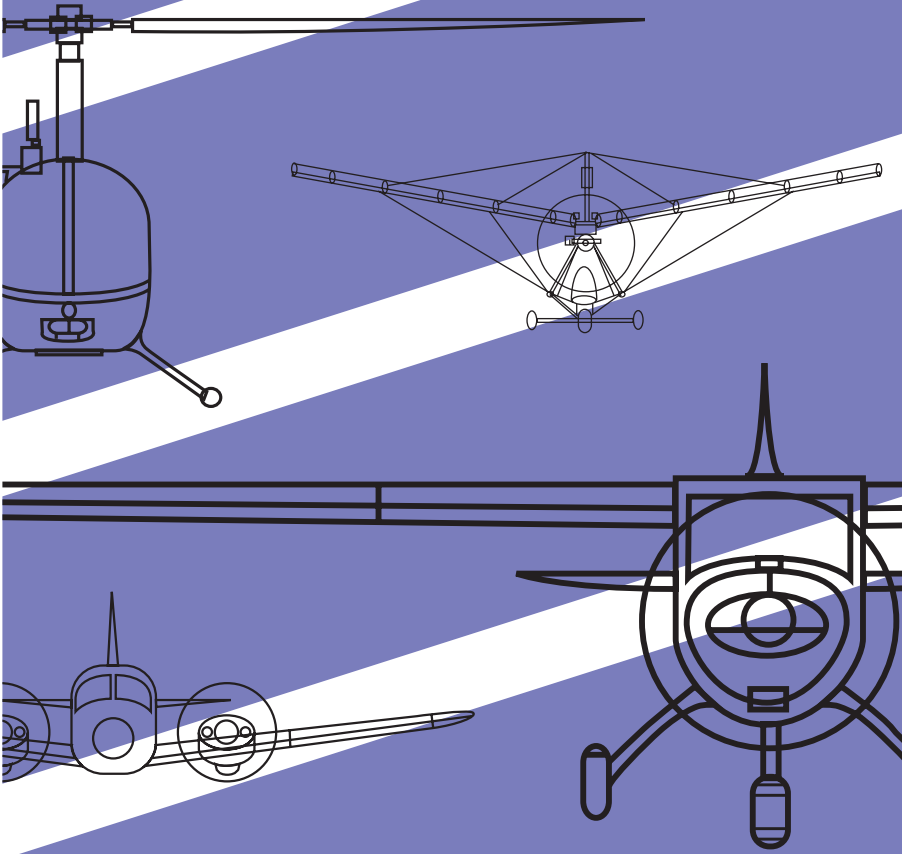




17B

HELICOPTER AIRMANSHIP



HELICOPTER AIRMANSHIP



Main photo above – Jeremy James, HCGB, all others, John Thorpe except where indicated

1 INTRODUCTION

a Although this guide is mainly intended for helicopter pilots, much of the advice will be **equally relevant to gyroplane pilots**.

b A review of the 42 fatal accidents during a recent 15 year period to helicopters of less than 5700 kg, reveals that most should not have happened. Broadly, they are the result of the following:

- low flying including wire strikes 8
- controlled flight into terrain 8
- loss of control VMC 6
- technical failures 5
- third party into rotors 4
- loss of control IMC/night 4
- collision with ground objects 4
- mid-air collision 1
- unknown 2

c **Comprehensive knowledge**, careful **preparation** and frequent flying **practice** are the best insurance against becoming an accident statistic. Avoid a complacent 'it will be all right' attitude.

2 KNOWLEDGE

2.1 Reporting

a Learn from the mistakes of others; you might not live long enough to make **all** of them yourself. Improve your knowledge via other peoples' problems by reading the CAA's GASIL, the Air Accident Investigations Branch's monthly Bulletin and the General Aviation Safety Council's quarterly Bulletin.

b Share your knowledge and experience with others, preferably by reporting to the Civil Aviation Authority Safety Data Department, British Helicopter Advisory Board, the

Helicopter Club of Great Britain, or for gyroplanes the Popular Flying Association, anything from which you think others could learn. Your report could prevent someone else's accident. Photographs often help to illustrate a problem.

c Details of all helicopter occurrences are on the CAA's Safety Data Department database.

d If there is a Manufacturer's Safety Course, improve your knowledge by participating – it could result in cheaper insurance!

2.2 Refresher Training

Revise your basic knowledge and flying skills by having a **regular** check flight, (at least every 6 months), with an instructor which should include:

- **practice engine failure so that in a single-engine helicopter it is a reflex response to lower the collective IMMEDIATELY and to enter autorotation**
- in multi-engined helicopters, practice simulated engine-out procedures
- sloping ground take-offs and landings
- appropriate emergency procedures for the type of helicopter, including emergency R/T call, either on the intercom or by a practice PAN call
- AWARENESS of (but not necessarily demonstrated) height-velocity curve, dynamic roll-over, vortex ring, ground resonance and engine icing situations
- awareness of the importance of maintaining rotor rpm, and proficiency at recognising and recovering from low rotor rpm conditions, both with power ON and power OFF
- operation from confined areas

- other flying that you or your instructor feel would be beneficial.

