

Basic Helicopter (HP) and Advanced Helicopter (HP)

General

The Achievement Scheme is run by the MFNZ as a National Scheme and it is open to all model flyers. Where a non-member wishes to participate in the achievement scheme the examiner who will be conducting the test must inform the MFNZ office via email or telephone no later than the day prior to the test being carried out of the non-member's full name, address and the date that the test will be conducted. This enables the MFNZ to extend insurance at suitable levels for the day of the test. If this procedure is not followed the test will be invalid.

The candidate must successfully complete the test schedules in one attempt. A maximum of two attempts at the examination are permitted in any one day.

The test schedule is split broadly into five areas; the pre-flight safety checks, moving from the pits/start-up area to the take-off/landing area, the flying manoeuvres, the recovery & return to the pits, and the questions.

The Basic Certificate

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.

As an Examiner, the level of competence you should expect of a candidate should be based on that criterion; that is 'is this person, in your opinion, fit to be allowed to fly unsupervised'.

The candidate should have studied the MFNZ members manual, any local site rules (if applicable) and be familiar with the 'Safety Code for General Flying'. 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 members manual.

Also be aware that you 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 you ask.

The Advanced Certificate

The Advanced Certificate is "designed to recognise the pilot's more advanced ability and a demonstrated level of safety.

As an Examiner, therefore, the level of competence required from a candidate should firstly be based on the question; 'has this person demonstrated their flying ability and safety to me in a satisfactory manner' and, secondly, 'how do I feel about them appearing in public, possibly at a large display, on the strength of the certificate which I may be about to award them'.

The aim of the Advanced certificate has always been to give the club flyer a personal attainment goal beyond the Basic Certificate; a demonstrated level of competence and safety which is attainable by the average pilot with a little thought and practice.

The long term strategy behind this is that if enough club flyers qualify for their Advanced certificates then the general standard of flying both within your club and nationally cannot help but rise.

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

The Model

The test can be performed with virtually any model helicopter, fixed pitch or collective. The helicopter may be internal combustion engine powered or electric powered. The only exception to this is that helicopters with contra-rotating main rotors are not permitted for the Basic and Advanced tests, the reasoning being that these models are generally too stable to provide an adequate test of a candidate's abilities.

Whatever model is brought by the candidate, it must be suitable to fly the manoeuvres required by the test they are taking. You do not have the authority to alter the required manoeuvres to suit a model and if, in your opinion, the model is unsuitable for the test then you should explain this to the candidate and tell them that they cannot use that model. The selection of the model to do the test is the responsibility of the pilot and it is their ability you are testing, not the model.

On no account may the candidate use defects or limitations in the performance of the model as an excuse for poor performance on their part and you should make no allowance on this point. The type of model presented cannot be used as an excuse for not completing certain manoeuvres.

Electric Powered Models must be treated as LIVE as soon as the main flight battery is connected, irrespective of radio state and great care must be demonstrated by the candidate. The arming sequence should be clearly understood and discussed/demonstrated to you by the candidate.

Gyros, Electronic Stabilisation and GPS

Where a fly bar is fitted, it is acceptable to use an electro-mechanical or solid state gyro in a helicopter being used to take the test although electronic stabilisation is restricted to a single sensor acting in rotation around the yaw axis only. This allows a range of gyros to be fitted, from simple yaw dampers to solid state heading lock units but only acting on the tail rotor.

If the helicopter does not have a fly bar fitted it is acceptable to use extra electronic stabilisation, however the extra electronic stabilisation must only be acting as a fly bar replacement system and must not take over control from the pilot or achieve automated flight.

The use of any autopilot and/or artificial stability features which are (or may be) designed into such units beyond definition above is not acceptable during the test for the Basic and Advanced certificates and is not permitted.

Candidates should be prepared to explain the capabilities of the system they are using and show that it does not take over control from the pilot and that automated flight will not be achieved during the test.

GPS must not be used during any test.

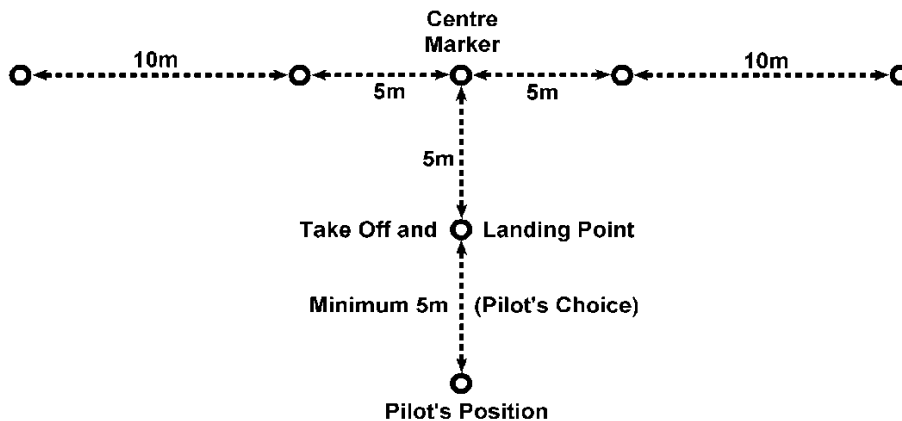
There is no requirement for the fixed positioning of manoeuvres relative to the wind direction in the Helicopter tests and you will find no reference to the wind in the text of either the test or this Standards Document.

This makes it absolutely ESSENTIAL that you discuss this with the candidate at length so that you are both aware of exactly how you want the manoeuvres to be presented and what limitations will be accepted if the wind direction is not favourable.

Ground Positioning

When taking a helicopter test, it is your responsibility as the Examiner to lay out a series of ground markers to assist both the candidate and yourself to assess the manoeuvres being flown. Small cones or any other similar marker may be used as long as they don't interfere with the flying of the model. However, it is vital that the marker used for the take off/landing point (TOLP) does not affect the model at all and probably the best marker in this case would be something like the fluorescent discs that lay flat on the ground. Alternatively, you could use some of the biodegradable ground marker spray paint that is readily available.

The layout of markers required is shown below and it must be emphasised that absolute accuracy of distance is not required when setting them out. Pacing will be quite accurate enough. It is essential, though, that the centre marker, the TOLP and the pilot's position are in line.



GROUND POSITIONING MARKERS

The general positioning of the markers will depend very much on the geography of the flying site and safe operation of the model and you should set them out with these factors in mind.

It is not a requirement that the markers in the cross bar are used by the pilot but they are there to help. However, the centre marker, the takeoff/landing point and the pilot's position must be used with some accuracy.

Landings should generally be no more than a metre from the takeoff/landing point and the pilot is expected to stay close to the selected pilot's position mark although it is not required that they 'plant' their feet. If you feel that the pilot is starting to wander, you should stop them and insist that they stand near the pre-selected mark.

Remember that it is a requirement that 'all manoeuvres are carried out in front of the pilot' so the use of the pilot's position point will be important.

