



**BRITISH MODEL FLYING ASSOCIATION
THE R/C ACHIEVEMENT SCHEME**

**TEST STANDARDS for CHIEF EXAMINERS
and CLUB EXAMINERS
GUIDANCE FOR TEST CANDIDATES**

**THE 'B' CERTIFICATE
(HELICOPTER)**

ISSUE 4

February 2004

General

The 'B' certificate is 'designed to recognise the pilot's more advanced flying ability and a demonstrated level of safety suitable for flying at a public display'. As an examiner, the level of competence you should expect of a candidate should be based on the question; 'has this person demonstrated their flying ability to me in a satisfactory manner, and 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?'

For many years the 'B' certificate has been seen as a 'display licence' but, in fact, it has always been much more than that. It was set up in the first place as a method of encouraging club flyers to gain further flying skills by meeting and being tested to a recognised national standard.

Whilst it certainly has its uses in the context of display pilots, the real aim of the 'B' certificate has always been to give the club flyer a personal attainment goal beyond the 'A' certificate ; a 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 'B' certificates then the general standard of flying both within your club, and nationally cannot help but rise. Examiners should be pressing this concept positively within their clubs and discouraging the idea of the 'B' certificate of being just a 'display licence'.

A pilot capable of flying to 'B' certificate standards and wishing to go straight to the Helicopter 'B' test without taking the 'A' test may do so but candidates should on no account be forced along this path. A flyer, known within a club to be a good pilot, going through the 'A' before taking the 'B' can be an excellent example to the rest of the club members and this should be pointed out to any candidate wishing to go direct to the 'B'.

The candidate for the 'B' certificate should have studied the BMFA Members' Handbook and be familiar with the 'Safety Code for general flying' as well as the 'operational guide, 'all models', 'radio control' and 'helicopters'. Besides being an excellent guide to the safe flying of helicopters and other model aircraft, most of the questions asked at the end of the test will be from these sections of the Handbook.

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 flight time required may be marginal for electric but a change of battery packs part way through the test is allowable.

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. You should make no allowance on this point; the selection of the model to do the test is the responsibility of the pilot and it is they you are testing, not the model. Similarly, the type of model presented cannot be used as an excuse for not completing certain manoeuvres.

Gyros

It is acceptable to use an electro-mechanical or solid state gyro in any 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.

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

Height and Speed

The 'B' certificate candidate should be a confident pilot, and this should show in the height and speed at which they fly the test. The hovering parts of the test should be flown with the skids at eye level. The flying sections should typically be completed at a height of between ten and twenty five metres (roughly one to two houses high). The pilot should show good use of the controls to maintain a constant height throughout each of the separate elements of the test and transitions between various heights should be smooth and steady. Height selection and accurate height control are factors you should attach some importance to.

Consistency

Good use of the controls should ensure that the model stays at a constant height, and moves at a steady speeds suitable to each of the separate elements of the test. All deviations from these constants should be noted, and will form part of the judgement of the test.

Unnecessary varying of height and inconsistent lines are valid reasons to fail a candidate at this level as they give a good indication of the flyer's general level of competence and they must strongly influence your final decision. Poorly flown height or lines are a sure sign that the flyer has either not practised the test or has not reached the required standard of flying and are legitimate reasons to fail them.

Continuity

The manoeuvres are set out in such a way that they are flown one after the other as a sequence. You should discuss with the candidate before the flight the way in which you would like the various elements flown and the candidate should have a good knowledge of the test before the event. If the candidate is very hesitant during the test and is not capable of following the sequence then you might conclude that they have either not had enough practice or that their basic flying skills are not yet well enough developed.

Although the manoeuvres are set out as a sequence, it is **ABSOLUTELY NOT** expected that they will be flown as a schedule with one manoeuvre flowing into the next. The candidate may opt to fly the test in that manner but that is their choice. Most flights will have a combination of transitions and positioning circuits between the various elements and you should note any additional flying for positioning etc., just as carefully as the rest of the flight, as this can say much about the competence of the pilot.

A pilot who transitions directly from one manoeuvre to the next is not to be penalised as this is quite acceptable, but watch out for the pilot who is not sufficiently practised. Flying some

of the manoeuvres in this manner can get them into some very awkward positions. The candidate should have a good knowledge of the test before the event.

It should be possible to fly the test on one tank of fuel but if, very exceptionally, the model does have to be refuelled then the pilot should clear this with you before the test starts. It is allowable only once during the test, as is changing the batteries in an electric powered model, and anything the pilot does during this time must be considered by you to be part of the test. This includes the way they land, retrieve, use correct refuelling procedures, re-start, carry out and take-off.

Trim

It is expected that the candidate will start the test with a model that has been trimmed out previously but, if necessary, they should be able to trim the model out relatively quickly. If you see obvious signs that the model is out of trim and the candidate makes no attempt to rectify the matter, you may well question their basic competence.

