidate.

In all cases:

(1) If, at any time, the helper takes over the decision making process from the candidate then the candidate must fail.

(2) The Examiner can make no allowances whatsoever for anyone during the flying of the test. The candidate can either perform the flight manoeuvres as specified or they can't. If they can't then they must not be bypassed.

Make sure in the briefing that both the candidate and the helper are fully aware of both of these points.

16. Administration notes for Examiners

There are specific forms for Examiners to use during the tests (included in this document); further copies can be downloaded from the MFNZ website. Completed forms should be sent to the local Club Secretary within seven days of the test and, whilst they must be filled in by the Examiner, they may be sent in to the local Club Secretary by either the Examiner or the Candidate. You should take great care that all the details are filled in correctly, especially the successful candidates **NAME** and their **MFNZ number** (this can save a great deal of confusion).

This is very important as what is seen on the pass form is what will appear on the final certificate. It is embarrassing for you to have to send one back to be re-done and it gives the candidate a definite impression of sloppy work by someone.

Club secretary's should collate the information and pass on the original or copied forms to the MFNZ Membership Administrator promptly for the issue of an updated membership card showing the qualification(s) achieved.

Basic Jet Turbine (BT) and Advanced Jet Turbine (AT)

Basic Jet Turbine (BT)

The Model

The candidate for the *Wing's* Basic Jet Turbine Test (BT) will need to fly a gas turbine powered model that is capable of flying the aerobatic manoeuvres required, but that does not necessarily mean either a scale or competition aerobatic model. In fact the test can be performed with any sport/trainer jet models.

Another important point to remember is that the candidate is not expected to build or necessarily own the model they use. There is no reason why a flyer who does not own a suitable model could not borrow one from a friend or club mate by arrangement.

The use of an autopilot is not allowed during the test. If any such system is fitted to the model it must be disabled during the test and you should check that this has been done.

The use of an aircraft stabilisation gyro is acceptable and permitted.

Crossing Distance

The distance out from the pilot is important. Any crossing manoeuvres during any one flight should be performed at a consistent distance out from the pilot and this should be between 30 and 80 metres, depending on the size of the model being used to take the test, and you should establish this with the candidate prior to the test.

The Basic Test

The pilot must stand in the designated pilot area for the entirety of the flying part of the test.

(a) Carry out pre-flight checks as required by the MFNZ Safety Codes, including failsafe

operation. The examiner should discuss the following points with the pilot during the pre-flight process.

Understanding of frequency control measures for all approved frequencies.

Describe the functions of a flight line observer and the pilot's interaction with them.

Check model integrity, control surfaces, wing and tail mounting and exhaust ducting if fitted.

Check of control surface direction when operating transmitter for correct sense/throws/mixers. Carry out range check and describe purpose/ function of fail safe. Student to perform a complete and thorough safety check of model including installed systems. Student to describe purpose and importance of centre of gravity indicating position on aircraft. Student to discuss and describe flight dis-orientation and corrective actions.

Student to discuss and explain the protocols of flying etiquette.

Check and display batteries are charged, describe understanding of charging/cycling/testing same.

Describe starting precautions with turbine models including safety procedures for helpers.

Describe safety procedures for controlling bystanders.

(b) Start-up and Taxi to the take-off position

Carry out fueling process display understanding and purpose of fuel tap, check for any leaks.

Describe the operation and application of a CO2 fire extinguisher if needed during start or fire. Ensure model facing into wind and exhaust efflux not affecting other fliers, onlookers or property.

Fit and monitor hand data terminal during start cycle, awareness of high exhaust temps etc.

Carry out high power checks ensuring engine parameters within limits.

Demonstrate Fail Safe function is set (engine to idle then shut down or straight shut down).

The model must be physically restrained during start-up and until it reaches the taxi point, the use of wheel brakes alone is not sufficient.

The model must taxi out from the taxi point to the take-off position. Taxying out of the pits is an instant fail. Prior to taxiing out the pilot should inform other pilots flying that the model is going out onto the active area.

