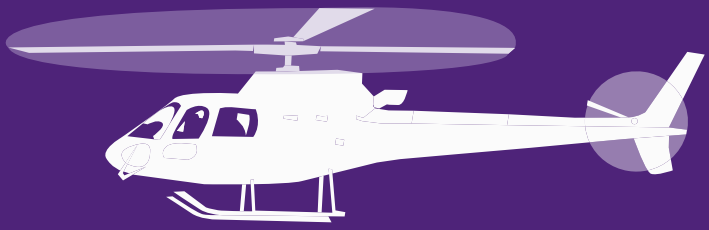
April 24

UK Civil Aviation Authority



HELICOPTER AIRMANSHIP

SAFETY SENSE

SS17

YOUR SAFETY SENSE LEAFLET FOR:
HELICOPTER AIRMANSHIP

This Safety Sense Leaflet provides pilots of general aviation helicopters with useful information for developing and maintaining their airmanship.

Inadequate judgement, skills or situational awareness are frequently highlighted as contributors to helicopter accidents. Good aeronautical knowledge, flight preparation and flying practice will make you a better pilot and reduce the likelihood of becoming an accident statistic.

Part-FCL defines 'Airmanship' as: 'the consistent use of good judgement and well-developed knowledge, skills and attitudes to accomplish flight objectives'.

Airmanship is built on self-discipline, the acquisition and retention of skill, and situational awareness – of one's self, the aircraft, environment, other airspace users and risks.

The SSL should be read in conjunction with the *Skyway Code*, other Safety Sense Leaflets and publications cited throughout the text.

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SAFER FLYING

Maintaining proficiency

Adopting a self-disciplined and studious attitude is important for acquiring and retaining aeronautical knowledge, especially when flying practice is infrequent. If there is a manufacturer safety course available for your helicopter, attending will enhance your skills and may reduce insurance premiums.

It is recommended to have a recurrent training and a check flight with an instructor every six months. Revise by studying the Rotorcraft Flight Manual (RFM) or Pilot's Operating Handbook (POH). Ensure you are familiar with the external, ground, in-flight and emergency checklists.

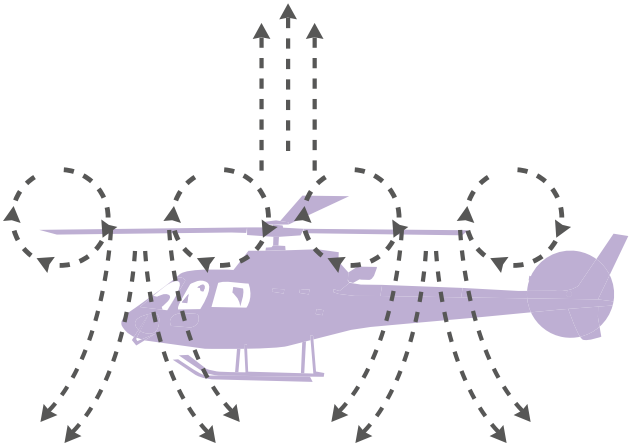
Your self-study, recurrent training and check flights should include limitations, normal and emergency procedures, including (but not limited to):

- Engine failure procedures and practice:
  - In a single-engine helicopter it should be a reflex response to immediately lower the collective and enter autorotation.
  - In a multi-engine helicopter, practice the single engine profiles and memory items.
- Autorotative landings.
- Rotor speeds and power settings, including recognition and recovery from low rotor RPM conditions, both with power on and with power off.
- Engine/rotor RPM control without the use of a governor.
- Helicopter stability, smooth handling and disc loading.
- Awareness of your helicopter's height-velocity diagram.
- Avoidance and recovery from static and dynamic roll-over, vortex ring, loss of tail rotor effectiveness, unanticipated yaw and ground resonance.
- Effects of low and negative G manoeuvres and correct recovery action.
- Prohibited manoeuvres.
- Sloping ground takeoffs and landings.
- Operation from confined areas, including power check parameters and applicable landing and takeoff profiles.
- Operation of navigation instruments.
- Assessment of flight visibility and, in case of impeding entry into IMC, actions to safely regain VMC or commence an IFR flight plan (if instrument rated and flying an IFR certificated helicopter).
- Engine or carburettor icing conditions, avoidance and recovery.
- Radio procedures, including an emergency radio transmission call, either to an instructor over the intercom or via a 'practice pan' call to Distress and Diversion (D&D) on 121.5 MHz.
- All-up mass, loading, and weight and balance calculations.
- Threat and Error Management (TEM).

Cover any other topics or flying procedures that you or your instructor feel would be beneficial. See also AIC P 138/2019 – Light Helicopter Flight Training.

SAFER FLYING

Vortex ring



Often considered as the equivalent of the fixed-wing stall, vortex ring state (VRS) is a condition of powered flight where the helicopter settles into its own downwash. On entering vortex ring, the rate of descent will increase dramatically (normally by at least three times), for the same power setting.

Conditions for vortex ring

Vortex ring is likely to occur when descending in powered flight at an airspeed below 30 kts and with a rate of descent close to the main rotor 'downwash velocity'.