On the other hand, if they do need to re-trim and are making attempts to do so, you should make allowances for a short time of flight with a somewhat erratic path. This should not be penalised unless it puts the model in any dangerous situations or unless the model flies behind the pilot or into any other unsafe area. If the pilot does use the first part of the flight as a trimming exercise, they should be required to land as soon as they are satisfied with the trim and the test should then commence at manoeuvre (b). If a flight is abandoned prior to starting manoeuvre (b) because of trim problems it will not count as a test flight attempt.

Nerves

Quiet competence is what you are looking for during the flight, but most candidates may well be nervous and you should make some allowance for this. If the flyer is very nervous you should seriously consider abandoning the test for the time being and arranging a coaching flight or two to settle the candidate 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.

Repeating Manoeuvres

At 'B' certificate level the candidate should be competent enough to fly the test with very few errors. If you identify any major faults, the test should be taken again. It may be, however, that the candidate will make minor mistakes on a manoeuvre and if you are not fully satisfied with what you have seen you should not hesitate to ask for the manoeuvre to be repeated.

Some judgement is called for on your part here. A major mistake is grounds for failing the candidate, especially if loss of control or a dangerous situation occurs. You should definitely not let the candidate have two or three attempts at each manoeuvre until they get it right, but you must give yourself the best chance of assessing the competence of the pilot you are testing.

You should consider what you have seen the model do, and if you think to yourself 'that could be better' than a request that the manoeuvre be repeated is probably justified. Be extremely careful about using this option, however, as you could degrade the worth of the test. Under no circumstance must the test degenerate into a series of practice manoeuvres.

Repeating the test

The rules allow two attempts at the test in one day and if the candidate fails the first of these you must consider their performance in deciding what to do next. Many failures will be reasonably good or borderline cases and in these circumstances it may be appropriate to arrange one or two coaching flights before repeating the test. remember that many of the candidates will be unfamiliar with flying under pressure and might do very well on the second test..

However, it will probably be obvious to you on many occasions that the pilot you are testing is simply not ready for the test they are taking. In this situation it is better that you tell them so quite clearly. It could then be extremely useful for you to arrange a demonstration test for them so that they can gain an understanding of the standard of flying that is required, especially if they are not clear about the manoeuvres and the positioning for them. This, possibly with a little coaching, is far more useful to everyone than simply telling the candidate that they have failed.

Another possibility that may occur during a test is an engine failure part way through which could very well lead to a damaged model. The rules are that the test should be performed in one flight, so if this happens you cannot let the candidate go up again and continue where they left off.

In this case you should certainly offer them another test flight but make sure that they have had enough time to sort out what the problem was and to thoroughly check the model for any possible damage. Under no circumstances let them go straight into another test flight without having a proving flight so that you are both sure that the problem has been solved and that the model is airworthy.

How they handled the first emergency and how thoroughly they checked over the model for possible damage may also be of interest to you !

Note that the possibility exists of a refuelling stop as covered in 'Continuity' above. This is treated differently to an engine failure but **ONLY** if cleared with you before the test starts.

A flight which is abandoned for any reason prior to starting manoeuvre (b) will not count as a test flight attempt

Ground Positioning

The candidate will have to choose the spot for their 'take-off and landing pad'. There is no laid down size for this area but you should expect all take-offs and landings to be confined to within a metre or so of the selected spot. Most importantly, the candidate should select a spot which is a safe distance from the pits area and which will not cause overflying of other pilots, spectators or pits areas during any part of the test.

If their original choice is bad in this respect but they quickly realise the problem and ask to re-position before starting the test they should not be penalised. If they start the test from a poor position and try to work around the problem then you should stop the test and offer a re-try under the terms of 'repeating the test' above.

It may help the pilot considerably if a ten metre square is marked on the ground around the landing pad, one side of it aligned into wind. If this is done then the landing pad will be at the centre of the square and the pilot will generally stand midway along the downwind edge of the square, facing into wind.

General Manoeuvres and Hovering

All take-offs and landings should be smooth, without undue tail 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 the tail should not oscillate unduly.

The standard 'brief' hover time should be between five and ten seconds and is at the discretion of the pilot. 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. They 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.

Circuit and other 'flying' manoeuvres should be performed at the heights mentioned in 'Height and Speed' above.

It is a requirement that 'all manoeuvres are carried out in front of the pilot'. In all other PAS tests the pilot will be generally be standing in one position and consistently facing one way. This does **NOT** apply to the helicopter 'B'. In some of the hovering manoeuvres the pilot will be facing into wind with the model in front of them whilst in the circuit and flying manoeuvres the pilot will be facing crosswind with the model flying in positions similar to a fixed wing model. The pilot's position is important and they should convince you by their actions that they have given the matter some thought.