General Manoeuvres and Hovering

All take-offs and landings should be smooth, without undue oscillations, and lifts and descents should be straight and controlled with the model a comfortable and safe distance in front of the pilot. In any stationary hovering the model should remain steady and should not oscillate unduly.

The standard 'brief' hover time is about five seconds. You should discuss this with the candidate before the test so that they know that you will want to see a positive stop with the hover long enough to show that the model is well controlled and steady with little wandering or oscillation. Stopwatch accuracy is not required.

The candidate should also be aware that the decision to move on is theirs and that you will not be asking them to commence with the next manoeuvre. However, during your pre-flight briefing, they may ask that you indicate when you are satisfied that they have completed their

'brief' hover times to help them decide when to move on. This is quite permissible if requested by the candidate.

Circuit and other 'flying' manoeuvres should be performed at the heights mentioned in 'Height and Speed' above. Movement of the model from one point to another whilst in the hover should be done at a steady walking pace.

Care should be taken in the flying manoeuvres that the line of approach and height each time is consistent and you should take particular note of performance in this area.

Intermediate Landing

Exceptionally, at a pre-determined point in the flight an intermediate landing may be permitted for the sole purpose of the fitting of a freshly charged flight battery. This landing may only be made with the prior consent of the Examiners. 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 Examiners.

Full pre and post flight checks are not normally required during an intermediate landing and takeoff 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 Basic Test

(a) Carry out pre-flight checks as required by the MFNZ safety codes.

The pre-flight checks are laid out clearly in the MFNZ Members' 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 was their first flight of the day. Particular attention should be given to airframe, control linkages and rotors.

Points to look for are that the candidate has a steady and regular ground routine, especially when starting and tuning the engine. Nerves should not play a part in the pits, and you should satisfy yourself that the candidate is in full control of what they are doing whilst preparing the helicopter for flight.

A tidy flight box and a neat ground layout makes a good impression but bear in mind that that Basic certificate candidates may not have been flying for too long and you should make allowances.

A poor performance in this area is not direct grounds for failing the candidate but can certainly be part of a cumulative fail if other aspects of the performance are below the standard you expect.

Pay particular attention to the way the candidate uses the local frequency control system and make sure that they fully understand it and use the correct sequence appropriate to their model. For 35 MHz, this is usually 'get the peg, Tx on, Rx on'. For 2.4 GHz, the candidate should be aware of any local transmitter usage limitations and if a flight peg is required, it must be obtained before the usual Tx on, Rx on sequence. Some radio equipment and, occasionally, a specific model requirement requires that the Rx be switched on first and, if this is the case, the candidate should explain this clearly to you.

With electric powered models, take note that the candidate is aware that the model is 'live' as soon as the flight battery is plugged in and that they take appropriate safety precautions. If a separate receiver battery is fitted, the candidate should have the opportunity to check the operation of the radio equipment before the flight battery is plugged in.

Watch carefully and take note that the transmitter controls, trims and switches are checked by the pilot.

All candidates are required to be aware of the local the frequency control system and anyone who is required to use it but switches their radio on before doing so should be failed on the spot.

With i/c powered models, it is important that the candidate is seen to hold the rotor head securely during the starting procedure and until the model is past the flight line.

Electric powered models must be carried out from the pits area to a safe point before the flight battery is connected and they **MUST** be considered live as soon as the flight battery is plugged in. Great care should be taken at this point and any help available to the candidate should be used in the interests of safety.

If there is no one else available then there is nothing to stop you aiding the candidate by, for instance, carrying the model to the test area etc. but any such actions must be performed by you directly on the instructions of the candidate. You must not prompt them or carry out any actions of your own accord.

It is important that you talk these points over with the candidate in you pre-flight briefing.

(b), (c), (d), (e), (f) and (g) together form a horizontal 'T'.

During the course of manoeuvres (b), (c), (d), (e), (f) and (g) the model should not have deviated significantly from a straight line drawn between the end points Slight drifting may be

permissible in adverse wind conditions, but should be rapidly corrected and put back on the correct course. If the deviation is severe, or the model does not follow the line at all, the candidate should not pass. The hovering speed between the end points is at the discretion of the candidate but must be no faster than a slow walk.

Each stop should be a controlled hover, with any movement being quickly checked, without signs of large over-corrections. The pauses at each hovering point should be about five seconds, other than in (b).

The height of the helicopter should be consistent throughout these manoeuvres with no major deviations.

(b) Take off and hover tail in over the take-off point, with the helicopter skids at approximately eye level, for about twenty seconds and then land.

Take off should be smooth and the lift to eye level should be vertical, straight and controlled with the model a comfortable and safe distance in front of the pilot. Once at eye level the model should remain stationary, and the tail should not oscillate unduly. You should notify the candidate when the hover time of about twenty seconds has passed and ask him to commence with the next part of the manoeuvre. The descent and landing should be smooth and steady with little oscillation of the tail on touchdown caused by poor tail control.

(c) Take off and hover for about five seconds, then hover the helicopter slowly forwards for approximately five metres, stop, and hover for about five seconds.

After the take off and five seconds hover time and, on your command, the pilot now hovers the model forward, at a slow hovering pace, for a distance of about five metres then stopping and hovering for about five seconds. All the previous comments about line, height at eye level, speed and steadiness apply and the orientation of the model should still be facing in the same direction as this initial forward hover, as for all the rest of the first set of manoeuvres.

(d) Hover the helicopter slowly sideways for approximately five metres, stop, and hover for about five seconds.

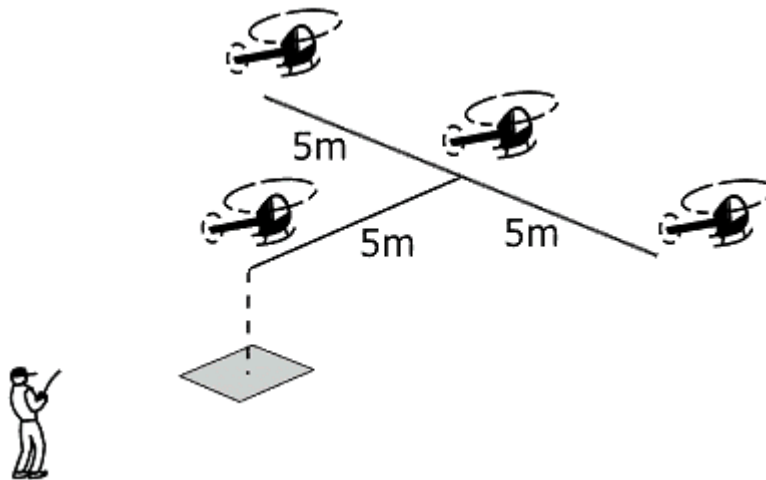
The pilot may choose to perform the initial sideways hover in either direction (to his left or right) and, once you have been told the direction, the candidate should, without turning the model, commence a sideways hover at eye level for a distance of approximately five metres. Having travelled about five metres the pilot will stop the model and hold it in a steady hover at eye level and, with the tail pointing in the same direction as it was when it took off, for about five seconds

(e) Hover the helicopter slowly sideways in the opposite direction for approximately ten metres (five metres past its original position in front of the pilot), stop, and hover for about five seconds.