2.3 Limitations

a You must **know** the helicopter's limitations and your own – **HEED THEM BOTH.**

b Experienced fixed wing pilots, but with low helicopter hours, may be confident and relaxed in the air but will not yet have developed the reflex responses, control feel, co-ordination and sensitivity necessary in a helicopter. They may well react incorrectly to a low rotor rpm warning. (See para 2.2 and 4.9b.) A more cautious approach is necessary.

3 PREPARATION

3.1 Paperwork

Make sure that your licence/rating, certificate of experience and medical are up-to-date. Also check that the helicopter's documents, including Certificate of Airworthiness/Permit to Fly, Maintenance Releases and Insurance are current.

3.2 The Helicopter

a If you do not fly very often, prior to flight study the Pilot's Operating Handbook/Flight Manual etc so that you are thoroughly familiar with:

- limitations
- normal and emergency procedures
- rotor speeds/power settings
- the height-velocity avoid areas
- weight and balance calculations
- operation of radio and navigation instruments.

b Sit in the helicopter and re-familiarise yourself with the external and ground checks, cockpit layout, fuel system and position of all controls etc.

c Carry out refresher training as described in para 2.2 if you have not flown the **type** in the last six months. (Many commercial operators require a check-flight if their pilots have not flown the type in the last 28 days!)

3.3 Weather

a Get an aviation weather forecast, **heed what it says**, and make a carefully reasoned GO/NO GO decision. Do not let 'Get-there/home-itis' influence your judgement. Establish clearly in your mind the current en-route conditions, the forecast and the 'escape route' back to good weather. Take account of the freezing level. Plan a more suitable route if you are likely to fly over high ground which may be cloud covered.

b The various methods of obtaining aviation weather, (including codes) are available in a small booklet '**GET MET**'. This is available free from CAA Safety Promotion. Please send SAE, address at end.

c Know the conditions that lead to the formation of piston engine icing (see Safety Sense Leaflet 14A). Know the Flight Manual/Pilot's Operating Handbook instructions regarding the use of Carb heat or Engine anti-ice and comply with them. Include Carb Air Temp and OAT in your regular scan of Ts and Ps.

d Beware of turbulent and windy conditions, especially if your experience is limited.

e In wet weather beware of misting of windshield and windows, especially when carrying wet passengers.

3.4 Winter Flying

a In addition to much of the information in Safety Sense Leaflet 3C 'Winter Flying', helicopter pilots should also beware of 'white-out', due to blowing snow, when landing on a snow covered surface.

b It should also be noted that there are **NO** general aviation helicopters cleared for flight in icing conditions. You must use weather forecasts to avoid snow and icing conditions.

c Wear warm clothing in case of heater failure or a forced/precautionary landing – you can't put them on in flight!

d A Canadian gyroplane accident was the result of the pilot's eye balls freezing, he lost control and crashed.

e If operating from an icy surface, take care to open and close the throttle slowly and lead with the appropriate yaw pedal to avoid the possibility of the helicopter rotating on the spot.

3.5 VFR Navigation

a Use appropriate current aeronautical charts, **ready folded to show the planned track**, it may be too late when you are airborne.

b Check NOTAMs, Temporary Navigation Warnings, AICs etc for changes issued since your chart was printed or which are of a temporary nature, such as an air display, or ATC frequency change. (Internet site <http://www.ais.org.uk>.)

c Information on Royal Flights, Red Arrows displays and Emergency Restrictions of Flying is available on **Freephone 0500 354 802**. The information is updated daily. (Sticker available from Safety Promotion, please send SAE.) See AIC 13/1998 (Pink 165) 'Helicopter Flights in Restricted (Emergency/Incident/Accident) Airspace'.

d Prepare your Route Plan thoroughly with particular reference to Safety Altitude and suitable diversions. Familiarise yourself with geographical features, time points, airspace en-route and the procedures in any helicopter special routes.

e If you fly a single engine helicopter and your proposed route takes you over a congested area, forest, lake etc where a forced landing due to engine failure could be hazardous to yourself or those on the ground, plan a different route – so that you can make a safe forced landing.

f Note congested areas, high ground, masts and other obstructions in planning your safe altitude; note Maximum Elevation Figures (MEF) on charts. Remember you must not fly over some High Security Prisons and other sites in a helicopter, these may not be shown on your chart, but are listed in the UK AIP ENR 5-1-2.