(c) Take-Off and join the circuit in whichever direction is appropriate for the conditions.

Just prior to take-off the pilot should describe the procedure they will follow in the event of Flame-out on takeoff or during flight.

Take off must be performed with the model a safe distance from the pits area and on a line which does not take the model towards the pits, other people or any other danger area.

The pilot must stand in the pilot's area during the take off. If the pilot has to stand out on the strip behind the model when it starts its run then he is not ready to take this test.

Take off should be straight with the model not being pulled off the ground too soon. Abandoning the take-off for genuine reasons should not be penalised. It's far better that the candidate shows that they are thinking about what they are doing rather than trying to continue with a deteriorating situation. If a take-off is aborted in a safe manner you should immediately reassure the candidate that they will not be penalised for taking correct actions, even though these may conflict with what the test requires.

Climb out should be at a steady angle and straight until operational height is reached when the model will turn into circuit, level out and maintain constant circuit height.

The type of circuit can be either racetrack or rectangular this pattern should be maintained for the duration of the flight unless a certain maneuver calls for otherwise.

(d) Level Flight

On completion of the circuit, the model will be flying into wind past the front of the pilot and just beyond the far edge of the take off area. Model must pass parallel to the far side of the runway maintaining constant speed, height and heading.

This first pass in front of the pilot is extremely important as it sets the standard height and line for the rest of the test and this standard height and line will be referred to in these notes.

(e) Procedure Turn

The model approaches upwind at standard height and line in straight and level flight on a line parallel with the pilot. As the model draws level with the pilot it commences a 90° turn away from the pilot. The model maintains this track momentarily before commencing a 270° turn in the opposite direction, completing the manoeuvre on the reciprocal heading at the original height and on the original approach line.

Ensure manoeuvre does not move downwind.

(f) Figure Eight

Fly a "figure of eight" course with the cross-over in front of the pilot, height to be constant. The examiner will expect this manoeuvre to be flown accurately, but allowing for any

adverse wind conditions.

The model approaches up wind straight and level , turns performed are of approximately equal radius, constant speed and height maintained. Cross over point should be directly in front of pilot with exit at same height and heading as entry.

This manoeuvre should not move downwind.

(g) One roll

From straight and level flight down wind, maintain entry and exit at constant height and heading. the model rolls at a constant rate through one complete rotation resuming straight and level flight on exit. Minimum duration 2 seconds.

(h) One loop

Run in height and line should be standard and into wind the manoeuvre should be performed exactly in front of the examiner. A perfect loop is not required, but the entry and exit height and line should be very close to the standard.

Watch for appropriate throttle management during the manoeuvre and prompt the pilot if necessary.

(i) Stall

Angle of attack is increased at low power until the model stalls, the nose drops and speed is increased until level flight resumes. Discuss appropriate height for recovery as model is set up.

This (above) manoeuvre may be omitted at the examiners discretion dependent on model type.

(j) Fly Inverted straight and level flight for a minimum of 3 seconds with a half roll to inverted and from inverted.

Run-in line should be standard, and the manoeuvre should be performed with the centre of the inverted portion positioned exactly in front of the pilot.

After the 3 second run the model should be half rolled to upright before any climb-out. The entry and exit rolls may be in either direction.

Throughout the duration of the manoeuvre, the heading and height of the model should not deviate substantially although minor deviations are acceptable.

Note that this manoeuvre is NOT a slow roll.

(k) Fly a landing circuit and approach and overshoot at 15 foot altitude. Note that this manoeuvre is an aborted landing, not a low pass.

Watch out for the downwind leg not being flown parallel to the upwind leg and the turns being flown either too tight or too wide.

The throttle should be reduced as appropriate for the approach and consideration should be given to the fact that many gas turbine powered models may require the throttle to be retarded significantly earlier in the landing pattern, when compared to other forms of propulsion.