Downwash velocity or induced velocity is defined as the airspeed of the airflow drawn down through the rotor disc. Although vortex ring is dependent on the helicopter type and weight, a commonly accepted unsafe rate of descent is more than 500 ft/min. Ensure you are familiar with the conditions applicable to your type, as stated in the RFM or POH.

Effect of vortex ring

- Vibrations as vortices break away at the blade tips.
- Less responsive pitch and roll controls, as a result of the unstable airflow constantly modifying the thrust and moment of control.
- Fluctuations in power requirement (torque or MAP), as the large changes in drag cause thrust variations.
- Abnormally high rate of descent as vortex develops, which can exceed 3,000 ft/min.

Recovery actions

Recovery actions may be taken by cyclic and/or collective application. However, depending on the rotor system, cyclic input alone may be insufficient to modify the helicopter attitude enough to gain airspeed. It is also possible to recover from vortex ring by reducing the collective to minimum pitch. The loss of height during recovery by reducing the collective pitch is greater than the corresponding loss of height via cyclic input – the rate of descent in autorotation at low airspeed will be very high.

The following recovery actions are normally recommended at the incipient stage to minimise the loss of height:

- Apply a positive forward cyclic input, to achieve an accelerative attitude enough to gain airspeed. Depending on the rotor system, the recommended nose down attitude may vary; and
- If an accelerative attitude cannot be reached, decrease collective pitch to enter autorotation and then apply forward cyclic, as required to increase airspeed.

Discuss VRS recovery actions with your instructor during refresher training, always making reference to the RFM/POH.

The 'Vuichard technique' provides an alternative recovery action to the classic one described above, and may produce a quicker exit from incipient VRS, however you should consult any manufacturer guidance on the technique.

Vortex ring avoidance

Since the recovery actions will entail a considerable loss of height, it is important to avoid vortex ring, especially when close to the ground. A rate of descent greater than 500 ft/min and an airspeed of less than 30 kts whilst in powered flight should be avoided.

The following operations should be conducted with great care:

- Approaches to confined areas
- Downwind approaches
- Steep approaches
- Hover Out of Ground Effect (HOGE)
- Low speed autorotation recovery
- Downwind quick stops

SAFER FLYING

Loss of tail rotor effectiveness

The main function of the tail rotor is to counter main rotor torque, but it also provides directional stability and yaw control. In some conditions, yaw control may be reduced and the tail rotor rendered ineffective in producing the required thrust to maintain heading.

As a result, the helicopter may yaw in the opposite direction to the main rotor blades, even as application of the critical yaw pedal approaches full travel. This is known as a loss of tail rotor effectiveness (LTE) and has caused many helicopter accidents, including in the UK.

LTE is the onset of an uncommanded rapid yaw rate, which is unrelated to a helicopter malfunction, does not subside by itself and, if not promptly corrected, can result in loss of control. LTE relates to a helicopter's high-power/low-airspeed aerodynamic characteristics (for example, main rotor interference on the tail rotor, tail rotor vortex ring state and tailwind weathervaning), loading and environmental conditions, which may overwhelm the tail rotor's ability to provide the required thrust.

Conditions likely to induce an LTE include operating below effective translational lift airspeeds, in critical relative wind speeds and azimuths, and:

- near or at maximum main rotor torque (for example, at all-up mass);
- at a high density-altitude (including in hot air temperatures);
- in presence of turbulent or varying winds which increase the required main or tail rotor thrust;
- flying sideways, rearwards or with too much sideslip;
- hovering in cross or tail wind;
- when excessive rates of yaw are allowed to develop; or
- with low rotor RPM (for example during overpitching).

Further references and information on LTE:

- NTSB Safety Alert
- EASA Safety Information Bulletin
- EHEST leaflet HE 1 – Safety Considerations
- NTSB Safety Alert Video – LTE
- AAIB investigation – possible LTE related accident

SAFER FLYING

Unanticipated yaw

A yaw associated with the onset of directional (yaw) instability is known as an uncommanded or unanticipated yaw (UY). This may occur both in the same and opposite direction as the main rotor blades. The latter occurs more often, which resembles an LTE.

Environmental and loading conditions may affect a helicopter's directional (yaw) stability. After passing a critical azimuth for relative wind, a sudden change from stable to unstable pedal control characteristics may occur. This azimuth may be exceeded deliberately and in a controlled fashion (for example as the pilot commands a spot turn) or unintentionally, for example caused by an unexpected change in wind direction or speed.

A change in yaw stability can cause significantly different rates of turn for a given pedal position. This may require the pilot to promptly adjust their pedal input, to avoid losing control. For example, significant opposite pedal may be necessary to stop or reverse an incipient turn, which may otherwise accelerate. Loss of control may occur, even though sufficient tail rotor thrust is still available.

Pilots lacking familiarity with a helicopter's flying characteristics, for example with low type-specific experience or little recent flying practice, may be especially vulnerable to UY and slow to correct it. Consider that the reflex responses necessary to handle a helicopter in an unusual situation or emergency may not be sufficiently consolidated. Adopt a cautious learning attitude.

Airbus Helicopters published a safety information notice that provides general explanations on directional stability and unanticipated yaw for certain types within the Airbus fleet. The conditions leading to UY and the applicable prevention and recovery actions will be type specific.