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.

Administration

There are separate forms for Examiners to use during the Helicopter 'B' test, but if you do not have one then the fixed wing 'B' form may be used but it is **essential** that parts 1 and 2 (and 3 if you have old paperwork) of the 'pass form' are clearly and separately marked by you with the word '**HELICOPTER**'.

Forms should wait no longer than a month before being sent in to the Controller. You should take great care that all the details are filled in correctly, especially the successful candidates **NAME and, if possible, their BMFA 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

Helpers for Disabled Candidates, Young Candidates and Others Who have Requested Help During the Test

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 you, as an Examiner, will think 'how much can I relax the test requirements for this person'.

Many 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 achievement scheme as a true national scheme then we must consider how we can accommodate candidates, not how we can stop them from participating.

The answer, of course, is that you, as an Examiner, must make on-the-spot decisions about what you will allow during the test and, in such cases, you are within your authority to take such decisions. The guidelines set out below may help but at all times the three 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 you that they know what they are doing or what is happening for the full duration of the test.

For instance, a disabled flyer may have difficulty handling the model and may not be able to carry it out to the strip 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 you should expect the candidate to do as much of the work as possible themselves and they should be able to talk you through anything that the helper does for them. Be sure to discuss all this with the candidate before starting the test.

All of these comments can apply to younger flyers too but there is an added complication with engine starting. Many parents are very 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, again, is a case where a helper can be used. If this situation does occur with the younger candidates, however, you 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.

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) You 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 passed.

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

The Test

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

The pre-flight checks are laid out clearly in the BMFA Members' Handbook. The candidate should also go through the pre-flying session checks, also laid out in the handbook. 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 'B' 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 they understand it and use the correct sequence of 'get the peg, Tx on, Rx on'. Also watch carefully that and take note that the transmitter controls, trims and switches are checked carefully by the pilot. You should specifically look for the candidate to positively check that the idle-up switches are not set to on.

Any candidate who switches on their radio before checking the frequency control system must be failed on the spot.

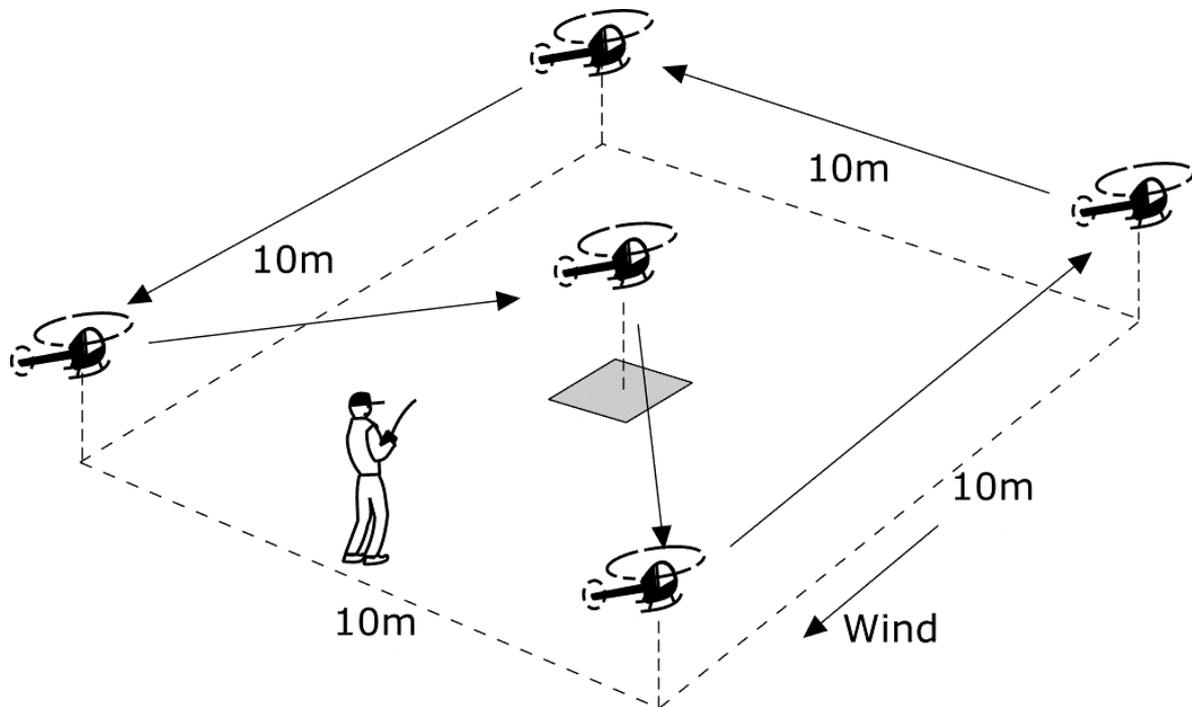
It is important that the candidate is seen to hold the rotor head securely during the starting procedure, and until the model is past the flight line. If there is no one else available then there is nothing to stop you aiding the candidate by carrying the model to the test pad, etc., but any such actions 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. Talk these points over with the candidate in your pre-flight briefing.