Once established on final approach, on line and descending, the throttle may be adjusted to achieve the desired descent rate. The aim of all this is to have the model at a speed, position and rate of descent which will guarantee an accurate touchdown on the landing area. Only when this is **QUITE CLEAR** and the model is at approx 20 feet altitude should the throttle be opened and the model climbed straight ahead at constant climb angle back up to circuit

height.

The pilot should call this manoeuvre out loudly as an **OVERSHOOT**.

(l) Perform a landing circuit appropriate to the site and conditions wheels to touch within 30 metres of a pre-designated point..

The pilot should call **LANDING** when on downwind for final.

Model approaches straight and level, maintaining height and heading in turn to downwind leg and maintaining constant rate of descent and heading into base leg and onto final.

Model enters final lined up with runway centreline maintaining heading and descent.

Model is gently flared to a touchdown point within 30 metres of pilot centre line with minimum bounce and maintains heading parallel to runway while rolling to a stop, the model should decelerate and turn off the runway in a controlled manner.

It should be appreciated that for many gas turbine powered aircraft the throttle may have to be reduced early in the landing pattern. Once established on final approach, on line and descending, the throttle may be adjusted to achieve the desired touch down point.

(m) Taxi back, stop and shutdown engine

The model should taxi in from the landing area, stopping at the taxi point a safe distance from the pits and other pilots etc. and the engine shut down, ready for recovery.

(n) Complete post flight checks as required by the MFNZ Safety Codes.

The post flight checks are set out clearly in the members manual but the Examiner should watch particularly that the 'Rx off, Tx off (unless the equipment manufacturer specifies otherwise), frequency system cleared' sequence is followed correctly.

This is also a good time for the examiner to discuss any areas of concern with the pilot and make suggestions for improvement if required.

The Questions (Basic)

The candidate must answer correctly a minimum of **five** of the **Mandatory Questions (Annex I, questions 1-15;** attached to this document) on safety matters, based on the MFNZ Safety Code for general flying and local flying rules.

The candidate must **also** answer correctly a minimum of **eight** questions from the **General and Specific Discipline Questions (Annex I, questions 16-29 and 93-101;** attached to this document) on safety matters, based on the MFNZ Safety Code for general flying and local flying rules.

It is suggested that the 'questions' are asked before the flying test.

Prior to the 'flying test' the examiner should also ask a minimum of three 'Local site/club Rules'.

Such questions should query the maximum altitude models can fly over the flying site as well as the boundaries of the site together with site 'etiquette' and pilot safety.

Remember, the Proficiency scheme is a test of both flying ability and knowledge. It doesn't matter how well the candidate can fly, if they cannot answer the safety questions they should not pass.

As an examiner however, you should prepare yourself thoroughly for any testing that you do and you may wish to sort out your own personal and private list of sensible questions. Don't forget that you can use any local rules which you know and which the candidate should be aware of. Remember that the majority questions you ask are to be BASED on the MFNZ Safety Code; you are not expected to ask them 'parrot fashion' and the candidate is not expected to answer that way either.

This opens up the possibility of asking a candidate if they can think of reasons behind specific rules. For instance, why is the club frequency control system operated as it is and what might go wrong? Why operating transmitters should not be taken out when retrieving models from an active flying area? Or why should models not be taxied in or out of the pits area?

Examiners and Candidates Check List

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 MFNZ members manual and 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 candidate to talk you through anything that the helper may do for them as the test progresses
- 5 Agree any Airspace requirements that need to be pre-determined by the 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 be looking for.