SAFER FLYING

Prevention

Prevention of both LTE and UY relies on knowledge of type flying characteristics and strict compliance with limitations, especially when operating close to maximum:

- Weights
- Cross and tail wind speeds
- Sideways and rearward taxi speeds
- Rates of turn
- Operating altitudes and temperatures

Limitations should be available from the RFM/POH, either as numerical values or via flight envelope diagram covering different flying conditions. Study and observe the applicable limitations. Figures 1 and 2 show examples of generic flight envelopes with critical winds for LTE.

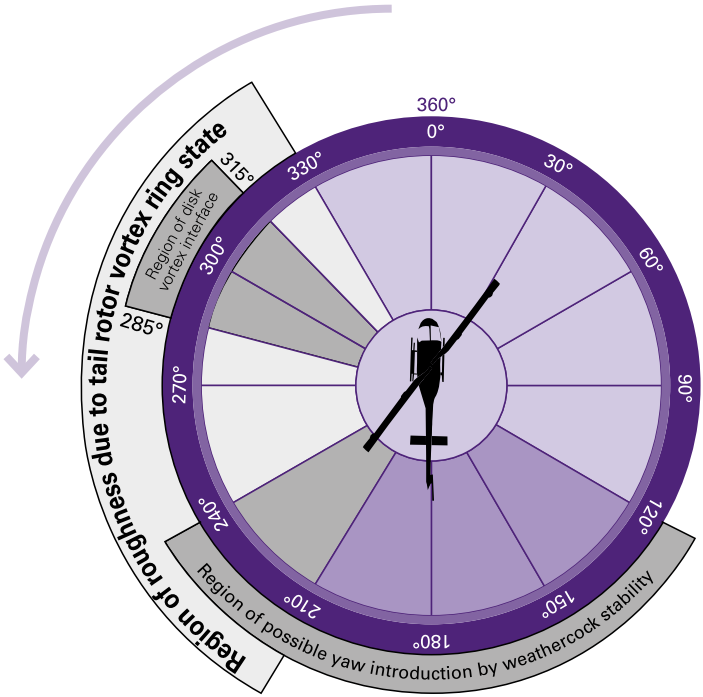


Figure 1. Relative wind directions that can contribute to LTE for counterclockwise main rotor helicopters

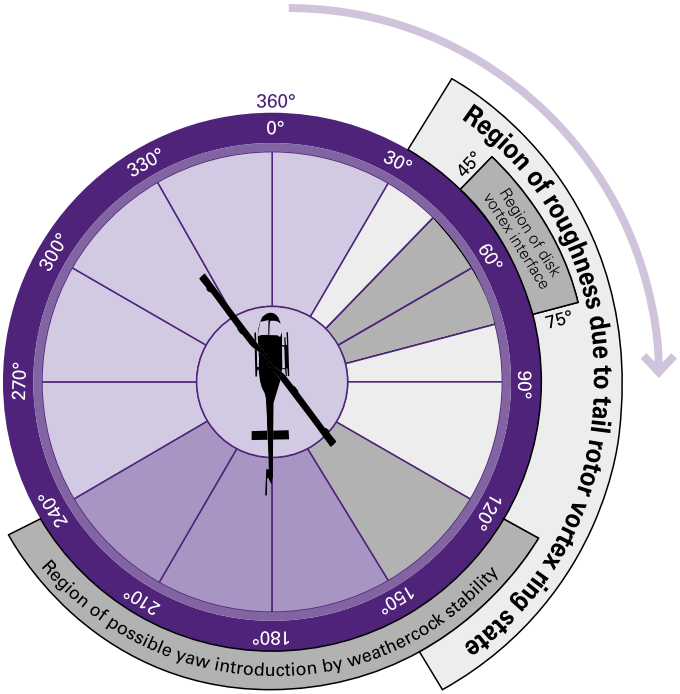


Figure 2.
Relative wind directions that can contribute to LTE for clockwise main rotor helicopters

Include wind speed and direction in your flight planning; they can affect your helicopter's susceptibility to LTE and UY. Maintain vigilance against inadvertent airspeed reductions or heading changes conducive to LTE or UY; for example, during low-speed orbit and downwind manoeuvres.
Be aware of operating in areas where the wind may change locally; for example over ridgelines and around buildings. Plan an obstacle-free escape route in which to regain control, should you encounter unfavourable winds, and LTE or UY as a result.

Recovery

Discuss and practice LTE and UY with a flight instructor. For example, conducting slow, steady-rate hovering pedal turns, to maintain proficiency in controlling yaw in varying wind conditions. Ensure you are familiar with and deploy any recovery techniques specified in the RFM/POH for your aircraft.

Should you encounter LTE or UY, the primary recovery action will normally be to immediately apply and hold full opposite yaw pedal until the uncommanded yaw stops. With LTE, you may also need to reduce power and increase forward airspeed if possible. As you achieve recovery, adjust controls for normal forward flight.