(b) Perform one hovering 'M'

The helicopter takes off from a position five metres in front of the pilot and climbs to eye level, where it hovers briefly. The helicopter, without turning, is then hovered diagonally backwards to a point level with the pilot and five metres to one side and again hovers for a brief period. The model is then hovered forward for ten metres where it again stops and hovers briefly. The pilot then hovers the model, without turning it, sideways for ten metres so that it passes in front of the pilot, ending five metres to the other side of the pilot and ten metres in front. After another brief hover the model moves backwards, without turning, to a point level with and five metres to one side of the pilot where it once more hovers briefly. The model now hovers diagonally forwards toward the original take off point and hovers briefly above the take off point before landing on the original take off pad.

All movements are in a straight line and at a constant speed and are carried out with the skids level with the pilot's eyes. The pilot will find that the previously mentioned 'ten metre square' will be most useful (see 'Ground Positioning').

It is important to be satisfied that the pilot is in full control whilst hovering both to their left and right. Ideally their feet should remain facing into wind and they should not turn to face the helicopter, but should look at it over their shoulder.

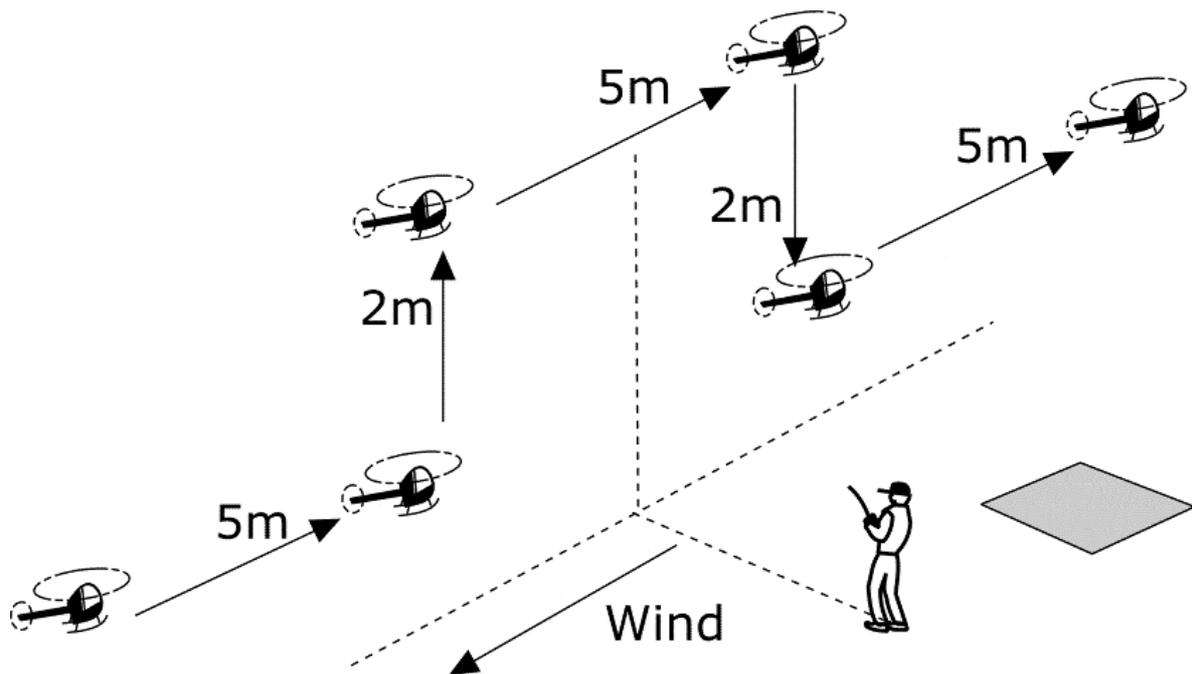


(c) Perform one 'Top Hat'

The pilot should now turn to face crosswind and should hover the model to a position about ten metres out and fifteen metres downwind from where they are standing, with the skids at eye level and the model facing into wind. The model now moves forward at the normal hovering pace for five metres, stops and hovers briefly. then climbs vertically for two metres before briefly hovering again. The pilot will now hover the model forward for ten metres so that the model passes the pilot sideways on to them as they face crosswind. The model again hovers briefly and the pilot now causes the model to descend two metres until the skids are once again at eye level where it again hovers briefly. The model now moves forward for another five metres which concludes the manoeuvre.