At the end of the hover time the pilot, without turning the model, will hover it sideways in the opposite direction, passing in front of them and stopping 5 metres past the centre line. At this point the pilot will once again stop and hover the model with it still facing in the same direction as it was at take-off.

(f) Hover the helicopter slowly sideways in the first direction to bring it back to its original position in front of the pilot, stop, and hover for about five seconds.

The candidate should, without turning the model, commence a sideways hover at eye level for a distance of approximately five metres back to the centre marker. Having travelled to the centre marker the pilot will stop the model and hold it in a steady hover for about five seconds at eye level and, with the tail pointing in the same direction as it was when it took off.



(g) Fly slowly backwards, bringing the helicopter back to its original position over the take off point, stop, hover for about five seconds and land.

After hovering for about five seconds, the model is hovered backwards (without turning it) to the start position, stopped and hovered for about five seconds above the TOLP with skids at eye level. After the hover time has been completed the model should descend and land close to the original take off point. During this last section, you will be observing the same criteria as previously and the model should have performed as before in relation to the course and at a similar speed. The descent and landing should be smooth and steady with little oscillation of the tail on touchdown caused by poor tail control.

(h) Take off and fly slowly forward for approximately 5 metres, stop and hover for about five seconds. Turn 90 degrees either left or right and fly forward to perform two 'lazy eights', each at least 30 metres in length. Each time the helicopter passes in front of the pilot it must be sideways on to the pilot and throughout the manoeuvre the model must be flying forward, not sideways.

The pilot should make a quick visual check that the area he intends to overfly is clear and that no other models are flying in the near vicinity; you should be watching for definite head movements as they scan the area.

The pilot should fly this manoeuvre at a safe height above eye level, but should not fly at such a height that the model cannot be clearly seen by both the pilot and yourself. Between eye level and five metres is the correct height band for this part of the test and the model **must** hover through the lazy eights, not fly through them. The pilot must be clear about the height at which they wish to fly before they take-off and you should discuss this with them in the pre-flight briefing.

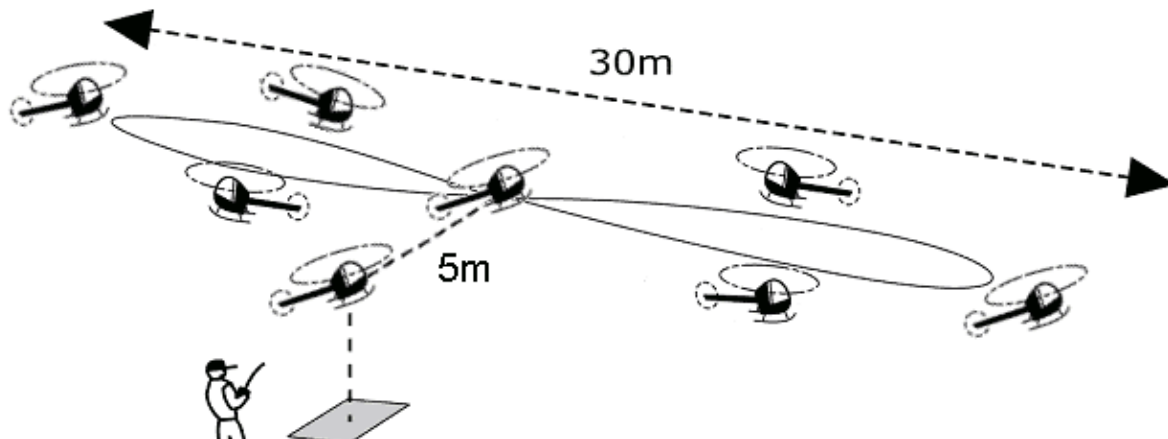
Having ensured that it is safe to start the manoeuvre, the pilot then takes the model off, rises smoothly to the flight level previously selected and hovers forwards for approximately 5 metres, stopping over the centre marker and hovering for about five seconds.

The pilot then turns the model 90°, either left or right and, at the same time, slowly moves off forward at about a **walking pace** (but still in the hover). It is not required that the 90° turn is completed before the model accelerates; the turn and acceleration may be one smooth manoeuvre although the pilot may treat them as separate manoeuvres if they wish.

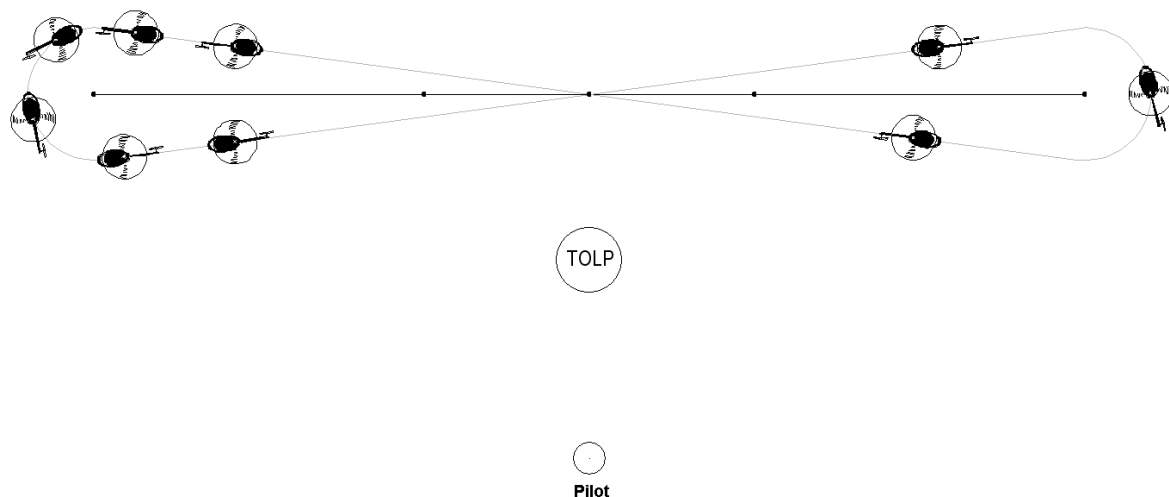
The pilot moves away at his chosen height for a distance of about fifteen metres where they begin a turn the model smoothly through 180°, flying forward in the hover all the time, and bringing the model back across in front of them. Without hesitation the model continues at

the same speed in the new direction until it has flown past the pilot for a further fifteen metres to his opposite side. At this point he smoothly executes another 180° turn, causing the model to be now moving in the same direction as the first leg, again hovering across in front of the pilot.

The model does not stop at this point but it then repeats the events of the first lazy eight until two full eights have almost been completed and the model is near or over the centre ground marker.