Examiners Check List. Basic Jet Turbine (BT)

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

| | | |
|-----|---|--|
| (a) | Pre start checks. | |
| (b) | Starting | |
| (c) | Take off | |
| (d) | Level Flight | |
| (e) | Procedure Turn | |
| (f) | Figure Eight | |
| (g) | One roll | |
| (h) | One loop | |
| (i) | Perform a stall and recovery. | |
| (j) | Inverted Flight | |
| (k) | Left / Right hand circuit and overshoot. | |
| (l) | Landing, wheels to touch within 30m of a pre-set point | |
| (m) | Taxi back, stop and shutdown engine | |
| (n) | Complete post flight checks as required by the MFNZ Safety Codes | |
| | Answer five questions from the list of mandatory questions on legal aspects of model aircraft flying. | |
| | Answer satisfactorily a minimum of eight questions on safety matters based on the MFNZ Safety Codes for General Flying and local flying rules. | |

Advanced Jet Turbine (AT)

General

The 'Basic' Qualification (BT) must be obtained first. The Advanced Test (Gas Turbine) has been designed to give a pilot who has already attained a Basic Certificate an opportunity to take a further test to show more advanced skills.

The Model

The candidate for the Advanced Test will need to fly a gas turbine powered model that is capable of flying the aerobatic manoeuvres required, but that does not necessarily mean either a scale or competition aerobatic model. In fact the test can be performed with any sport/trainer jet models.

Another important point to remember is that the candidate is not expected to build or own the model they use. There is no reason why a flyer who does not own a suitable model could not borrow one from a friend or club mate by arrangement.

The use of an autopilot is not allowed during the test. If any such system is fitted to the model it must be disabled during the test and the examiner should check that this has been done.

The use of an aircraft stabilisation gyro is acceptable and permitted.

Crossing Distance

The distance out from the pilot is important. Any crossing manoeuvres during any one flight should be performed at a consistent distance out from the pilot and this should be between 30 and 80 metres, depending on the size of the model being used to take the test, and the examiner should establish this with the candidate prior to the test.

Caller/Spotter/Observer

The candidate is allowed to have a caller/spotter/observer standing with him during the flight. The caller's only duty is to remind the pilot of the manoeuvre to be flown next or to alert the pilot to any safety issues, for example an approaching full size aircraft. No prompting of the pilot during manoeuvres is allowed and the caller may not discuss any

matters with either the candidate or the Examiner during the flight. Failure to abide by this will mean that the candidate fails the test.

The rules allow two attempts at the test in a day. If the candidate fails the first of these the examiner must consider their performance in deciding what to do next. Many failures are generally good pilots and the failure could be a borderline case.

The Advanced Jet Test

The pilot must stand in the designated pilot area for the entirety of the flying part of the test.

(a) Carry out pre-flight checks as required by the MFNZ Safety Codes, including failsafe operation

The pre-flight checks are laid out clearly in the MFNZ members manual. The candidate should also go through the pre-flying session checks, also laid out in the members manual. Ask the candidate to go through their checks as if the test flight was their first flight of the day and also ask for a demonstration of the fail safe.

Points to look for are that the candidate has a steady and regular ground routine, especially immediately prior to and during engine start-up. Nothing less than a competent performance is acceptable, the candidate must be fully in control of what they are doing when preparing their aircraft for flight.

A neat, uncluttered and safe ground layout is essential and is to be expected from ATJ candidates.

(b) Risk Assessment and Pre-Start

Demonstrate an awareness of a risk assessment process for the flying site.
Identify and prioritise the key risks and mitigation measures required.

Describe the flame out procedure for the model on this site for the following three scenarios: @35 feet altitude climbing after take off, @100 feet altitude heading upwind over the centre of the strip, and @100 feet altitude heading upwind at the upwind end of the strip.

Demonstrate knowledge of decision points re flaps undercarriage etc.

Demonstrate a satisfactory safety and pre flight check of the model including: Check of correct model on Transmitter; voltage on Transmitter in safe range; Check of control surface direction and mixers operating correctly;

Check security of control surfaces, turbine, tailpipe and fuel system.

Describe the radio and gear installation of the model to demonstrate adequacy for purpose.

Confirm flight and ECU batteries charged and operating in safe range Perform range check and demonstrate awareness of attitude, direction on radio signal.

Describe fail safe functions operating in the model.