g Plan to reach your destination at least one hour before sunset, unless qualified, equipped and prepared for night flying. (Public transport night flying is prohibited in single-engine helicopters.) You may not spot fog or low cloud at night.

h In order to comply with Rule 5 of the Rules of the Air, 'Low Flying', you must **NOT fly:**

- within 500 ft of persons, vessels, vehicles and structures, unless taking off or landing in accordance with normal aviation practice or,
- over or within 1000 m of any assembly in the open air of more than 1000 persons at an organised event,
- over a congested area, ie city, town, or settlement, below 1500 ft above the highest fixed object within 600 m of the helicopter, unless flying on a notified route under 'Special VFR',
- at such a height/speed combination that persons or property on the surface are endangered in the event of an engine failure,
- in the London 'Specified Area', except on the approved route

Note: If your proposed flight appears to be limited by Rule 5, first check the full terms of the Rule and, if necessary, seek further advice from the CAA's General Aviation Dept*.

i If you intend to fly below 1000 ft agl (where most military low flying takes place). Use **Freephone 0800 515544** for the Civil Aircraft Notification Procedure (CANP) or Pipeline and Powerline Inspection Procedures, (PINS) to let them know where and when you will be operating on relevant activities (see appropriate AICs and Safety Sense Leaflet 18A 'Military Low Flying').

j Know the procedure if you get lost, see para 4.7.

k Above all, prepare a thorough route plan (see Safety Sense Leaflet 5D 'VFR Navigation').

l GPS is a back-up to other methods of navigation NOT a substitute for them. Double check way-point calculation and entry.

3.6 Radio

a Know what to do in the event of radio failure, including when flying Special VFR in controlled airspace etc.

b Have all necessary radio frequencies to hand, including those for destination and diversion aerodromes, VOLMET, LARS, Danger Area Crossing Service etc.

c When using RADIO-NAV to back-up your visual navigation, note the frequencies and Morse ident of radio NAVAIDs.

d Brush-up periodically on radio procedures, phraseology etc (CAP 413 'Radiotelephony Manual').

3.7 Weight and Balance

a Use the actual (not typical) empty weight and centre of gravity (cg) from the latest Weight and Balance Schedule of the **actual** helicopter you are operating. Helicopters get heavier due

to extra equipment etc. Take account of ground handling equipment, camera installations etc.

b Check that the helicopter's maximum/minimum weights are complied with. If too heavy, you must adjust the weight by off-loading passengers, baggage or fuel.

c Check that the cg is within limits for take-off and throughout the flight. If it does not stay within the approved range, eg after passengers have been unloaded, or with low fuel and two heavy crew in front; then in some helicopters, you may run out of cyclic control for landing. You may have to carry ballast; make sure it is suitable and properly secured.

d **Never** attempt to fly a helicopter which is outside the permitted weight/cg range and performance limitations. It is dangerous as well as illegal, invalidates the C of A and almost certainly your insurance.

3.8 Performance

a Make sure that the sites you intend using are going to be large enough for take-off and landing. Use the Pilot's Operating Handbook/ Flight Manual to calculate the space and power required. Calculate your density altitude.

b Use the recommended take-off and landing profiles. **Minimise** flight in the height-velocity avoid areas.

3.9 Fuel Planning

a Always plan to land by the time the tank(s) are down to the greater of ¼ tank or 45 minutes, but don't rely solely on the gauge(s) or low fuel warning. Remember, a headwind may be stronger than forecast, which particularly affects slower flying helicopters. Frequent use of carb heat/hot air will also increase fuel consumption.

b Know the hourly fuel consumption of your helicopter. In flight, check that the gauge(s) agree with your calculations.

c Understand the operation and limitations of the fuel system, gauges, pumps, mixture control (do not lean mixture unless it is permitted), unusable fuel etc.

3.10 Destination

a Check for any special procedures due to activities at your destination, such as parachuting, gliding, microlighting etc. Use the UK Aeronautical Information Publication (UK AIP) or other Flight Guides including NOTAMs and Temporary Navigation Warnings, etc to find out where the helicopter operating area is located.

b If your destination is a private landing site, the surroundings may be very different from the licensed aerodrome at which you learnt to fly, or from which you normally operate. The final approach and take-off area should be at least twice the length of the helicopter including rotor blades. There may be hard-to-see cables or other obstructions in the approach path, or hills, trees and buildings close to the site giving wind shear and/or unusual wind patterns.

c Try to choose a landing site where you can use the recommended profiles, but if that is impossible consider:

- a check out with an instructor or someone who knows the site well, or
- a check from the ground of the potential problems associated with different wind directions, or the reduced climb on a hot day.