During the lazy eights, you will be looking for a safe controlled flight throughout. The candidate should not lose or gain height significantly on the turns and should hover in a straight line between the turns with only sufficient drift on the model to prevent it from moving either further away or, more dangerously, closer to himself during each leg of the manoeuvre. The **overall** length of each eight should be at least thirty metres and the model must be sideways on to the pilot each time it passes across their front. Some allowance can be made for a strong or gusty wind but the basic points of the manoeuvre must still be demonstrated.



At no time during the manoeuvre should the model be flying sideways. Throughout all the turns and straight flight, it must be flying forward in the hover and not 'crabbing' sideways.

The turns should be made by use of cyclic and rudder co-ordinated correctly, and must **not** be half piroettes at the end of each leg. The flight pattern should be as the diagram in the

MFNZ Members' Members manual and not deviate significantly from it. The pilot should be equally competent to the left and to the right when flying this manoeuvre. If any significant difference in their flying skills shows up here then you should seriously consider whether they show the degree of competence necessary. It should be borne in mind that the manoeuvres in the test have been made reasonably simple, so that a fairly high degree of control can be demanded.

(i) At the conclusion of the two 'lazy eights', bring the helicopter to a halt sideways-on over the centre marker. Turn the model tail in to the pilot and hover for about five seconds. From this point fly the model to a landing on the original take off point.

At this point the model should be approaching the area of the centre marker, still at the chosen manoeuvre height, and the pilot should aim to smoothly decelerate the model to a stop in front of and sideways on to himself. The model is then turned to the heading it had before the lazy eights were started and hovered for about five seconds. At this point it should be over the centre marker, about five metres in front of the TOLP and hovering at the standard height.

The model is now flown to a landing at the original take-off point. The path taken is entirely at the discretion of the pilot and you should take the opportunity to watch carefully for a smooth well-thought-out and safe manoeuvre.

After landing, the candidate should shut down the engine and allow the rotor blades to stop turning before collecting the model to return to the pits.

Remember that electric models must be assumed to be 'live' until the flight battery has been disconnected and the handling of the aircraft by the candidate must reflect this during retrieval and in the pits area.

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

These are clearly set out in the MFNZ Members' Members manual, but you should pay particular attention to the correct Rx off, Tx off sequence and watch carefully to see that the frequency control system in use is cleared correctly.

Examiners and Candidates and Basic Test 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
Local site rules (if applicable) | <input type="checkbox"/> |
| 2 | Discuss whether the model is suitable in "these conditions" | <input type="checkbox"/> |
| 3 | Any "no fly zones" need to be identified | <input type="checkbox"/> |
| 4 | Remind candidate to talk you through anything that the helper may do for them as the test progresses | <input type="checkbox"/> |
| 5 | Agree any manoeuvre requirements that need to be pre-determined by | <input type="checkbox"/> |

the Examiner and Candidate prior to the commencement of the test flights

- 6 Clearly identify the take off / landing point and agree with the candidate the required hovering times that he will be flying and you will be looking for.

Examiners Check List. Basic Helicopter (HP)

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

FLIGHT TASK		COMMENTS
(a)	Carry out pre-flight checks as required by the MFNZ Safety Codes.	
(b)	Take off and hover tail in over the take off point, with the helicopter skids at eye level, for about twenty seconds and then land.	
(c)	Take off and hover for about five seconds then hover the helicopter slowly forwards for approximately five meters, stop, and hover for about five seconds.	
(d)	Hover the helicopter slowly sideways for approximately five meters, stop, and hover for about five seconds	
(e)	Hover the helicopter slowly sideways in the opposite direction for approximately ten meters (five meters past its original position in front of the pilot), stop, and hover for about five seconds.	
(f)	Hover the helicopter slowly sideways in the first direction to bring it back to its original position in front of the pilot, stop, and hover for about five seconds.	
(g)	Fly slowly backwards, bringing the helicopter back to its original position over the take off point, stop, hover for about five seconds and land	
(h)	Take off and hover forward for about five meters, stopping over the centre ground marker and hover for about five seconds. Turn 90 degrees either left or right and fly forward to perform two 'lazy eights', each at least 30 meters in length. Each time the helicopter passes in front of the pilot it must be sideways on to the pilot and throughout the manoeuvre the model must be flying forward, not sideways.	
(i)	At the conclusion of the 'lazy eights', bring the helicopter to a halt above the centre ground marker, turn the model tail in to the pilot and hover for about five seconds. Then fly to the original take off point, and land.	
(j)	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 a minimum of five questions on safety matters from the MFNZ Safety Codes and local flying rules.		

The Advanced Test

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

The pre-flight checks are laid out clearly in the MFNZ Members' 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 was their first flight of the day.

Points to look for are that the candidate has a steady and regular ground routine, especially when starting and tuning the engine. Nerves should not play a part in the pits, and you should satisfy yourself that the candidate is in full control of what they are doing whilst preparing the helicopter for flight.

A tidy flight box and a neat ground layout makes a good impression and is to be expected from Advanced certificate candidates

A poor performance in this area is not direct grounds for failing the candidate but it is inevitable that you will be making mental notes of all aspects of the candidates performance and this is one that may have an effect on a real 'borderline' case.

Pay particular attention to the way the candidate uses the local frequency control system and make sure that they fully understand it and use the correct sequence appropriate to their model. For 35 MHz, this is usually 'get the peg, Tx on, Rx on'. For 2.4 GHz, the candidate should be aware of any local transmitter usage limitations and if a flight peg is required, it must be obtained before the usual Tx on, Rx on sequence. Some radio equipment and, occasionally, a specific model requirement requires that the Rx be switched on first and, if this is the case, the candidate should explain this clearly to you.

With electric powered models, take note that the candidate is aware that the model is 'live' as soon as the flight battery is plugged in and that they take appropriate safety precautions. If a separate receiver battery is fitted, the candidate should have the opportunity to check the operation of the radio equipment before the flight battery is plugged in.

Watch carefully and take note that the transmitter controls, trims and switches are checked by the pilot.

All candidates are required to be aware of the local the frequency control system and anyone who is required to use it but switches their radio on before doing so should be failed on the spot.

With i/c powered models, it is important that the candidate is seen to hold the rotor head securely during the starting procedure, and until the model is past the flight line.

Electric powered models must be carried out from the pits area to a safe point before the flight battery is connected and they MUST be considered live as soon as the flight battery is plugged in. Great care should be taken at this point and any help available to the candidate should be used in the interests of safety.