Describe risks and procedure for failed starts with a kerosene ignition engine.

Describe procedure for dealing with hot start/fire including briefing to any helpers.

(c) Start-up and Pre-Flight

Prior to starting, the candidate and the examiner should agree the location of Pit and Start- Up areas, as well as the Taxi and Take-off points, which must be consistent with the site operations and safety requirements.

Demonstrate safe starting procedure for the engine/s , model position, helper/s.

Demonstrate fail safe functionsturn TX off with model held by helper, engine must drop to idle revs or shut down or combination of both depending on the engine. Flight controls recommended to set to neutral or hold (justify reasoning).

(d) Flight Test

The Advanced certificate Flight test should show the pilot is able to place the model at a desired height, speed and position. Accordingly the flight manoeuvres should be carried out and judged against objective criteria, in this case the FAI judges guide for the F4C scale flying schedule. Each manoeuvre should be able to be scored a five to pass. After the trim pass is completed the flight manoeuvres must be completed in the order nominated, one manoeuvre per pass. Pilot can choose to fly procedure turns or turnaround style positioning manoeuvres.

(e) Take-Off and Position.

Just prior to take-off the pilot should describe the procedure they will follow in the event of Flame- out on takeoff or during flight.

Take off must be performed with the model a safe distance from the pits area and on a line which does not take the model towards the pits, other people or any other danger area. The pilot must stand in the pilot's area during the take off. If the pilot has to stand out on the strip behind the model when it starts its run then he is not ready to take this test.

Take off should be straight with the model not being pulled off the ground too soon.

Abandoning the take-off for genuine reasons should not be penalised. It's far better that the candidate shows that they are thinking about what they are doing rather than trying to

continue with a deteriorating situation. If a take-off is aborted in a safe manner you should immediately reassure the candidate that they will not be penalised for taking correct actions, even though these may conflict with what the test requires.

Climb out should be at a steady angle and straight until operational height is reached the model is then turned into a racetrack style circuit and levelled out and constant circuit height maintained.

Free pass downwind for trimming, model sets up for flight schedule.

(f) Level Flight

The model will fly into wind past the front of the pilot and just beyond the far edge of the take off area. Model must pass parallel to the far side of the runway maintaining constant speed, height and heading.

This first pass in front of the pilot is extremely important as it sets the standard height and line for the rest of the test and this standard height and line will be referred to in these notes.

(g) Slow Roll

The manoeuvre should be flown at standard height and line with the model flying downwind. The centre point of the roll should occur as the model passes in front of the pilot. The roll should be of at least three seconds duration and the application of both elevator and rudder control at the appropriate times should be obvious to the examiners.

Throughout the duration of the roll, the heading and height of the model should not deviate substantially although minor deviations are acceptable.

(h) One Loop

The model flies into wind with standard run in height and line and the manoeuvre should

be performed exactly in front of the pilot. A perfect loop is not required, but the exit height and line should be very close to the original.

Skewing out is a sign that the model has not been trimmed correctly or that the wings were not level at the start of the manoeuvre. The pilot should not get into this situation to start with, but if they do then they must be able to compensate.

Watch for appropriate throttle management during the manoeuvre and penalise the pilot if they fly the manoeuvre at a constant high throttle setting.

The Candidate should perform 4 manoeuvres from the following list (i-r) alternatively downwind and upwind starting with the first manoeuvre performed downwind.

(i) Reversal

The model should run in on the standard line in straight and level flight at a height sufficient to ensure completion of the manoeuvre at a height of not less than 50 feet.

As the model passes the position of the pilot the model performs a half roll and when inverted performs half of a circular inside loop and resumes straight and level flight on the standard height and line, in a direction opposite to that of the entry.

Skewing out of the loop is a sign that the model has not been trimmed correctly or that the wings were not level at the start of the half loop. The pilot should not get into this situation to start with but if they do then they must be able to compensate.