The model, still with skids at eye level, must then be hovered back to the landing pad 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.



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

The pilot will at this point be standing downwind of the model and 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.

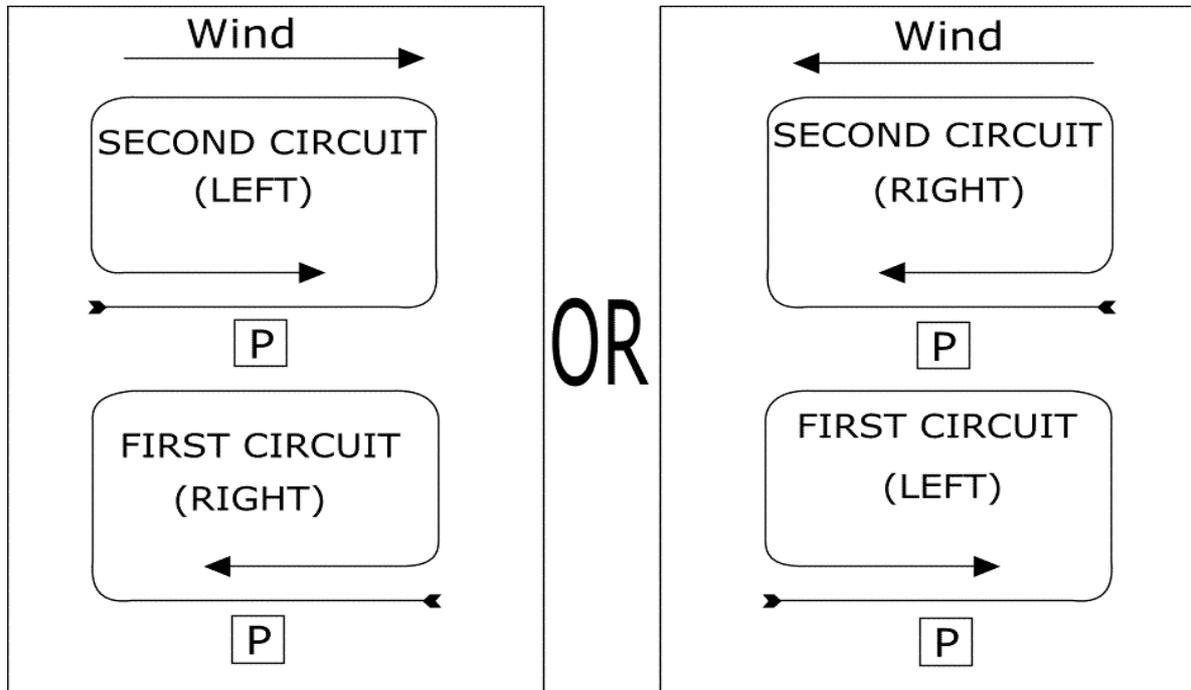
(e) Fly a left hand circuit.

(f) Fly a right hand circuit.

The pilot will now be positioned facing crosswind and can elect to fly these manoeuvres in either order. The circuits may be of any type the pilot desires i.e., racetrack, circular or rectangular. 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 flightline and the model must never pass behind the pilot. The direction of the first circuit flown should therefore be chosen to allow this turn away and whether this is left or right will depend upon the wind direction.