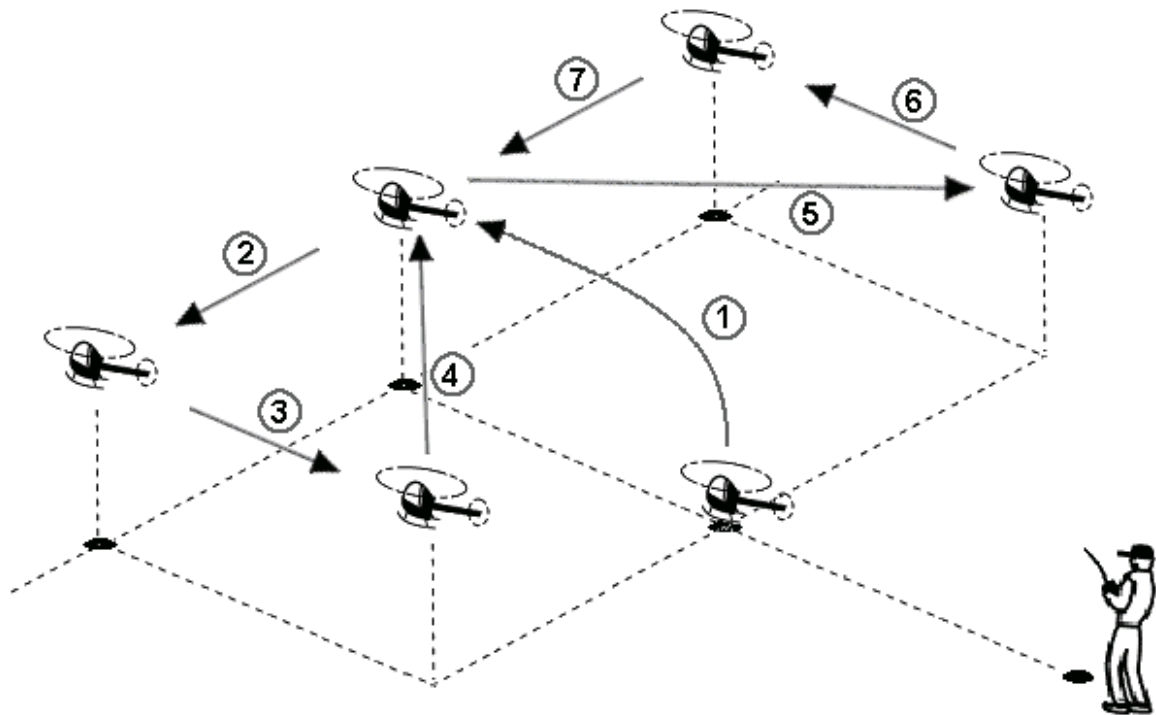
If there is no one else available then there is nothing to stop you aiding the candidate by, for instance, carrying the model to the test pad, etc., but any such actions must only be performed by you directly on the instructions of the candidate, you must not prompt them or carry out any actions of your own accord.

It is important that you talk these points over with the candidate in your pre-flight briefing.

(b) Perform one hovering bow tie

All sections of the manoeuvre are numbered and referenced to the manoeuvre drawing. The manoeuvre as described is flown anti-clockwise. However the direction of the flight may be either clockwise or anti-clockwise, at the discretion of the Examiner.

At all times in the manoeuvre, the model must be facing forward.



- (1) The model starts on the TOLP, takes off and flies to a position over the centre marker where it is hovered for about 5 seconds.
- (2) The model then hovers sideways to the left for about 5 metres to a position over the left inner marker where it is held and hovered for about 5 seconds.
- (3) The model then hovers backwards for about 5 metres to a position immediately behind the left inner marker and level with the TOLP where it is held and hovered for about 5 seconds.
- (4) The model then hovers diagonally forward and to the right to a position over the centre marker where it is held and hovered for about 5 seconds.
- (5) The model then hovers diagonally backward and to the right to a position immediately behind the right inner marker and level with the TOLP where it is held and hovered for about 5 seconds.
- (6) The model then hovers forwards for about 5 metres to a position over the right inner marker where it is held and hovered for about 5 seconds.
- (7) The model then hovers sideways to the left for about 5 metres to a position over the centre marker where it is held and hovered for about 5 seconds.

This completes the manoeuvre.

Hover height must be consistent throughout the manoeuvre and there should be minimum wandering away from the straight lines between the designated hovering points as the manoeuvre is flown.

(c)) Perform one 4-point pirouette

From the previous manoeuvre, the manoeuvre is begun with the helicopter hovering over the centre marker, tail-in to the pilot and it is held in that position for about 5 seconds. The model

is then rotated 90 degrees and held in the hover, sideways on to the pilot for about 5 seconds.

The model is then rotated a further 90 degrees in the same direction to be nose in to the pilot and hovered in that position for about 5 seconds.

The model is then rotated a further 90 degrees in the same direction to the sideways on position to the pilot and hovered in that position for about 5 seconds

The model is then rotated a further 90 degrees in the same direction to the tail-in position to the pilot and hovered in that position for about 5 seconds.

The model is then hovered backwards for approximately 5 metres and landed on the TOLP.

This completes the manoeuvre.

The helicopter must rotate either clockwise or anti-clockwise for the entire manoeuvre. The Examiner will state which direction he wishes to see. The clear inference is that the candidate must be competent to perform the rotations in both directions prior to the test.

Hover height must be consistent throughout the manoeuvre with minimum wandering away from the Centre marker. The landing must be within the 2 metre diameter circle centred on the TOLP.

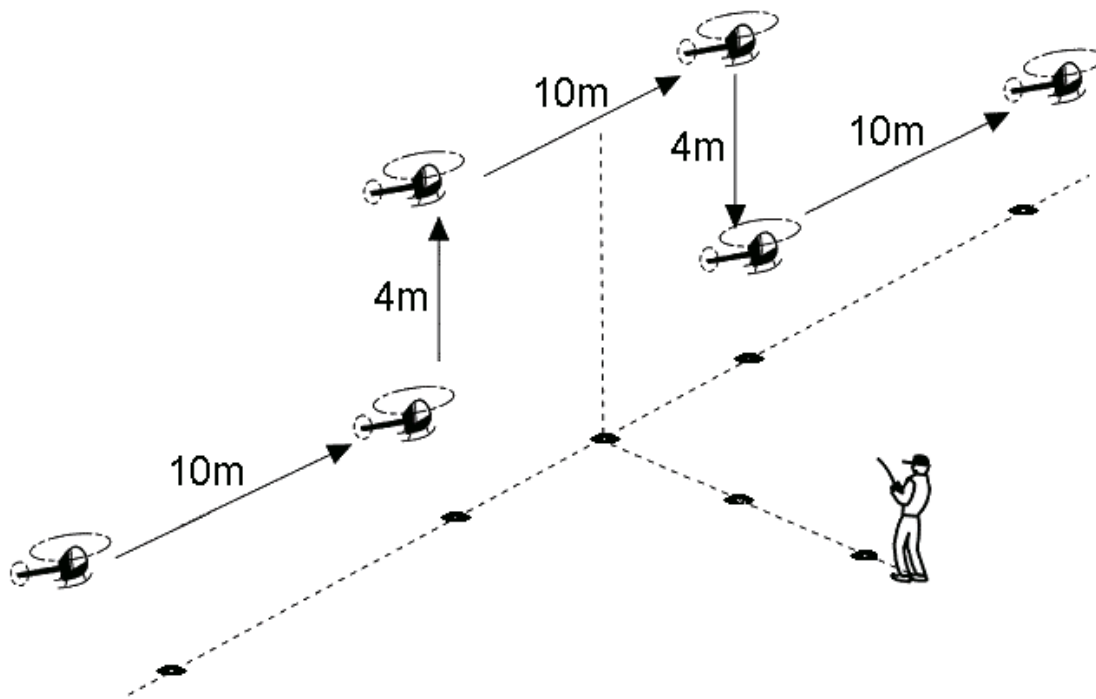
(d) Perform one 'Top Hat'