In order to avoid the potential for overstressing of the airframe, appropriate use of the throttle and energy management are important for this manoeuvre. The manoeuvre should be flown smoothly, with the throttle retarded early and only opened as appropriate to resume normal flight.

(j) Immelman Turn

The model should run in on the standard line in straight and level flight. The model then pulls up into the first half of a circular loop and when inverted, performs a half roll before resuming straight and level flight on the opposite track.

Skewing out in the half loop is a sign that the model has not been trimmed correctly or that the wings were not level at the start of the manoeuvre. The pilot should not get into this situation to start with, but if they do then they must be able to compensate.

The exit path should be the reciprocal of that at entry.

(k) Two rolls in the same direction

These should be performed from standard height and line and must be continuous rolls with no hesitation between them. The model should be half way through the two rolls when it passes in front of the pilot although the examiner may allow a little leeway here.

There should be no serious loss of height or direction during the manoeuvre although slight barrelling of the rolls is permissible. The speed of the rolls should be such that the pilot has to make noticeable elevator inputs to maintain the models height.

'Twinkle rolls' that are so fast that no visible elevator input is required are NOT acceptable.

(l) Two rolls in opposite directions

These should be performed from standard height and line and must be continuous rolls with no hesitation between them. The model should be half way through the two rolls when it passes in front of the pilot although the examiner may allow a little leeway here.

There should be no serious loss of height or direction during the manoeuvre although slight barrelling of the rolls is permissible. The speed of the rolls should be such that the pilot has to make noticeable elevator inputs to maintain the models height.

'Twinkle rolls' that are so fast that no visible elevator input is required are NOT acceptable.

(m) Four point roll

The manoeuvre should be flown at standard height and line. The model should be rolled 90° and should stop momentarily before rolling a further 90° in the same direction to the inverted. The inverted centre point of the roll should occur as the model passes in front of the examiners although you may allow a little leeway here.

The model is then rolled a further 90° in the same direction and the roll again stopped momentarily before rolling through a further 90° to the upright. The manoeuvre should be at least three seconds duration and the application of both elevator and rudder control at the appropriate times should be obvious to the examiners.

Throughout the duration of the roll, the heading and height of the model should not deviate substantially, although minor deviations are acceptable. A scale model may require a slight nose up altitude when initiating the manoeuvre.

(n) Cuban Eight

The model should run in on the standard line in straight and level flight at a height between approximately 50 and 100 feet. After passing the position of the examiners the model pulls up into a circular inside loop and completes approximately 2/3 of the loop until it is inverted 45° nose down. The model is then half roll to upright directly in front of the examiners position. The model then commences another inside loop until it is once again orientated 45° nose down inverted. The model is then half rolled to the upright and recovered to the original entry height and line.

Skewing out is a sign that the model has not been trimmed correctly or that the wings were not level at the start of the manoeuvre. The pilot should not get into this situation to start with but if they do then they must be able to compensate.

Appropriate use of the throttle should be made during the manoeuvre and the recovery to straight and level flight should be on the same height, line and direction as the original entry.

(o) Half Cuban

Model pulls up into a circular inside loop until 45 degrees nose down. The 45 degree inverted flight is held until when in front of the pilot, the model rolls upright on the same heading until entry height is achieved when the manoeuvre exits at the entry height and on a reciprocal heading.

(p) Half Reverse Cuban

Start with the 45 degree climb and half roll then downward loop to finish level with entry height.

(q) Three Turn Spin

From straight and level flight, the model decelerates into a stall and commences the spin through three turns and recovers to level flight on the same track as the initial flight direction. During descent the model may drift with the wind.

(r) Inverted Pass

Run-in line should be standard and the manoeuvre should be performed with the centre of the inverted portion positioned exactly in front of the pilot. If the initial run-in is upright

the model must be half rolled to the inverted before the 3 second run commences.

After the 3 second run the model should be half rolled to upright before any climb-out. The entry and exit rolls may be in either direction.

Throughout the duration of the manoeuvre, the heading and height of the model should not deviate substantially although minor deviations are acceptable.

