SAFETY SENSE

General Aviation Helicopter Airmanship

Introduction

All Safety Sense information can be obtained free from CAA publications or visit their website at www.caa.co.uk/publications.

Rotorflight have included this document as a simple common sense reminder to all PPL's of their responsibilities to themselves and their passengers when flying a *Rotorflight* helicopter i.e. to be safe during all phases of your flight.

A review of the 42 fatal accidents during the recent 15 year period to helicopters of less than 5700kg, 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

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

Knowledge

Reporting

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.

Share your knowledge and experience with others, preferably by reporting to the Civil Aviation Authority Safety Investigation & 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.

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

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

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.

Limitations

You must be aware of the helicopter's limitations and your own !!!

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. A more cautious approach is necessary.

Preparation

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.

The Helicopter

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.

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

Carry out refresher training as previously mentioned if you have not flown the type in the last six months. (Many commercial operators and flying schools require a check-flight if their pilots have not flown the type in the last 28 days)

Weather

Get an aviation weather forecast and make a carefully reasoned 'Go/No Go' decisions. 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.

The various methods of obtaining aviation weather (including codes), are available in a small booklet ‘GET MET’. This is available free from the Met Office.

Know the conditions that lead to the formation of piston engine icing. 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 & Ps.

Beware of turbulent and windy conditions, especially if your experience is limited – know the wind limits (if applicable) for the helicopter type you fly.

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

Winter Flying

Pilots should be aware of ‘white-out’, due to blowing snow, when landing on a snow covered surface.

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.

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

A Canadian gyroplane accident was the result of the pilot’s eye balls freezing. He lost control and crashed!

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. Be aware also of frozen skids and possible dynamic rollover situations.

VFR Navigation

Use appropriate current aeronautical charts (it is a legal requirement to carry a current map), ready folded to show the planned track.

Check NOTAMs 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 www.ais.org.uk).

Information on Red Arrows displays and Emergency Restrictions of Flying is available on Freephone 0500 354 802, updated daily.

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.

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 – Fly Defensively!

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 all shown on your chart, but are listed in the UK AIP ENR 5-1-2.

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!

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, i.e. city, town, or settlement, below 1000 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

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 Power line Inspection Procedures (PINS) to let them know where and when you will be operating on relevant activities.

Know the procedure if you get lost.

Above all, prepare a thorough route plan.

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

Radio

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

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

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

Brush-up periodically on radio procedures, phraseology etc.

Weight and Balance

Use the actual 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.
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.

Check that the cg is within limits for take-off and throughout the flight. If it does not stay within the approved range, e.g. 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.

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.

Performance

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

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

Fuel Planning

Always plan to land by the time the tank(s) are down to the greater of ¼ tank or 30 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.

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

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

Destination

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.

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 the 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.

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 the engine failure.

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

Flying Abroad

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

Take the helicopter's documents which include for example - in some countries the insurance details written in their language, e.g Spain, your licence and a copy of 'Interception Procedures'.

Before crossing an International FIR boundary you must file a Flight Plan, check that it has been accepted.

Don't forget the Prevention of Terrorism restrictions for flights to Ireland, Channel Isles and Isle of Man.

Permit to Fly aircraft may need special permission in many countries.

Over Water

The weather over the sea can often be very different from the land, e.g. sea fog.

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

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.

In addition, if there is space available (not applicable to Robinson helicopters with only under seat storage) take a life raft, its 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.

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

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

Remain on an appropriate aeronautical radio station.

Pilots and passengers who regularly fly over water, are advised to attend an underwater escape training and Sea Survival Course.

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

Minimise over water time in single-engine helicopters- Fly Defensively!
Public Transport helicopters are limited to 10 minutes over water when crossing sea areas around the UK.

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 a 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.

Pilot Fitness

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).

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.

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

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

Practice

Pre-Flight
After removing blade tie-downs, pilot and engine covers, complete a thorough pre-flight inspection, paying particular attention that swash plate, control rods etc. are secure and in good condition - climbing may be necessary. Don't forget any 'tele-temps' designed to show overheating. Use the check list.

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.

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 (AVTUR only).