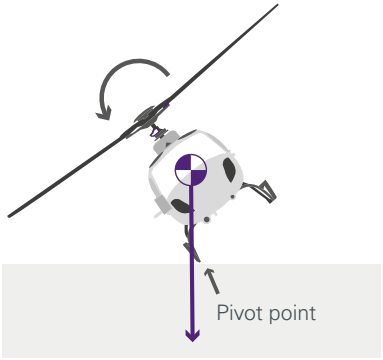
SAFER FLYING

Static and dynamic rollover

Static rollover

Static rollover occurs when the helicopter pivots about one skid/wheel in contact with the ground to such an extent that the helicopter's centre of gravity (CG) moves beyond the skid/wheel.

Once the static rollover angle is exceeded, removal of the original force causing the roll will not stop the rolling motion. This angle is around 30° for most helicopters.



Critical rollover angle

The critical rollover angle for a helicopter can be described as either the:

- Maximum lateral slope angle upon which the helicopter can land, yet maintain its main rotor disc parallel to the natural horizon; or
- Maximum flapping angle of the main rotor system.

Most helicopters have a critical rollover angle of 13° to 17° and if it is exceeded, application of full opposite cyclic will not stop the helicopter rolling motion.

Dynamic rollover

Dynamic rollover normally occurs when a helicopter is taking off, landing or hovering, with one skid/wheel in contact with the surface. The helicopter may begin to roll about the point of contact with the surface (pivot point). For example, the pivot point could be a skid/wheel, stuck or restrained to the ground, ice, soft asphalt or mud. It could also be a skid/wheel contacting an object or the ground while hovering sideways or during slope operations. Dynamic rollover can occur at roll angles far less than the static or critical rollover angles.

Excessive application of collective in combination with a rolling motion about a skid/wheel can result in sufficient roll momentum that full opposite cyclic cannot counteract, even before reaching the critical rollover angle.

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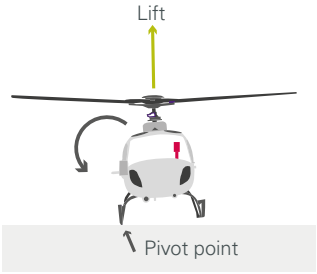
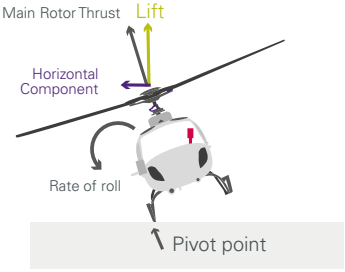
Lifting to the Hover

- Collective is raised and lift generated
- One skid is stuck and becomes the pivot point
- Opposite cyclic keeps the disc level with the horizon
- A small roll rate develops



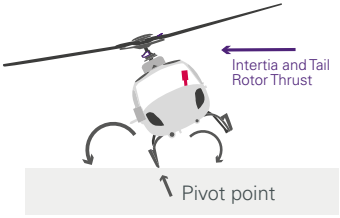
Dynamic Rollover

- Collective is raised further and more lift generated
- Critical rollover angle is reached
- No more cyclic is available to level the disc
- Horizontal component of the rotor thrust will add to the roll rate
- The roll rate increases



Corrective Action

- The helicopter will continue to roll due to its inertia and may roll beyond the static rollover angle if the collective is not lowered soon enough.
- Lower collective to remove the horizontal component of the rotor thrust in an attempt to stop the roll before the C of G is beyond the pivot point.



Precautions

- Check the wheels or skids are clear of any obstructions;
- Any change in lateral C of G will modify the lateral cyclic requirement and availability;
- Always practice hovering Engine Off Landing (EOL) into the wind;
- Use caution when hovering and taxiing close to obstacles or ground;
- Whenever possible, slope operations should be conducted into the wind;
- During take-off and landing, especially on a slope, all control inputs should be made slowly, smoothly and gently – sideways motion should be avoided;
- During slope operations if the upslope skid/wheel starts to leave the ground before the down slope skid/wheel, lifting to the hover should be aborted;
- On landing, if the cyclic control limit is reached, further lowering of the collective may cause a rollover; and
- When landing or taking off on a floating platform that is pitching and/or rolling, extreme caution should be exercised.

SAFER FLYING

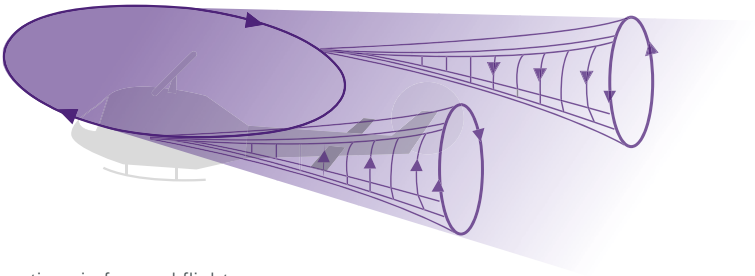
Rotor downwash and wake turbulence

Rotor downwash and wake turbulence result from the aerodynamic effects of a helicopter's lift-generating blades. Downwash spreads out from a helicopter's rotor disk in all directions during hover or slow taxi. It is more of a risk when operating close to the ground, at an airfield, close to other aircraft, or in any area where objects may be thrown around and cause injury or damage.