Note that this manoeuvre is NOT a slow roll.

(s) Derry Turn

The model should approach on the standard line in straight and level flight. As the model approaches the pilot's position it commences a steep banked turn (approximately 45° angle of bank) so it is flying directly away from the pilot, i.e. 90° to the original direction.

When centred in front of the pilot the model then makes a 3/4 roll in the same direction as the entry to the turn, i.e. if the initial turn was to the right, then the roll should also be to the right. In other words the model effectively rolls from upright in a right hand bank through the inverted to upright in a left hand bank. The model is then immediately transitioned into a 90° left hand turn and completes the manoeuvre when it flying in the same direction as at the start, but displaced further away.

On completion of the choice of 4; (i-k) manoeuvres the Candidate should perform the following compulsory manoeuvres.

(t) Circuit and overshoot

Commences with into wind pass with gear extended to check gear status. The downwind leg should be flown parallel to the upwind leg turns being flown not too tight or wide.

Descent shouldn't start before downwind leg with base leg exiting to final lined up with the runway, rate of descent and heading remain constant.

The throttle should be reduced as appropriate for the approach and consideration should be given to the fact that many gas turbine powered models may require the throttle to be retarded significantly earlier in the landing pattern, when compared to other forms of propulsion.

At about 20 feet altitude the pilot calls overshoot and climbs away on a constant heading and climb rate to rejoin the circuit.

Only when this is **QUITE CLEAR** and the model is at approximately 20 feet should the throttle be opened and the model climbed straight ahead back up to circuit height. Watch out for correct throttle control.

The pilot should call this manoeuvre out loudly as an **OVERSHOOT**.

(u) Landing

This may be a rectangular circuit with four turns or 'racetrack' with two. The examiner will watch out for the downwind leg not being flown parallel to the upwind leg and the turns being flown either too tight or too wide. Which ever circuit is flown, the throttle should be reduced at an appropriate point to achieve the desired decent rate and to establish the model on the desired path towards the landing area.

It should be appreciated that for many gas turbine powered aircraft the throttle may have to be reduced early in the landing pattern. Once established on final approach, on line and descending the throttle may be adjusted to achieve the desired touch down point.

The pilot should call **LANDING** when on final. Visual checks of the active area are still very important and must be seen to be done even at this stage of the landing.

If the candidate opens the throttle and climbs away then they should have a very good reason, such as people on the runway. Any reasons offered by the candidate for an unscheduled overshoot cannot include not being lined up correctly or anything similar. However, a forced overshoot for good reasons should not be penalised and a new approach and landing should be allowed.

Touchdown should be smooth with minimal or no bounce and within the designated 25 metre landing zone and the model should decelerate and turn off the runway in a controlled manner.

Ground loops and heavy or nose over landings are not acceptable at this level.

(v) Taxi back, stop and shutdown engine

The model should taxi in from the landing area, stopping at the taxi point a safe distance from the pits and other pilots etc. and the engine shut down, ready for recovery.

If the model does not taxi in then the Examiners should take this into account when assessing the candidate's flight as a pilot at this level should be capable of controlling his aircraft in all active phases of the flight. If the candidate has performed an excellent flight then not taxiing in might not weigh too heavily but it might well affect the decision if the Candidate's flight was average but passable. In borderline cases, it might be appropriate to ask the candidate to repeat the take- off/landing manoeuvres so that safe taxiing out and in may be demonstrated.

(w) Complete post flight checks as required by the MFNZ Safety Codes.

The post flight checks are set out clearly in the members manual but the Examiner should watch particularly that the 'Rx off, Tx off procedure is followed (unless the equipment manufacturer specifies otherwise).

The test must be completed in one flight. Exceptionally, at a pre-determined point in the flight, an intermediate landing may be permitted for the sole purpose of re- fuelling. This landing may only be made with the prior consent of the Examiner. The pre-determined point may be either after a specific manoeuvre or at a specific time of flight, whichever is requested by the candidate and agreed by the Examiner.