Check engine and transmission oil levels and, if necessary, top them up. Do not be fooled by a 'tide line' on the sight glass, this has led to failures as there was no oil in the gear box.

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

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 de-icing fluids on rotor blades, due to the possibility of damaging the bonding of metal fittings and composite rotors.

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

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

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

Make sure all baggage doors are properly closed and locked.

Passengers

Removal of dual controls will prevent passenger interference.

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.

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.

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.

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, children's 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 and will certainly change the colour of the helicopter!

Some passengers may be affected by flicker vertigo.

Starting Engine/s

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

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

If parked on snow or ice don't forget the possibility of the helicopter yawing. Place your foot across both pedals to prevent accidentally using the pedals until ready for take-off.

Take-off

Know the helicopter Marshalling Signals.

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

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.

Beware of hovering close to tall buildings and hangars when there is a possibility that the helicopter downwash will not dissipate uniformly and may re-circulate 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, re-circulation can occur when the helicopter is hovering closer than two thirds of the rotor diameter from an obstruction.

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.

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

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 – not good!

Look Out

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 aircrafts 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 the blind spots and move your head, or the helicopter, to uncover these areas. Scan effectively.

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!

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

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

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

Airspace

Do not enter controlled airspace unless you have a clearance. 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 Areas Crossing and Information Services.

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.

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.

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

<u>En-route Diversion</u>
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.

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

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

If conditions get worse, e.g. 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!**

An occasional weather check from VOLMET is always worthwhile.

Divert if the periodic cruise check, such as FREDA (Fuel, Radio, Engine, DI, Altimeter) indicates you won't have 30 minutes fuel reserve at destination.

<u>Lost</u>

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 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.

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 fuel getting low?

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 afterwards use a telephone so that you can advise that you are safe and obtain a weather update or further help.

Control Considerations

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 in the green band.

In most helicopters, particularly two bladed teetering rotor types (like all Robinsons) 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.

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.

Environment

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 you helicopter; most comes from the tail rotor. Often a turn of 90 degrees can direct the noise away from a neighbour. Avoid 'blade slap' on descent by slowing down early with no sudden manoeuvres.

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.

When en-route, fly at a height/power setting which will minimise noise nuisance, as well as complying with Rule 5, 'Low Flying'.

NEVER be tempted to 'beat up' the countryside.

Select sites for practice auto rotations very carefully - HASELL includes 'LOCATION'!

Wake Turbulence and Rotor Wash

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 – re-plan.

Stay well clear of the 'blast' end of powerful aircraft.

Always be mindful of the effect your own rotor wash can have on parked aeroplanes and other surface objects.

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.

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

Circuit Procedures

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.

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.

Use the appropriate joining procedures at your destination aerodrome. Check circuit height and look out for other aviation activity, e.g. gliding, parachuting.

Check the windsock or nearby smoke to ensure you land into wind.
Be absolutely sure of the wind direction and strength before committing yourself to an approach direction.

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.

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 unless instructed by ATC to do so.

Be aware of optical illusions at unfamiliar landing sites, e.g. those with sloping terrain.

Take care at aerodromes where identification of the runways can be confused, e.g. 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!

In most piston engine helicopters, apply carb heat BEFORE reducing power, return to cold at 200 – 300 ft above ground.

Reduce rate of descent before reducing airspeed.

Landing

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

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

Avoid conditions likely to result in Vortex Ring:

- Power On
- Low IAS (below 30 kts)
- High Rate of descent (over 300 ft per min).

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).

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

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.

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

'Book in' and close any Flight Plan, if necessary by phoning the local Air Traddic Service Unit.

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.

MAIN POINTS

- If the engine fails in a single-engine 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 etc.
- Keep time over water to a minimum in a single-engine helicopter and wear a lifejacket (and survival suit), carry a life-raft if possible.
- 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 stop rotors.
- Don't over-load the helicopter.
- In a single-engine 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, e.g. 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.
- Remain at the controls until the rotors have stopped turning.
- Don’t do anything stupid – Remember, there are ‘old’ pilots and ‘bold’ pilots, But NO ‘old, bold’ pilots!