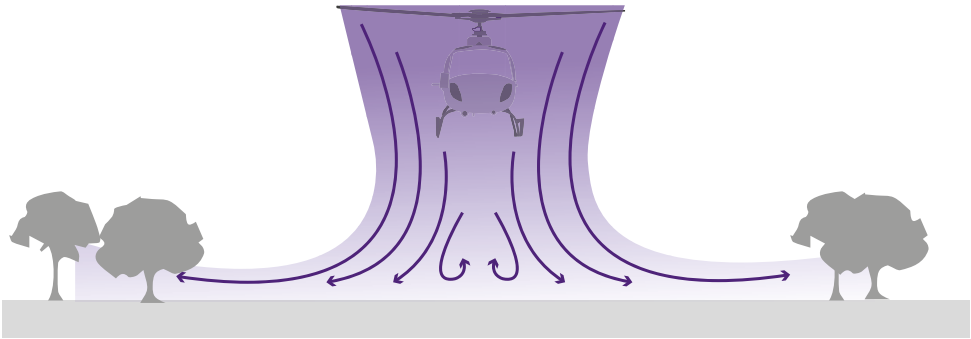
Wake turbulence stems from downwash during translational lift, normally at airspeeds around 15 kts and above, depending on type. Like the wing tip vortices of an aeroplane, a helicopter with translational lift will create blade tip vortices from the edges of the rotor disk on each side of the helicopter's track. These combine to generate a wake turbulence behind the helicopter, which is significantly stronger and more persistent than that of a fixed-wing aircraft of similar size and weight.

Be aware of and mitigate the potential impacts of your helicopter's rotor downwash and wake turbulence on other aircraft, people and property. Both downwash and wake turbulence have caused accidents and incidents in the UK and abroad.

Low-mass air vehicles and light aircraft are especially vulnerable due to the strength and persistence of helicopter downwash. Parked aircraft may be damaged and fixed wing aircraft may experience loss of control when taking off or landing through areas in which a helicopter recently hovered or taxied.



Wake vortices in forward flight



Rotor downwash

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Mitigating the impact

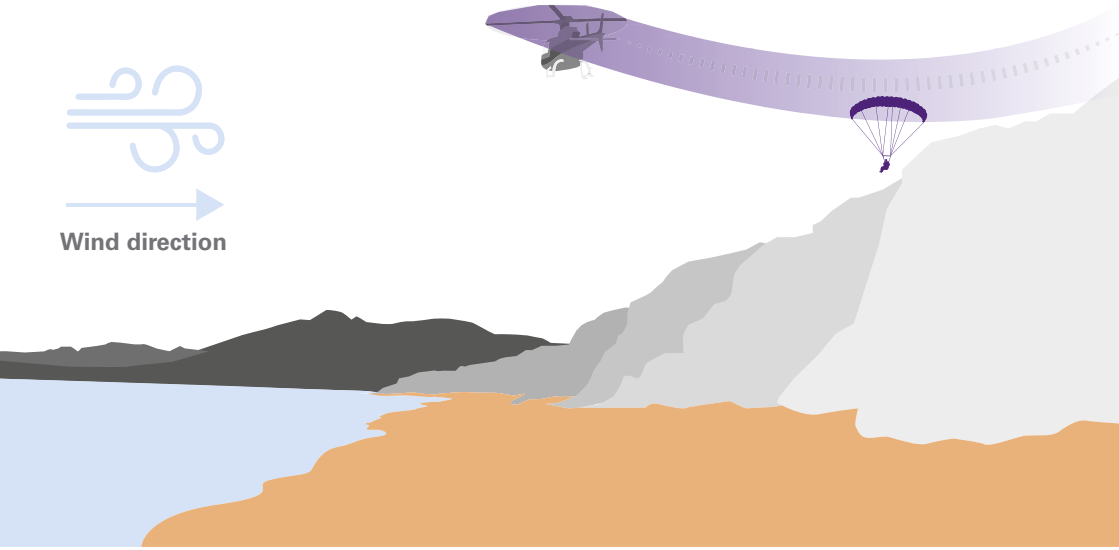
When hovering or hover-taxiing, plan on clearing other aircraft by at least 3 times your rotor diameter. During translational flight, consider the wind and visualise where your wake turbulence will travel, assessing whether it might affect low-mass air vehicles and lighter aircraft operating in the vicinity. Adjust your track or altitude (or land) as necessary to avoid impacting other aircraft.

Objects may also circulate into your airflow and affect the helicopter. Land immediately if necessary. You may also be affected by the rotor downwash and wake turbulence from other helicopters and heavier fixed-wing aircraft. Be vigilant and heed air traffic warnings where offered.

AIC P 083/2020 and SSL 15 – Wake Vortex contain more information on wake turbulence.

Paragliders

Helicopter wake turbulence has been associated with various recent accidents and incidents, particularly (but not only) involving paragliders. For example, AIRPROX Report 2022084 and a French BEA report from 2021 (see also BEA Lessons Learned video). Paragliders have a very limited ability to manoeuvre away from a helicopter's wake turbulence, especially when soaring on a cliff face or gliding down a valley. The wake turbulence will persist for longer when wind speeds are low. The wind may also blow the turbulence towards the flight path of a paraglider or other low-mass air vehicle – select flight paths that avoid this. Remember that under the Rules of the Air, when on a converging track with another aircraft, powered aircraft must give way to gliders.