The pilot should now take off and hover the model to a position either hovering over the appropriate outer marker or approaching it at hovering pace along the line of the cross markers at eye level height. The model now moves forward at the normal hovering pace for ten metres, stops and hovers for about five seconds then climbs vertically for four metres before hovering again for about five seconds. The pilot will now hover the model forward for ten metres so that the model passes the pilot sideways on to them. The model again hovers for about five seconds and the pilot now causes the model to descend four metres until the skids are once again at eye level where it again hovers for about five seconds. The model now moves forward for another ten metres and passes over the opposite end outer marker which concludes the manoeuvre.

The model, still with skids at eye level, must then be hovered back to the take off/landing point and landed smoothly and steadily.

The speed during the top hat should approximate to a normal walking pace, and the heading is constant throughout. The entry and exit to the manoeuvre is a test of the pilots ability to correctly position the model. The model should not drift away from or toward the pilot significantly and the model should be under accurate control for the whole manoeuvre.

The manoeuvre may be flown either from left to right or from right to left and the direction is decided by the Examiner.



(e) Take off and climb to a safe altitude.

The pilot must ensure that the route of his proposed flight path is clear before taking-off; watch for head movement as they scan the area. On taking-off, the helicopter will lift to a brief hover at about half a metre high. After again checking for obstacles and obstructions the pilot then climbs out at an angle greater than 45° to his selected safe height. When reaching this height the model can be transitioned into forward flight and the pilot can now position it for either a left or right hand circuit as he pleases.

During the climb out you will be looking for a positive approach to the manoeuvre, a constant angle and velocity. the pilot will also be looking for other traffic along the intended route.

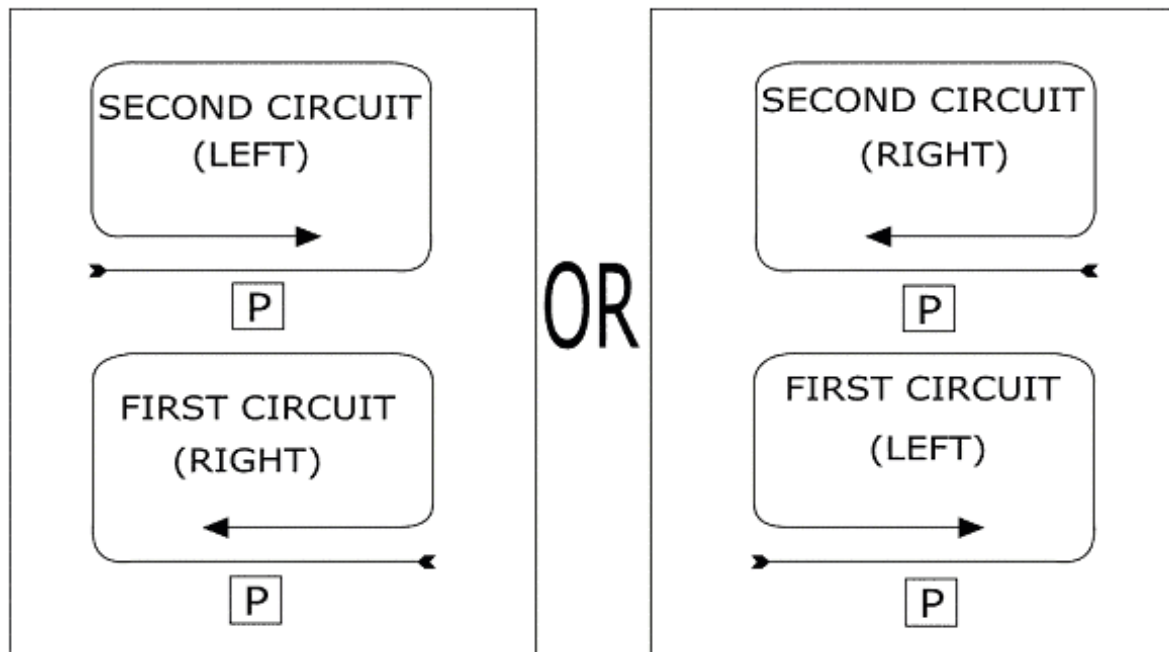
(f) Fly a left hand rectangular circuit.

(g) Fly a right hand rectangular circuit.

The pilot can elect to fly these manoeuvres in either order. The circuits should be rectangular as shown in the manoeuvre diagrams. the longest legs of the circuit must extend over at least fifty metres. It is important that the initial turn on each circuit is made away from the flight line and the model must never pass behind the pilot.

On the run in to the first circuit and on completion of it, the model will be flying past the front of the pilot, and, for safety reasons, twenty or thirty metres out from the take off pad. Tell the candidate prior to the flight the line you wish them to follow.

You must ensure that the candidate is clear on this, the line will be set by the model flying in front of them on a heading which will be agreed before the flight (and this will not always be into wind), and passing over a set point. The first pass in front of the pilot is extremely important as it sets the standard height and line for the rest of the 'flying' manoeuvres.