Always minimise the time that the helicopter is at greatest risk from engine failure.

d In a helicopter, you cannot just land anywhere – you need the landowner's (or his Agent's) permission. This also applies at strips and most aerodromes, where Prior Permission is Required (PPR).



'surrounding may be different ...'

3.11 Flying Abroad

a Make sure you are conversant with the aeronautical rules, charts (including scale and units, eg feet or metres), airspace etc for each country you are flying to/over.

b Take the helicopter's documents which include for example – in some countries the insurance details written in their language, eg Spain, your licence and a copy of 'Interception Procedures' (Safety Sense Leaflet No 11).

c Before crossing an International FIR boundary you **must** file a Flight Plan, check that it has been accepted. See Safety Sense Leaflet No 20A 'VFR Flight Plans'.

d Don't forget the Prevention of Terrorism restrictions for flights to Ireland, Channel Isles and Isle of Man. (UK AIP GEN 1-2-1 para 5.)

e Permit to Fly aircraft may need special permission in some countries.

3.12 Over Water

a Before flying over water, read Safety Sense Leaflet No 21A 'Ditching'. Some helicopter manuals/handbooks contain specific advice on ditching including the need to apply full lateral cyclic control as the helicopter contacts the water to stop the main rotor blades.

b The weather over the sea can often be very different from the land, eg sea fog.

c When flying over water, everyone in a single-engined helicopter should, as a minimum, **wear** a life jacket. In the event of an emergency there will be neither time nor space to put one on.

d The water around the UK coast is cold even in summer and survival time may be only 15 minutes (about the time needed to scramble an SAR helicopter). A good quality insulated immersion suit, with warm clothing underneath and the hood up and well sealed, should provide over 3 hours survival time. In water, the body loses heat 100 times faster than in cold air.

e In addition, take a life raft, it's heavy, so re-check weight and balance. A life raft is much easier to see and will help the rescuers find you. It should be properly secure, but easily accessible as a helicopter will sink faster than an aeroplane.

f Make sure that lifejackets, immersion suits and life raft have been tested recently by an approved organisation – they **must** be serviceable when needed.

g You are strongly urged to carry a Personal Locator Beacon (PLB) and flares.

h Remain on an appropriate aeronautical radio station.

i Pilots and passengers who regularly fly over water, are advised to attend an underwater escape training and Sea Survival Course (details in 'Ditching' leaflet).

j If the helicopter is fitted with flotation equipment, make sure you are familiar with its operation.

k Minimise over water time in single-engined helicopters. (Public transport helicopters are limited to 10 minutes over water when crossing sea areas around the UK.)

3.13 Night Flying

Night flying is a combination of visual and instrument flight, the ratio depending on the weather and background lighting including moonlight. You must have a Night Rating and you should be in current instrument flying practice (e.g. during the previous 28 days), using a helicopter FULLY equipped for instrument conditions. For night take offs and landings, the site and any relevant obstacles, should be illuminated by external means.

3.14 Pilot Fitness

a Don't fly when ill or tired – it is better to cancel a flight than to wreck a helicopter or hurt yourself!

Are you fit to fly – 'I'm Safe' checklist

- I Illness (any symptom)
- M Medication (your family doctor may not know you are a pilot)
- S Stress (upset following an argument)
- A Alcohol/Drugs
- F Fatigue (good night's sleep etc)
- E Eating (food keeps blood-sugar level correct).

b If you have to wear glasses for flying, make sure that the required

spare pair is readily accessible. Sunglasses and a peaked cap may be useful.

c During hot weather, beware of de-hydration, have water available, the cabin can be like a greenhouse.

d Wear clothes that cover the limbs and give some protection in the event of fire. Avoid synthetic material which melts into the skin.

4 PRACTICE

4.1 Pre-Flight

a After removing blade tie-downs, pitot and engine covers, complete a thorough pre-flight inspection, paying particular attention that swashplate, control rods etc are secure and in good condition – climbing may be necessary. Don't forget any 'telatemp' designed to show overheating. **Use the check list.**

b Check the surrounding area for loose objects that could blow about in the rotor wash and that the rotor disc will be well clear of obstacles.

c Determine visually that you have enough fuel of the right type. Don't let anyone confuse AVGAS and AVTUR. **Personally supervise re-fuelling** and be aware of the danger of static electricity. If necessary use a dip-stick to check fuel levels. Make sure the filler caps are properly secured and the earthing cable disconnected. With the fuel selector ON, check fuel drains for water and other contamination. Minimise 'Rotors Running' refuelling.

d **Check engine and transmission oil levels** and, if necessary, top them up. Don't be fooled by a 'tide line' on the sight glass, this has led to failures as there was no oil in the gear box. (See also Airworthiness Notice No 12 Appendix 43 'Helicopter Gearbox Oil Level Sight Glasses'.)