Wake turbulence drifting downwind towards a paraglider pilot who is flying near the cliff face

PREFLIGHT PREPARATION

Introduction

Thorough prefight preparation is essential for safe operations. You should develop a routine that ensures all items are adequately addressed. The *Skyway Code* contains more guidance, including an example preflight planning checklist.

As pilot in command you have legal obligations prior to and during the flight. Non-commercial and flight training flights with other-than-complex Part 21 helicopters must comply with Part-NCO of the Air Operations Regulation. Flights with non-Part 21 helicopters must comply with the Air Navigation Order 2016.

Fitness to fly

Do not fly when ill or fatigued. Use the **IAM SAFE** checklist to review fitness to fly:

I	**Illness** *Do I have any symptoms that might affect my ability to fly?*
A	**Attitude** *Am I emotionally ready and fully focussed on the flight?*
M	**Medication** *Am I taking any prescription or over-the-counter drugs that might affect my performance?*
S	**Stress** *Am I under pressure or have any worries and anxieties?*
A	**Alcohol** *Have I been drinking within the last 24 hours?*[1]
F	**Fatigue** *Am I tired or not adequately rested?*
E	**Eating** *Am I adequately nourished?*

- If you require glasses for flying, ensure the required spare pair is readily accessible.
- Sunglasses and a peaked cap may be advisable.
- During hot weather, beware of dehydration – have water available.
- Wear clothes that cover the limbs and give some protection in the event of fire – avoid synthetic materials that will melt into the skin.

[1]You must not fly within 8 hours of consuming alcohol. Significant quantities of alcohol may take 24 hours to exit the body. The legal blood/alcohol limit for aviation is 20 mg/100 ml- note this is a quarter of the limit for driving in England and Wales.

PREFLIGHT PLANNING

Threat and Error Management

The CAA advocates a Threat and Error Management (TEM) approach to pre-flight planning and execution. TEM is the process of detecting and responding to threats (such as powerlines or faulty equipment) and errors (such as selecting the wrong radio frequency, or missing a checklist item), to prevent safety being compromised.

Left unmanaged, these threats and errors can lead to 'undesired aircraft states' – the last opportunity to avoid a serious incident or accident. TEM can be considered an extension to airmanship, providing a structured way to help people maintain safety margins during everyday operations.

You should review each stage of your planned flight and determine relevant threats and possible errors that may occur. For more information on TEM for helicopters see:

EHEST Leaflet HE 8 The Principles of Threat and Error Management for helicopter Pilots, Instructors and Training Organisations | EASA (europa.eu)

Weather

Methods of obtaining aviation weather information are described in the GetMet booklet.

Review an aviation weather forecast valid for the time of your flight and make a carefully reasoned 'go' or 'no-go' decision. Do not let 'get-there/get-home-itis' influence your judgement. Read SSL 23 – Pilots: It's Your Decision and relevant chapter of *Skyway Code* for effective decision-making. The *Skyway Code* contains details of VFR and SVFR minima for helicopters.

Establish clearly in your mind the current takeoff and enroute conditions, the forecast for the destination, and an 'escape route' back to clear weather, should your 'go' forecast not materialise. Establish suitable enroute diversion options. Plan an alternative route for avoiding high ground that may be obscured by cloud. Consider the freezing level and associated icing hazards.

Know the conditions that lead to the formation of piston engine icing. Read SSL 14 – Piston Engine Icing and RFM/POH instructions regarding the use of carburettor heat or engine anti-ice.

PREFLIGHT PLANNING

Planning the route

Aeronautical information

The official source of aeronautical information is the UK Aeronautical Information Service (AIS).

Check:

- NOTAMs
- Aeronautical Information Circulars (AICs)
- Briefing sheets

If using third party flight planning software, you should also check the AIS website. Restrictions of a temporary nature are detailed in AIC Mauve. Briefing sheets are used by the CAA when information needs to be promulgated outside the normal AIC publication cycle. VFR chart changes are issued via AIC Green.

Details of Restricted Areas (Temporary) or temporary controlled airspace are also available via the AIS Information Line on **08085 354802** or **01489 887515**. Short term restrictions are often used to protect air shows or Royal Flights.

VFR moving maps

The CAA recommends the use of VFR moving map devices, as an aid to situational awareness. You must be familiar with your device and not allow it to become an in-flight distraction. Prior to takeoff, double check waypoint coordinate entry before loading and activating a route. For more information see SSL 29 – VFR Moving Map devices.

VFR moving maps may fail for a variety of reasons, such as overheating or battery degradation. You should carry a current and suitable paper aeronautical chart, folded to show the planned route. Cockpit space is usually limited in a general aviation helicopter, and it may be difficult to fold paper charts once you are airborne.

PREFLIGHT PLANNING

Planning the route

Identify hazards

Prepare your route plan thoroughly, with particular attention to safety altitude. Consider congested areas, high ground, masts, and other obstructions. Note Maximum Elevation Figures (MEFs) on charts. It is recommended to produce a pilot's log (PLOG), either on paper or your moving map device.