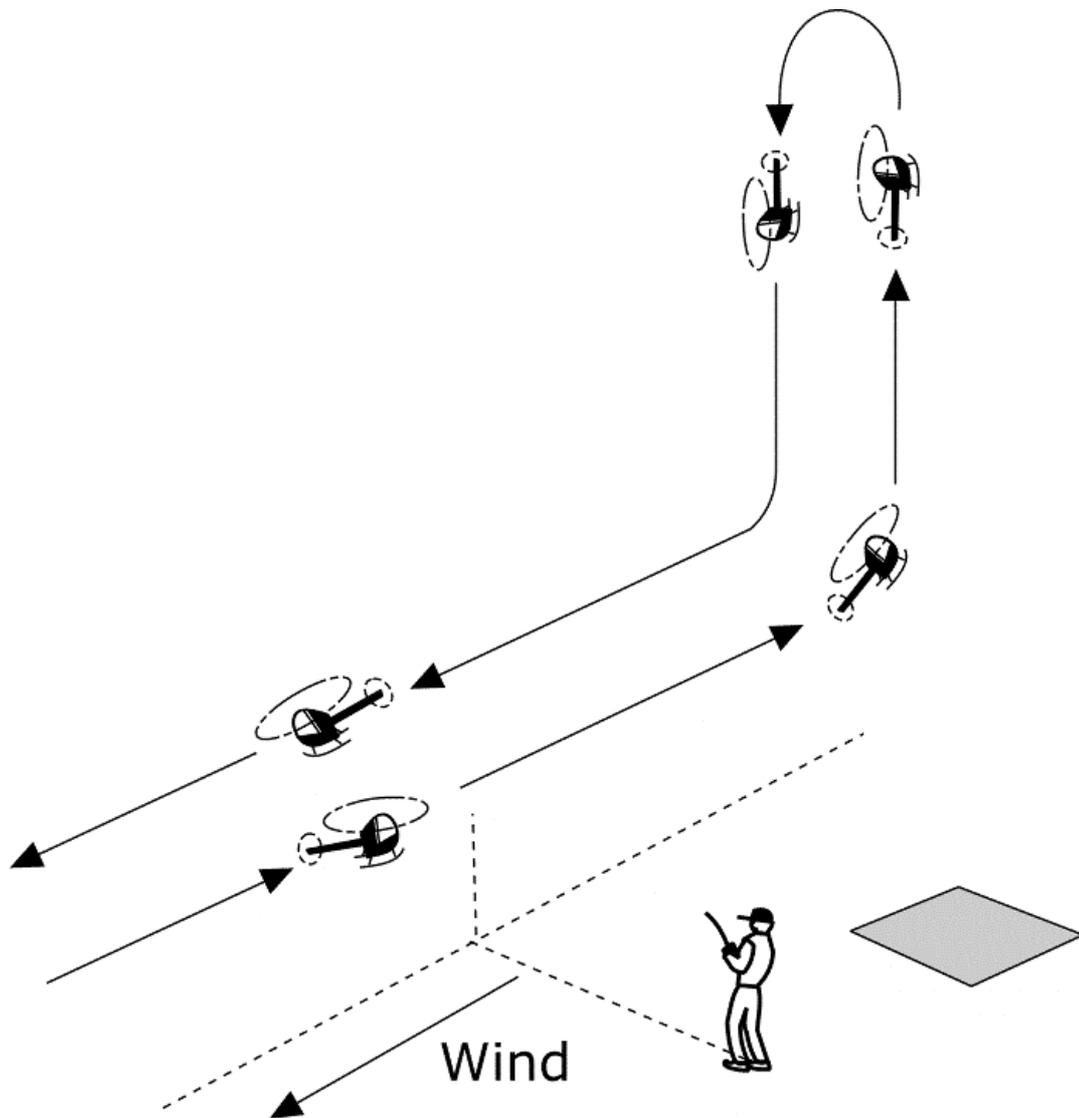
On the run in to the first circuit and on completion of it, the model will be flying into wind past the front of the pilot, and, for safety reasons, twenty or thirty metres out from the take off pad. Tell the candidate prior to the flight the line you wish them to follow.

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, usually, but not always, 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.



(F) Perform a stall turn.

With the pilot still facing crosswind the model should be flown in from downwind, on standard height and line, across in front of them to a point between thirty and fifty metres upwind. 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 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



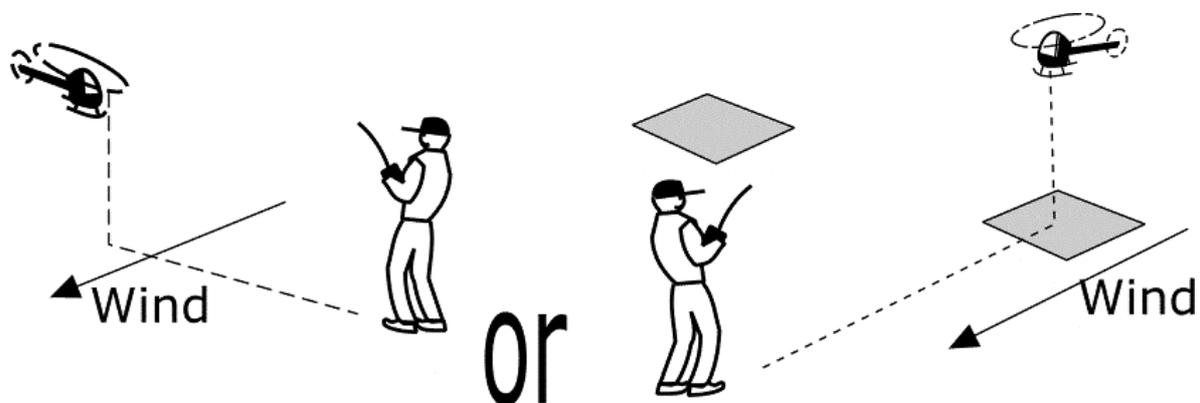
(h) Perform one twenty second nose-in hover.

The model must now transition from forward flight to the hover in a safe and steady manner and position for the nose-in hover. It is not specified whether this manoeuvre is performed into wind or crosswind so the pilot may choose.