'thoroughly inspect ...'

e Check engine intake(s) for foreign objects, particularly on turbine helicopters.

f Remove all ice, snow and **FROST** from the helicopter. Even light frost can disturb the air flow over an aerofoil surface. (Beware of re-freezing.) Only use authorised deicing fluids on rotor blades, due to the possibility of damaging the bonding of metal fittings and composite rotors.

g If you find anything which you are not happy about, get further advice.

h When doing the internal checks, **use the check list**. Confirm **visually** that the rotor blades move correctly in response to control inputs.

i Properly secure any baggage so that nothing can foul the controls. Beware of loose items, eg cameras being carried by passengers.

j Make sure all baggage doors are properly closed and locked.

4.2 Passengers

a Removal of dual controls will prevent passenger interference.

b The law requires that you **MUST** brief passengers on the location and use of doors, emergency exits and safety harnesses as well as emergency procedures. Personally check that doors and hatches are secure (see Safety Sense Leaflet 2B 'Care of Passengers').

c Centralise the controls and switch on the beacon/strobe. Do not start the engine until all ground personnel are well clear of the helicopter and all passengers are seated inside with the doors secure.

d Do not let passengers step up into the helicopter and then wave to their friend, their hands may be much too close to the rotor disc.



'escort passengers to and from ...'

e If it is necessary for passengers to get in or out with the rotors turning, brief someone to escort passengers to and from the helicopter. Passengers may behave oddly and do silly things in the wind and noise of a running helicopter, childrens' hands should be firmly held. Always approach from the front, wait outside the rotor disc until the pilot has given a 'thumbs up'. **NEVER** walk uphill away from a

helicopter or downhill towards a helicopter, the rotor tip may do more than part your hair!

Note: AIC 'Propeller and Rotor Markings', provides good advice on colours to make rotors much more visible (AIC 83/1997, Pink 150).

f Some passengers may be affected by flicker vertigo, see AIC 125/1996 (Pink 130) 'The Effect of Flickering Light on Helicopter Passengers and Crew'.

4.3 Starting Engine/s

a Know where to find and how to use the helicopter's fire extinguisher, as well as the location of any others in the vicinity.

b Use the check list and closely monitor the appropriate gauge(s).

c If parked on snow or ice don't forget the possibility of the helicopter yawing.

4.4 Take-off

a Know the helicopter Marshalling Signals shown overleaf.

b Make sure you know the maximum demonstrated sideways speed for the helicopter type you are flying and factor this for your experience and recency.

c Take particular care if you have to lift off crosswind or downwind, there may only be marginal control if there is a crosswind of 10–12 kts from the critical side. This can also affect hover taxiing.

d Beware of hovering close to tall buildings and hangars when there is a possibility that the helicopter downwash will not dissipate uniformly and may recirculate through the top of the rotor disc. This will require more power to hold hover height and produces a dynamic

force towards the obstruction. As a rule of thumb, recirculation can occur when the helicopter is hovering closer than two thirds of the rotor diameter from an obstruction.

e Before lifting off, always carry out a clearing turn. Consider your options such that engine failure will not be a hazard to persons or property on the ground (see para 4.11 on rotor wash).

f Lift-off slowly into a low hover and check engine gauges including manifold pressure/rpm and control effectiveness.



'low hover and a check ...'

g If you take off into a strong wind and then turn downwind with constant pitch and attitude, the speed 'perceived' from ground reference will appear to increase by an amount equivalent to the wind speed. If you then attempt to reduce 'perceived' speed by increasing the attitude, it can lead to the use of high power, together with a reduced rate of climb and in severe cases a high sink rate. You are now in the classic vortex ring condition, near the trees with low IAS and full power. Now get out of that! (see para 4.13c).

4.5 Look Out

a Always keep a good look-out (and listen-out) for other aircraft, particularly over and close to radio beacons, Visual Reference Points and in the vicinity of aerodromes. The most

hazardous conflicts are those aircraft with the least relative movement to your own. These are the ones that are difficult to see **and** the ones you are more likely to hit. Beware of blind spots and move your head, or the helicopter, to uncover these areas. Scan effectively. (See Safety Sense Leaflet 13A 'Collision Avoidance'.)

b Helicopters are harder to see than aeroplanes so if the fixed wing pilot hasn't seen you, you had better keep an exemplary look out and make sure you've seen him!

c Remember the Rules of the Air which include flying on the right-hand side of line features (even if your helicopter is flown from the right) and give way to traffic on your right.

d If the helicopter has strobe lights, use them. If you are in a crowded circuit environment, use landing lights as well.

e Spend as little time as possible with your head 'in the office'.