(h) Fly a Figure of Eight at circuit height with crossover in front of the pilot

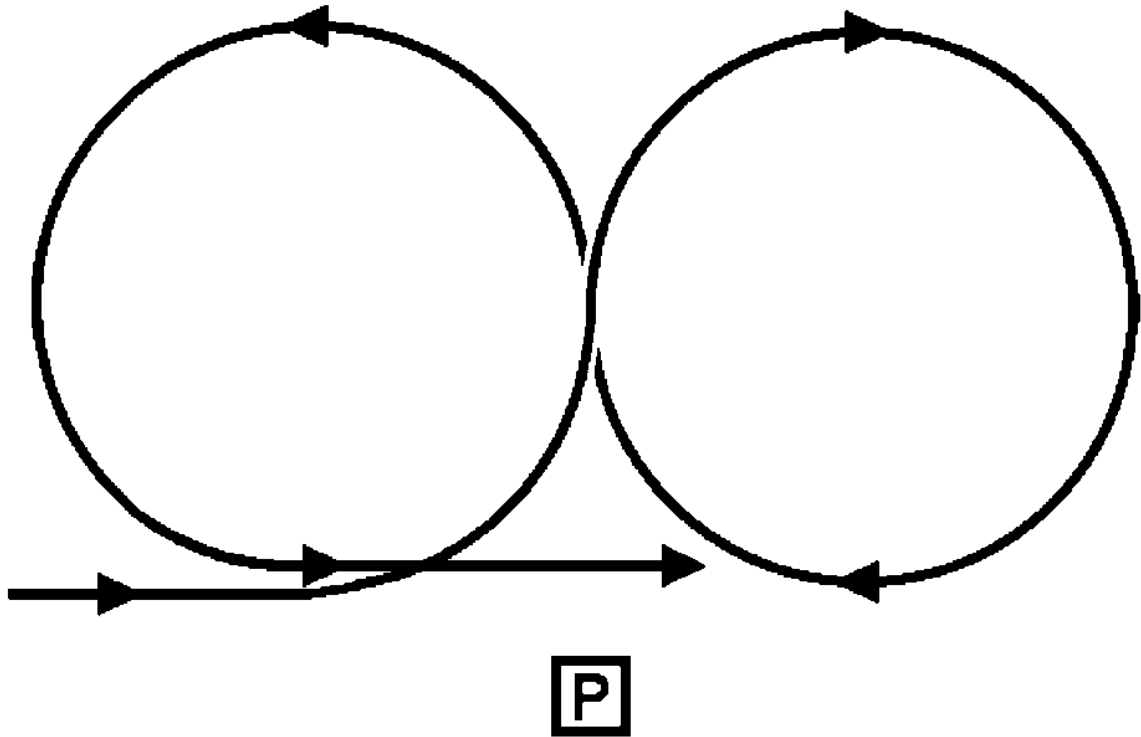
This should be flown as a banked circuit manoeuvre (not from the hover) and as shown in the diagram. The crossover point must always be in front of the pilot and, after a run in at standard height and line, the model MUST be turned through ninety degrees in the first turn so that it is flying exactly away from the pilot.

The first circle must also end with the model flying exactly away from the pilot, through the crossover point before it is turned into the second circle. Both circles should be of the same diameter as seen from the ground.

The main problems with this manoeuvre nearly always happen on the circle that is upwind of the pilot and if they do not adjust the angle of bank/turn rate to compensate they will either miss the crossover point by being a good way downwind, fly too near the pilots line, fly circles that are distorted or panic as the model accelerates towards them as it begins to come downwind and pull far too much bank (vertical!) to get the crossover point correct. This is not a sign that they have thought about the manoeuvre or practised it.

The second circle (3/4 circle actually) is rarely a problem. The manoeuvre finishes with the model flying at standard height and line across the front of the pilot, not with another turn away.

The initial run-in to the manoeuvre may be either from left to right or from right to left and the direction is decided by the Examiner.

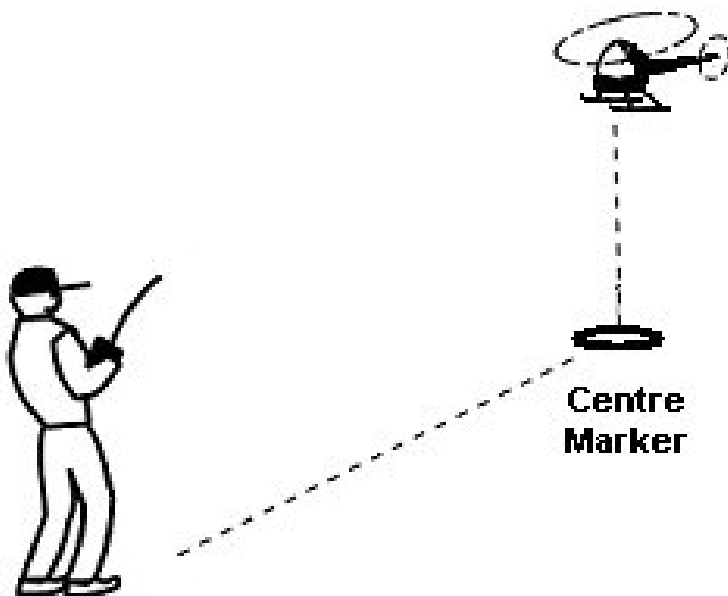


(i) Perform one twenty second nose-in hover.

The model must now transition from forward flight to the hover in a safe and steady manner and position for the nose-in hover.

The pilot should position the model over the centre marker, hovering at a height of approximately three metres. After a brief hover, the model is turned so that the nose is towards the pilot and held steadily in the nose-in hover for at least 20 seconds, then turned back, climbed away and transitioned to forward flight.

When the model is in the nose in position the tail boom should not be visible to the pilot. If the model is not completely nose in you should ask the pilot to correct it's position before starting the twenty second count. The helicopter should not drift significantly in any direction and height control should be good.



(j) Perform one double stall turn. Note that the stall turns must be performed with opposite rotation i.e. first one to the left, second one to the right or vice versa.

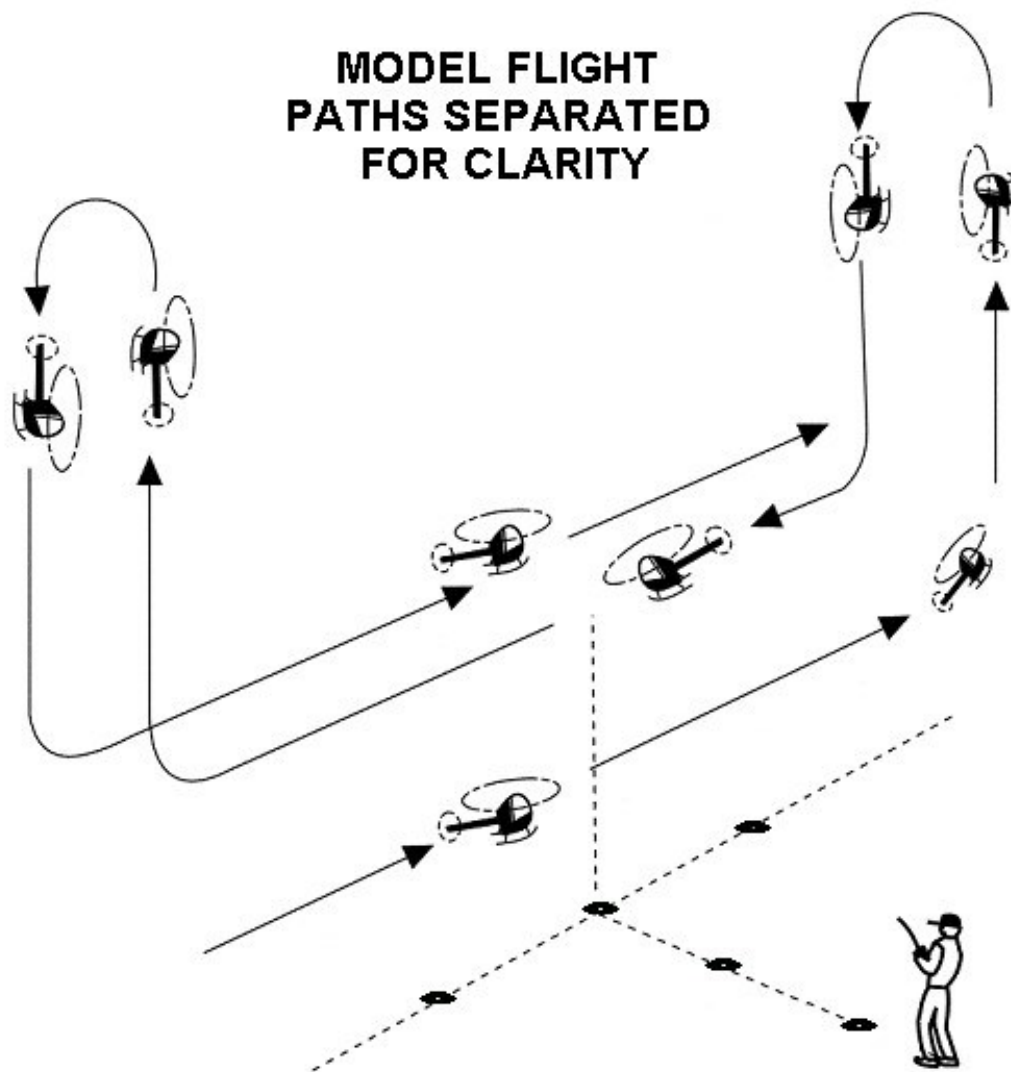
This manoeuvre is flown as one continuous manoeuvre. During the first element, the model should be flown in, on standard height and line, across in front of pilot to a point between thirty and fifty metres past the pilot. The model should then be pulled into a near vertical climb. At the top of the climb the model must stop (still pointing upwards) before being turned 180° about its vertical axis (a half pirouette). The model should descend approximately down the same path in a diving attitude and should pull out of the dive and exit the manoeuvre at about the same height as it started but on a reciprocal heading.