If performed into wind, the pilot should turn to face the wind and should position the model into wind over the landing pad, hovering at a height of between eye level and up to three metres. After a brief hover, the model is turned through 180° and held steadily in the nose-in hover for at least 20 seconds, then turned back into wind and, after a brief hover, climbed away and transitioned to forward flight.

If performed crosswind, the pilot should be facing crosswind and should position the model hovering into wind about five to ten metres in front of them (the pilot will be looking at the model side-on in this position). After a brief hover, the model is turned 90° towards the pilot and held steadily in the nose-in hover for at least 20 seconds, then turned back into wind and, after a brief hover, climbed away and transitioned to forward flight.

Whichever way the manoeuvre is performed, 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.

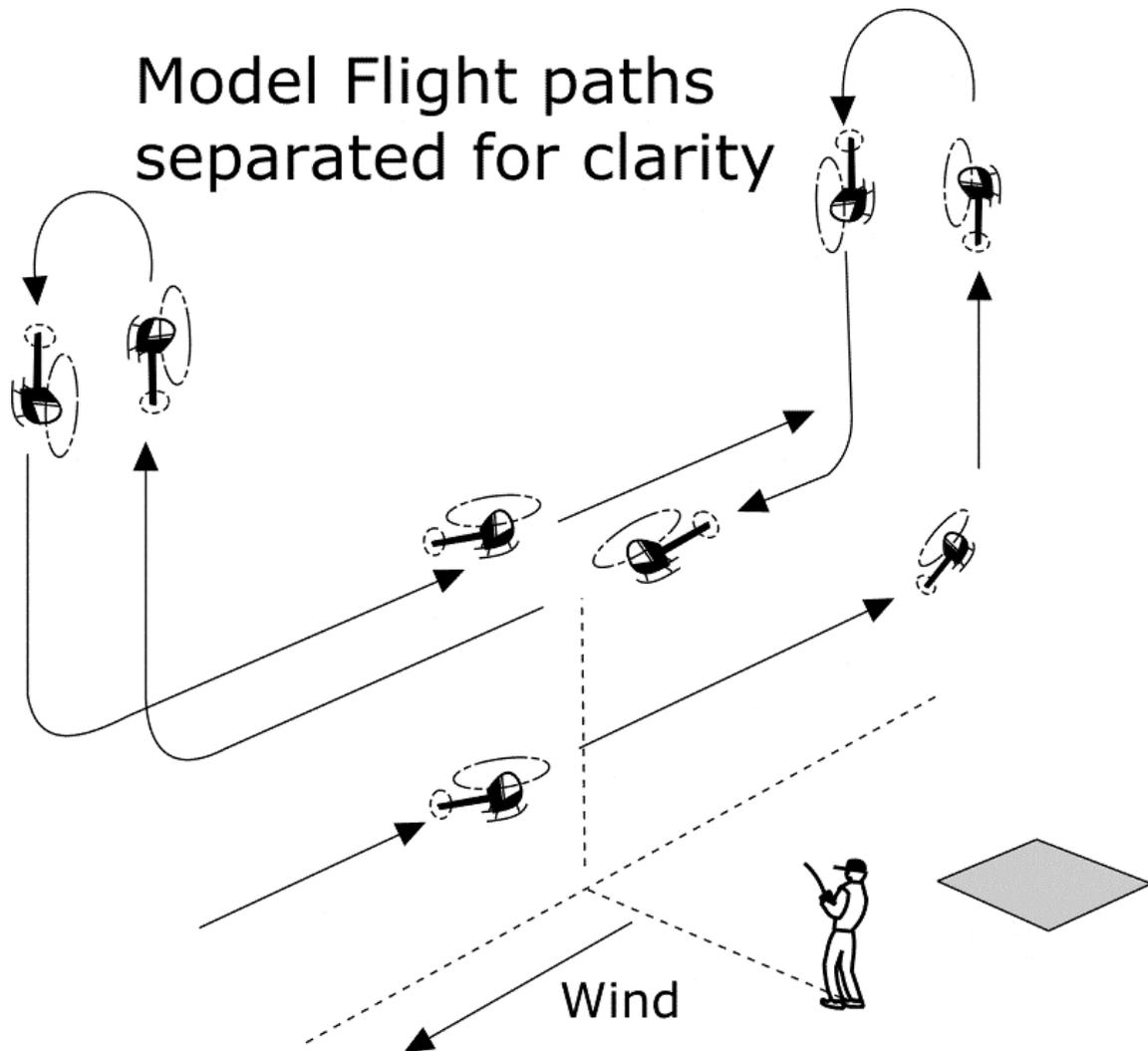


(i) Perform one double stall turn. Note that the stall turns must be performed with opposite rotation i.e. first one to the left, second one to the right or vice versa.