4.6 Airspace

a Do not enter controlled airspace unless properly authorised. You might have to orbit and wait for permission. Keep out of Danger and other Prohibited Areas. If you need to transit, contact the Danger Area Crossing and Information Services.

b Use the Lower Airspace Radar Service (LARS) which is available from many RAF and civil aerodromes, particularly on week days. It may prevent you from getting a nasty fright from military or other aircraft.

c A Radar Advisory Service (RAS) will tell you about conflicting aircraft and offer avoidance advice. If you take alternative action or consider no action necessary, then you must **tell** the controller. A Radar Information Service (RIS) gives you details of

conflicting aircraft, but you have to decide if avoiding action is necessary. Make sure you know which service you are receiving. Pilots are always responsible for their own terrain and obstacle clearance. (See Safety Sense Leaflet 8D 'ATC Services Outside Controlled Airspace'.)

d Allocation of a transponder code does **NOT** mean that you are receiving a service.

4.7 En-route Diversion

a You must not lose sight of the surface unless appropriately qualified, in current practice, and flying a suitably equipped helicopter. Don't fly above clouds unless they are widely scattered and you can remain in sight of the surface.

b If you encounter deteriorating weather **turn back or divert before you are caught in cloud**. A 180° turn in cloud can easily become a death spiral!

c Stick to your planned Safety Altitude. Many pilots have come to grief because a lowering cloud base has forced them lower and lower into the hills. You **MUST** avoid 'scud running'.

d If conditions get worse, eg 1,000 ft cloud base and 3 km or less visibility turn back, divert or make a precautionary landing before entering cloud. **Don't PRESS ON – LAND ON!**

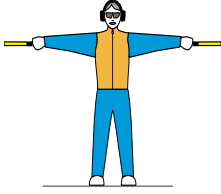
e An occasional weather check from VOLMET is always worthwhile.

f Divert if the periodic cruise check, such as FRED A (fuel, radio, engine, DI, altimeter) indicates you won't have 45 minutes fuel reserve at destination.

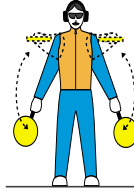
4.8 Lost

a If you are lost (or temporarily unsure of your position) then tell someone. Transmit first on your working frequency. If you have lost contact on that frequency or they cannot help you, then change to 121.5

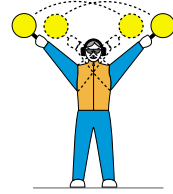
SOME HELICOPTER MARSHALLING SIGNALS



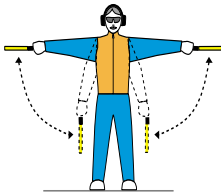
Hover: Arms horizontally sideways, palms downward.



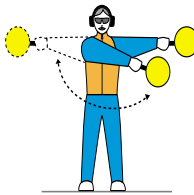
Move Backwards: Arms by sides, palms facing forward, arms swept forward and upward repeatedly to shoulder height.



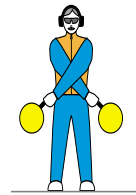
Stop: Arms repeatedly crossed above the head.



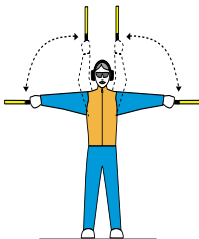
Move Downward: Arms extended horizontally sideways, with palms turned down, beckoning downwards.



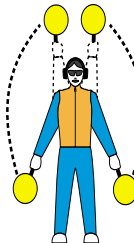
Move Sideways: Either arm placed horizontally sideways, then the other arm moved in front of the body to that side, in the direction of the required movement; repeated several times.



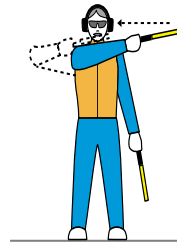
Land: Arms placed down and crossed in front of the body.



Move Upward: Arms extended horizontally sideways, with palms up, beckoning upward.



Move Ahead: Arms repeatedly moved upward and backward, beckoning onward.



Cut Engine(s): Either arm and hand placed level with the chest, then moved laterally with the palm downwards.

Note: In many cases the speed of arm movement indicates the rate/urgency.

MHz and make your PAN or MAYDAY call. If you have a transponder, the emergency code is 7700, it will instantly alert a radar controller. Select Mode C, if fitted.

b If you are lost and any of the items below apply to you, call for assistance – 'HELP ME':

- H High ground/obstructions – are you near any?
- E Entering controlled airspace – are you close?
- L Limited experience, low time or student pilot, let them know –
- P PAN call in good time – don't leave it too late
- M Met conditions – is the weather deteriorating?
- E Endurance – fuel remaining; is it getting low?