The second element is flown after the model has flown back down its original entry path and is performed approximately as far to the side of the pilot as the first element was to the other side. The description of the second element is exactly as for the first except that the pull-out and exit from the manoeuvre takes the model back along its original entry path to the manoeuvre.

Both of the stall turns should be away from the flight line. That is, if the initial entry to the manoeuvre is from the left to the right of the pilot, the first stall turn will be to the left and the second stall turn will be to the right (fly it with your hands and all will become clear)

You should look for accurate positioning of the model between the stall turns, that is at a constant height and along the same line. The model should not be allowed to skew off its intended route, and should be corrected if it does. Clearly, wrong control inputs in this instance will indicate a lack of competence at the required level

The initial run-in to the manoeuvre may be flown either from left to right or from right to left and the direction is decided by the Examiner.



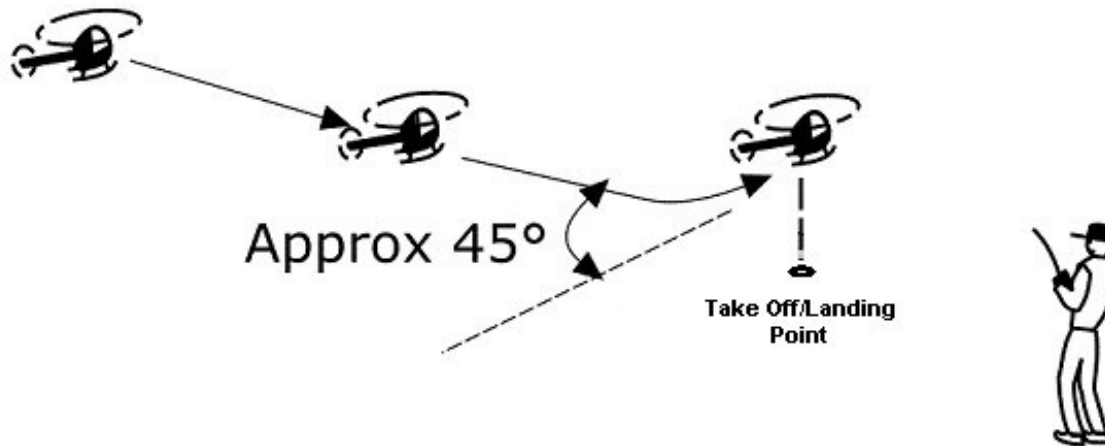
(k) Perform an approach at 45° to the vertical, landing within a pre-determined two metre square.

It is difficult to judge the angle of descent unless the model is almost sideways on to the pilot. For this reason the pilot should consider the planned approach path carefully and agree it with the Examiner during the pre-flight briefing. The direction of approach is the pilot's decision and everyone concerned with the test should be very clear exactly how the pilot will be attempting to fly the manoeuvre.

It is not a requirement that this manoeuvre should be entered from full forward flight so the pilot may set up the model in a steady hover or be moving forward in steady hovering flight at a minimum height of fifteen metres and at an appropriate distance away from the TOLP. The model should then sink at a constant rate with constant forward movement at an angle near to 45°, heading down towards the TOLP. Finishing this descent exactly over the TOLP is not required but the model should be no more than a metre or so out. The candidate is allowed a short hover at a height of around half a metre to make minor corrections before

settling the model on the ground. **The landing should be made with the model on the same heading as on the 45° descent.**

After landing, the candidate should shut down the engine and allow the rotor blades to stop turning before collecting the model to return to the pits.



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

These are clearly set out in the MFNZ Members' Members manual, but you should pay particular attention to the correct Rx off, Tx off sequence and ensure that the frequency control system in use is cleared correctly.

All manoeuvres must be carried out in airspace and orientations pre-determined by the Examiner and Candidate prior to the commencement of the test flight. The test must be completed in one flight.

The test must be taken outdoors.

Exceptionally, at a pre-determined point in the flight an intermediate landing may be permitted for the sole purpose of either refuelling or the fitting of a freshly charged flight battery. This landing may only be made with the prior consent of the Examiners. 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 Examiners. Two attempts per examination will be allowed in any one day.

The use of helicopters with coaxial contra-rotating main rotors is not allowed.

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

Examiners and Candidates Advanced Test 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
Local site rules (if applicable) 'Safety Code for General
Flying'
- 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 does 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 Discuss the various manoeuvres and any options that may be
available so that there can be no misunderstanding during the
test
- 7 In particular, does the candidate understand how you expect to
see the model positioned with regard to the wind throughout
the test.
- 8 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 Helicopter (AH)

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

FLIGHT TASK

COMMENTS

(a)	Carry out pre-flight checks as required by the MFNZ Safety Codes	
(b)	Perform one hovering 'bow tie	
(c)	Perform one four-point pirouette	
(d)	Perform one 'Top Hat'	
(e)	Take off and climb to a safe altitude	
(f)	Fly a left rectangular hand circuit	
(g)	Fly a right rectangular hand circuit	
(h)	Perform one figure eight at circuit height	
(i)	Perform one twenty second nose-in hover	
(j)	Perform one double stall turn with opposite rotation	
(k)	Perform an approach at 45 ⁰ to the vertical, landing within a predetermined two metre square	
(l)	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 Model Flying Displays and local flying rules.		