Familiarise yourself with geographical features, reporting points, enroute airspace and the procedures for any helicopter special routes.

Remember you must not fly over certain high-security prisons and other sites in a helicopter. These may not always be shown on your chart and are listed in ENR 5.1 of the UK AIP.

If you fly a single-engine helicopter and your proposed route takes you over an area where a forced landing could be hazardous to yourself or those on the ground (for example congested areas, forest, or lake), plan an alternative route with better forced landing options.

Plan your route to stay clear of airspace users whose safety may be affected by helicopter wake turbulence or downwash. Low-mass air vehicles, such as paragliders, hang-gliders, powered-parachutes and microlights are especially vulnerable and may be limited in their ability to manoeuvre away from the turbulent airflow generated by a helicopter. Check ENR 5.5 of the UK AIP and NOTAMs for areas of active aerial sporting and recreation activities. See more on p.12 Rotor Downwash and Wake Turbulence.

You should also review the hazards associated with operating near gliders, paramotors and their launching sites. Read the Paramotor Code, AIC Y 027/2023 – Gliding Activity in the UK and CAA guidance on the overflight of glider sites.

Low flying

Be aware of and plan in accordance with low flying regulations (see SERA.5005 Visual Flight Rules and the *Skyway Code*). Avoid flying lower than necessary and minimise annoyance to persons on the ground. Be prepared to reach a safe landing site in case of an emergency.

If you intend to fly below 1,000 ft AGL (where most military low flying takes place), use the Civil Aircraft Notification Procedure (CANP) or Pipeline and Powerline Inspection Procedures (PINS) to notify your flight to the crew of military air systems. See ENR 1.10 (paragraphs 5, 6 and 7) of the UK AIP and Safety Sense Leaflet 18 – Military Low Flying.

Radio procedures

Plan which air traffic service units you will contact for each stage of the flight. List the applicable frequencies on your PLOG, including enroute, destination and diversion aerodromes, VOLMET and Danger Area Crossing Services, as applicable.

Know your radio failure procedures, including when flying Special VFR in controlled airspace. The transponder code for radio failure communications 7600. VFR radio failure procedures are included in SSL 22 – Radiotelephony and ENR 1.1 (para 3.4) of the AIP.

For more information on radio procedures and air traffic services see:

- *Skyway Code*
- SSL 22 – Radiotelephony
- CAP 413 – Radiotelephony manual
- CAP 774 and CAP 1434 – UK Flight Information Services

PREFLIGHT PLANNING

Paperwork

Aircraft documents

Conduct a review of pilot and aircraft documentation and ensure all are valid for flight. For flights under Part-NCO, the following documents are required to be carried:

- AFM, or equivalent document(s);
- details of the filed ATS flight plan, if applicable;
- current and suitable aeronautical charts for the route area of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted;
- procedures and visual signals information for use by intercepting and intercepted aircraft; and
- the MEL or CDL, if applicable.

Part-FCL licence holders are required by FCL.045 to carry their licence while flying, along with a matching photo ID document.

Weight & balance

Use the actual (not typical) empty weight and centre of gravity (CG) from the latest weight and balance (W&B) schedule for the airframe you are operating. Aircraft often get heavier with age, for example due to extra equipment or respray of the paintwork, so ensure the W&B schedule is updated. Take account of any ground handling equipment, camera installations etc. that are normally carried in the aircraft.

Comply with the helicopter maximum and minimum weights. If too heavy, you must reduce the weight by off-loading passengers, baggage or fuel.

Check that the CG will be within limits for takeoff and throughout the flight. For example, if commencing with full fuel and passengers, the CG may move beyond the forward limit after the passengers disembark and the fuel load has reduced. In some helicopters, you may run out of cyclic control for landing. You may have to carry ballast, which must be suitable and properly secured.

Never accept a helicopter which is outside the permitted weight, CG range, or performance specifications. It is dangerous, illegal, invalidates the certificate of airworthiness and will likely affect your insurance.

Performance

Ensure that the intended operating sites are large enough for takeoff and landing. Use the POH / RFM to calculate the space needed and power required for the prevailing conditions and intended flight – for example, hover in ground effect (HIGE), hover out of ground effect (HOGE). Calculate your density altitude.

Plan on using the recommended takeoff and landing profiles and avoid or minimise flight in the avoid areas of your helicopter's height-velocity diagram.

Flight plans

Complete any booking out procedures for the aerodrome or operating site. If your flight requires a full VFR flight plan, file online or via a local ATSU. See the relevant chapter of the *Skyway Code* and SSL 20 – VFR Flight Plans.

PREFLIGHT PLANNING

Fuel planning

For operations under Part-NCO, NCO.OP.126 requires the carriage of sufficient fuel and oil to reach the intended destination and then fly for a further 20 minutes at best-range speed. The CAA recommends landing with not less than 1/4 tank or 45 minutes fuel endurance remaining.