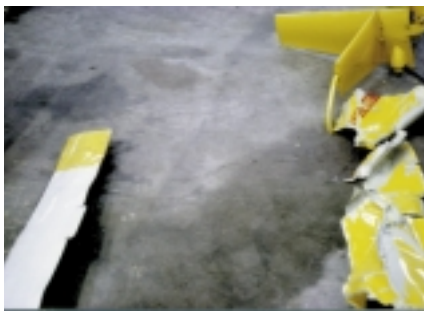
c As a last resort, **make an early decision to land** while you have the fuel and daylight to do so. Choose a site with care and, if possible, choose one with easy access to a telephone so that you can advise that you are safe and perhaps obtain a weather update or further help.

4.9 Control Considerations

a Fly at a safe speed in relation to visibility. Stay out of the 'height-velocity avoid curve'. Above all, **maintain rotor speed**, needles should be at the top of the green band rather than the bottom.

b In most helicopters, particularly two bladed teetering rotor types and especially gyroplanes, you **MUST** avoid a push-over manoeuvre resulting in negative 'g'. This can be one of the causes for the main rotor striking the tail boom with catastrophic results as shown below.

c When flying a helicopter (or gyroplane) with an articulated or



teetering head beware of retreating blade stall, especially at or near VNE in turbulent conditions. This may cause pitch up and roll. Recover by reducing speed and pitch.

4.10 Environmental

a The public don't like helicopter noise. Several aerodromes and landing sites are under threat of closure due to this, so it is vital to be a good neighbour. Know the noise pattern for your helicopter; most comes from the tail rotor. Often a turn of 90° can direct the noise away from a neighbour. Avoid 'blade slap' on descent by slowing down early with no sudden manoeuvres.

b Adhere to noise abatement procedures and do **NOT** fly over noise or other sensitive areas. These are detailed in the UK AIP or other Flight Guides or may be established on a local basis.

c When en-route, fly at a height/power setting which will minimise noise nuisance, as well as complying with Rule 5, 'Low Flying' (see para 3.5h).

NEVER be tempted to 'beat up' the countryside.

d Select sites for practice autorotations very carefully – HASELL includes 'LOCATION'.

4.11 Wake Turbulence and Rotor Wash

- a Don't operate in conditions worse than those stated in the Pilot's Operating Handbook/Flight Manual. Remember, these were obtained by a test pilot! If in doubt – replan.
- b Stay well clear of the 'blast' end of powerful aircraft.
- c Always be mindful of the effect your own rotor wash can have on parked aeroplanes and other surface objects.
- d Beware of wake turbulence behind heavier aircraft on take-off, during the approach or on landing. You should remain 8 nm, or 4 minutes or more behind large aircraft. Hover-taxiing helicopters, particularly large ones, generate very powerful vortices. (Safety Sense Leaflet 15B 'Wake Vortex' provides further guidance.)



Photo – FAA Technical Centre, Mr J Sackett

- e Note that wake turbulence lingers **when wind conditions are very light**. These very powerful vortices are **invisible**. Heed Air Traffic warnings.

4.12 Circuit Procedures

- a When joining or re-joining make your radio call early and keep radio transmissions to the point – 'cut the chat'. If non-radio (or your radio has failed), know the procedures.
- b Check that the change from QNH to QFE reduces the altimeter reading

by the landing site elevation. If landing using QNH, don't forget to add the site elevation to your planned circuit height.

- c Use the appropriate joining procedures at your destination aerodrome. Check circuit height and look out for other aviation activity, eg gliding, parachuting.
- d Check the windsock or nearby smoke to ensure you land into wind. Be very sure of the wind direction and strength before committing yourself to an approach direction.
- e Make radio calls in the circuit at the proper places and listen and look for other traffic. Remember pre-landing checks – easily forgotten if you make a straight-in approach.
- f If you have to fly a fixed wing circuit, maintain your speed, do not slow down or hover thus creating a collision hazard from following traffic.



'runways can be confused'

- g Be aware of optical illusions at unfamiliar landing sites, eg those with sloping terrain.
- h Take care at aerodromes where identification of the runways can be confused, eg 02 and 20. Make sure you know whether the circuit is left-hand or right-hand, as this will determine the dead side. If in doubt – **ASK**.
- i In most piston engined helicopters, apply carb heat **BEFORE**

reducing power, return to cold at 200 ft plus above ground.

j Reduce rate of descent before reducing airspeed.

4.13 Landing

a Don't land in tall dry grass, the hot exhaust could start a fire.

b A good landing is a result of a good approach. If your approach is bad, make an early decision and go around.

c Avoid conditions likely to result in Vortex Ring:

- Power On
- Low IAS (below 35 kts)
- High rate of descent (over 300 ft per min).