The candidate may be offered a chance to correct a manoeuvre or landing deficiencies at the examiner's option in the event of unfavorable external events during the flight or weather conditions...ie excessive crosswind or gusty wind conditions.

Full pre and post flight checks are not normally required during an intermediate landing and take off unless the model suffered a hard landing. However, the candidate should give the model at least a quick visual examination whilst on the ground.

The Questions (Advanced)

The candidate must answer correctly a minimum of **five** of the **Mandatory Questions (Annex I, questions 1-15;** attached to this document) on safety matters, based on the MFNZ Safety Code for general flying and local flying rules.

The candidate must **also** answer correctly a minimum of **eight** questions from the **General and Specific Discipline Questions (Annex I, questions 16-29 and 93-101;** attached to this document) on safety matters, based on the MFNZ Safety Code for general flying and local flying rules.

It is suggested that the 'questions' are asked before the flying test.

Prior to the 'flying test' the examiner should also ask a minimum of three 'Local site/club Rules'.

Such questions should query the maximum altitude models can fly over the flying site as well as the boundaries of the site together with site 'etiquette' and pilot safety.

Remember, the Proficiency scheme is a test of both flying ability and knowledge. It doesn't matter how well the candidate can fly, if they cannot answer the safety questions they should not pass.

As an examiner however, you should prepare yourself thoroughly for any testing that you do and you may wish to sort out your own personal and private list of sensible questions. Don't forget that you can use any local rules which you know and which the candidate should be aware of. Remember that the majority questions you ask are to be BASED on the MFNZ Safety Code; you are not expected to ask them 'parrot fashion' and the candidate is

not expected to answer that way either.

This opens up the possibility of asking a candidate if they can think of reasons behind specific rules. For instance, why is the club frequency control system operated as it is and what might go wrong? Why operating transmitters should not be taken out when retrieving models from an active flying area? Or why should models not be taxied in or out of the pits area?

Examiners and Candidates Check List

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:

- a. Has the candidate read the MFNZ members manual and Local site rules
- b. Discuss whether the model is suitable in “these conditions”
- c. Any “no fly zones” need to be identified
- d. Remind candidate to talk you through anything that the helper may do for them as the test progresses
- e. Agree any Airspace requirements that need to be pre-determined by the Examiner and Candidate prior to the commencement of the test flights
- f. Clearly identify the landing area and agree with the candidate the required landing pattern that he will be flying and you will be looking for

Examiners Check List. Advanced Jet Turbine (AT)

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

| | | |
|-----|--|--|
| (a) | Risk assessment and Pre start. | |
| (b) | Start-up and Pre Flight. | |
| (c) | Take off and position. | |
| (d) | Level Flight | |
| (e) | Slow roll | |
| (f) | One loop | |
| (g) | Select and perform four manoeuvres from the list below to be perform alternately upwind and downwind | |
| (h) | Reversal/Split S | |
| (i) | Immelmann turn | |
| (j) | Two rolls in the same direction | |
| (k) | Two rolls in opposite directions | |
| (l) | Four point roll | |
| (m) | Cuban eight | |
| (n) | Half Cuban | |
| (o) | Half reverse Cuban | |
| (p) | Three turn spin | |
| (q) | Inverted pass | |
| (r) | Derry Turn | |
| (s) | Perform a landing circuit appropriate to type, the site and prevailing conditions and overshoot | |
| (t) | Perform a landing, wheels to touch within 25m of a pre-set point | |
| (u) | Taxi back, stop and shutdown engine | |
| (v) | Complete post flight checks as required by MFNZ Safety Codes | |

| | | |
|-----|--|--|
| (w) | Answer <u>five</u> questions from the list of mandatory questions on legal aspects of model aircraft flying. | |
| (x) | Answer <u>eight</u> questions on safety matters from the MFNZ Safety Codes and local flying rules. | |