This manoeuvre is flown as one continuous element with the pilot facing crosswind. The first element is exactly as for the single stall turn as described in (g). The second element is flown after the model has flown back down its original entry path and is performed approximately as far downwind of the pilot as the first element was upwind. Again, 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 flightline. 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.

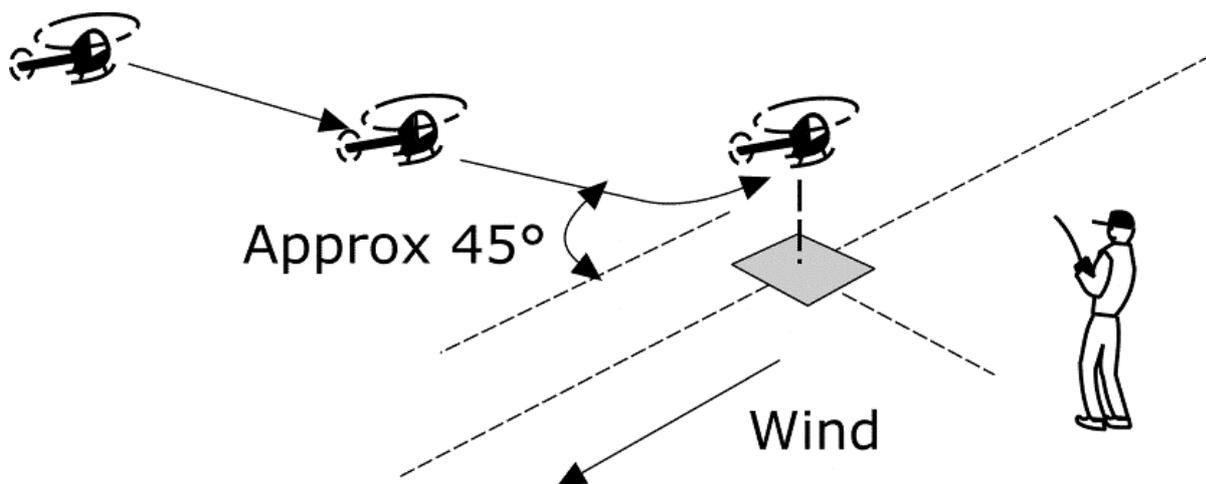


(k) Perform an approach at 45° to the vertical, landing within a pre-determined two metre square.

It is difficult to judge the angle of descent unless the model is sideways on to the pilot. For this reason the pilot should move diagonally back from the position he has taken during the rest of the test and should stand so that the landing pad is about ten metres crosswind from them.

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 downwind of the landing pad. The model should then sink at a constant rate with constant forward movement at an angle near to 45°, heading down towards the landing pad. Finishing this descent exactly over the landing pad 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 corrections before settling the model on the ground.

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 BMFA Safety Codes.

These are clearly set out in the BMFA Members' Handbook, 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.

The Questions

The candidate then 'must answer correctly a minimum of eight questions on safety matters, based on the BMFA Safety Codes for General flying and local flying rules'

Remember that on **no account** can a good performance on the questions make up for a flying test that you have considered too have failed. If you have failed the candidate's flying you should not even start to ask the questions. On the other hand the achievement scheme is a test of both flying ability and knowledge. it does not matter how well the candidate can fly, if they are unable to answer the safety questions they must not pass the test.

How many questions you should actually ask will depend on the circumstances at the time. for instance, if the candidate has completed a good flying test and answers the first eight questions with confidence then you need go no further. An acceptable test with some rough edges can be offset to some degree by the candidate performing well in the first eight questions.

A candidate who has done a test which you found only just acceptable and who hesitates on the questions should be asked a few more than eight questions and if you are still not satisfied that they have actually read the safety codes , you should no hesitate to fail them.

There is some debate as to whether a list of 'approved' questions should be published for examiners to use. Current opinion is that if such a list is published then candidates will also be able to study the list, and will not need to study the BMFA handbook. This is probably not a good idea.

As an examiner, however, you should prepare yourself thoroughly for any testing that you do, and you are encouraged to sort out a personal list of suitable questions. Do not forget that you can call upon any local rules which you are aware of and that the candidate should know. If you do compile a personal list of questions, do not let the candidate see them.

Remember that the majority of the questions you ask are to be BASED on the BMFA safety codes; you are not expected to ask them 'parrot fashion' and the candidate is not expected to answer in that manner either.

This opens up the possibility of asking the 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 could go wrong? , Why should models not be hovered out of or into the pit area?

Issue 1 - Ratified by Areas Council, 7th October, 1995

Issue 2 - Ratified by Areas Council, 18th October, 1997

Issue 3 - Ratified by Areas Council, 17th October, 1998

Issue 4 - Ratified by Areas Council, 7th February, 2004

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