See AIC 147/1998 (Pink 184) 'Vortex Ring'.

d The unplanned downwind approach is particularly hazardous. It can lead to over-pitching, loss of rotor rpm and lift, resulting in a hard contact with the ground. (Correlators are less effective at high power settings, so maintain rotor rpm by leading with the throttle before applying pitch.)

e If there is a white H marking, you must use that area.

f If you are loading passengers, have them escorted to/from the helicopter, or else make them wait until the rotors have stopped. They **must** be aware of the danger of the main and tail rotor (see para 4.2e).

g Remember, the flight isn't over until the engine(s) are shutdown and all checks completed and the rotors have stopped.

h 'Book in' and close any Flight Plan, if necessary by phoning the local Air Traffic Service Unit. See Safety Sense Leaflet No 20A 'VFR Flight Plans'.

A helicopter has the unique ability to land almost anywhere. If, despite our advice, you find yourself in a weather, fuel, navigation or other difficulty – simply land and sort out the situation.

- **Safety Promotion GAD, Aviation House, Gatwick Airport, West Sussex RH6 0YR.**
Tel: 01293 573225/7
Fax: 01293 573973
- **Safety Data Department (address as above)**
Tel: 01293 573220/1
Fax: 01293 573972
- **Air Accident Investigation Branch, Berkshire Copse Road, Aldersot, Hants GU11 2HH**
Tel: 01252 512299
Fax: 01252 376999
- **General Aviation Safety Council, Holly Tree Cottage, Park Corner, Nettlebed, Oxon RG9 6DP**
Tel/Fax: 01491 641735
- **British Helicopter Advisory Board, Graham Suite, Fair Oaks Airport, Chobham, Surrey GU24 8HX**
Tel: 01276 856100
Fax: 01276 856126
- **Helicopter Club of Great Britain, Ryelands House, Aynho, Banbury, Oxon OX17 3AT**
Tel: 01869 810646
Fax: 01869 810755
- **Popular Flying Association, Terminal Building, Shoreham Airport, Shoreham-by-Sea, West Sussex BN43 5FF**
Tel: 01273 461616
Fax: 01273 463390
(for gyroplanes)

5 MAIN POINTS

- ✓ If the engine fails, in a single-engined helicopter, you must have a reflex response to lower the collective **IMMEDIATELY**.
- ✓ Keep current. Regular simulated engine-off landing practice with an instructor is recommended.
- ✓ Know the helicopter thoroughly.
- ✓ Get an aviation weather forecast.
- ✓ Prepare a thorough Route Plan using latest charts and check on NOTAMs, Temporary Nav warnings etc.
- ✓ Keep time over water to a minimum in a single-engined helicopter and wear a lifejacket (and a survival suit), carry a liferaft.
- ✓ Pre-flight thoroughly with special emphasis on fuel, engine and transmission oil contents, and flying controls.
- ✓ Brief passengers/ground staff about getting in and out of helicopters. Either have passengers escorted or shut down the engine(s).
- ✗ Don't over-load the helicopter.
- ✓ In a single-engined helicopter, bear in mind the possibility and consequences of engine failure.
- ✓ Minimise time in the 'avoid curve'.
- ✓ Maintain a good look-out, scan effectively.
- ✓ Make regular cruise checks of OAT or carb air temperature and when necessary use carb heat.
- ✗ Keep out of controlled airspace unless you have clearance.
- ✓ Request help early (or **land**) if lost or have other problems, eg fuel shortage.
- ✓ Return or **land** if the weather deteriorates. Keep above your Safety Altitude.
- ✓ **Maintain rotor rpm.**
- ✓ Avoid retreating blade stall in turbulent conditions or near VNE – **SLOW DOWN.**
- ✗ **Push-over negative 'g' manoeuvres can be catastrophic, particularly in gyroplanes.**
- ✓ Remain at the controls until the rotors have stopped turning.
- ✓ Don't do anything stupid – become an old pilot, NOT a bold pilot.

COMPLACENCY IS THE ENEMY OF SAFETY

Other leaflets in this series:

- 1C *Good Airmanship Guide*
- 2B *Care of Passengers*
- 3C *Winter Flying*
- 5D *VFR Navigation*
- 6C *Aerodrome Sense*
- 7B *Aeroplane Performance*
- 8D *Air Traffic Services Outside Controlled Airspace*
- 9A *Weight and Balance*
- 10A *Bird Avoidance*
- 11 *Interception Procedures*
- 12C *Strip Sense*
- 13A *Collision Avoidance*
- 14A *Piston Engine Icing*
- 15B *Wake Vortex*
- 16A *Balloon Airmanship Guide*
- 18A *Military Low Flying*
- 19 *Aerobatics*
- 20A *VFR Flight Plans*
- 21A *Ditching*
- 22 *Radiotelephony*
- 23 *Pilots: It's your Decision*
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