- Headwinds may be stronger than forecast, which particularly affects helicopters that fly at a slower airspeed. Frequent use of carburettor heat or hot air will also increase fuel consumption, so consider the impact of temperature and humidity levels.
- Know the hourly fuel consumption of your helicopter. Plan in-flight checks to ascertain whether the gauges agree with your fuel calculations. Do not rely solely on the fuel gauges for determining the aircraft's fuel state.
- Know your unusable fuel figure and understand the operation and limitations of the fuel system, gauges, pumps, mixture and any other system controls.
- Familiarise yourself with the conditions when a 'minimum fuel' or 'mayday fuel' call may be warranted. Should the need arise, make the appropriate radio call without hesitation. The treatment of diversion requests and the response from ATC to fuel related radio calls is discussed in AIC W 084/2022.
- If you dispense or store your own fuel, read SSL 28 – Fuel Handling and Storage and follow any applicable health and safety requirements.

PREFLIGHT PLANNING

Destination planning

Plan to reach your destination at least one hour before sunset, unless qualified, equipped and prepared for night flying. You may be unable to spot fog or low cloud at night. See p.32 for more details on night flying.

Check for any special procedures due to activities at or around your destination, such as parachuting, gliding or paragliding. Use the UK AIP and third party flight guides to determine where on the airfield the helicopter operating area is located.

Private sites

If your destination is a private landing site, the surroundings may be very different from the licensed aerodrome at which you may have learnt to fly, or from which you usually operate. Take this into account when planning your flight.

The final approach and takeoff area should be at least twice the length of the helicopter, including rotor blades. There may be cables or other obstructions in the approach path that are difficult to visually detect. Hills, trees and buildings close to the site may create wind shear or unusual wind patterns. Operations at such locations in high winds, poor visibility or reduced light should be avoided.

Try to select a landing site where you can use the recommended profiles for your helicopter. If this is not possible, consider having a check out with an instructor or someone who knows the site. A ground visit may be beneficial; check for potential problems associated with different wind directions or reduced performance in conditions of increased temperature and density altitude. Always plan to minimise the time that the helicopter is at greatest risk from an engine failure.

Seek the necessary permissions for takeoff and landing. Unless in an emergency, you need the landowner's permission. This also applies at private strips and aerodromes where prior permission is required (PPR).

Inform the landowner or their representative to ensure any passengers or bystanders remain clear of the helicopter, unless you indicate it is safe to approach. Bystanders may not be aware of the dangers of approaching a helicopter with rotors or engines running.

GOING FLYING

Pre-flight checks

Remove any ice, snow and frost from the helicopter. Even light frost can disturb the air flow over an aerodynamic surface. Beware of re-freezing. Only use authorised de-icing fluids, due to the possibility of damaging the bonding of metal fittings and composite rotor blades.

Remove blade tie-downs and any covers for the pitot probes, static ports and engines. Complete a thorough pre-flight inspection according to the RFM checklist. It may be necessary to climb the side of the helicopter during the inspection; ensure you do so correctly, so as not to damage the structure or injure yourself. If you find any defect or damage during the inspection, ask a competent person for further advice.

Remember to check:

- Any sight glasses, chip detectors and overheating indicators; and
- Engine and gearbox oil levels.

When observing a sight glass, ensure you are looking at the actual fluid level and not just a 'tide line' marked on the glass by the normal fluid level. If the oil levels are low, ensure you know the correct procedure for adding oil; if not, ask a competent person to show or do it for you.

When checking the flight controls, visually confirm that the rotor blades move in the correct sense with the control inputs.

Check the surrounding area for loose objects that could blow around in the rotor downwash, and that the main rotor and tail rotor is clear of any obstacles when starting the helicopter. Ensure the skids or wheels are on solid ground and will not catch on anything when lifting off, potentially causing a dynamic rollover.

Ascertain that you have enough fuel of the right type, with any necessary additives. Use a dipstick or other appropriate verification method to check fuel levels.

Personally supervise fuelling. Verify that the correct fuel (AVGAS or JET A1) is dispensed; fuellers may make incorrect assumptions as to whether a helicopter is piston or turbine. Observe precautions to prevent fire, such as use of the earthing cable. Minimise rotors-running refuelling, which must only be conducted if approved in the RFM.

After completion of fuelling, ensure the filler caps are secured and the earthing cable disconnected. Check fuel drains for water and other contamination.

GOING FLYING

Passengers and luggage

Manage passenger expectations. Explain that the flight will only take place if the weather conditions are suitable and that the aircraft is serviceable. If during the flight you encounter poor weather or have a technical problem, you may have to return to the departure point, divert, or conduct a precautionary landing. Unlike when flying in an airliner, passenger clothing and footwear should reflect the possibility of an off-airport landing.

You must brief passengers on the location and use of doors, emergency exits and safety harnesses, as well as emergency procedures. This is a legal obligation on you as the pilot in command. SSL 2 – Care of Passengers contains more guidance on the passenger safety briefing.

When it is raining, the windshield and windows may mist, especially if passenger clothing is wet. Passengers may be affected by flicker vertigo. Be ready to react to this and any other medical occurrence.

Ideally you should load all passengers and luggage before starting engines. Personally check that doors and hatches are secure. Ensure that there are no loose articles that could interfere with the flight controls. Removal or blanking of dual controls will prevent any passenger interference.

Boarding with rotors turning

GA helicopter pilots are discouraged from embarking or disembarking passengers while the rotors are turning; people may behave erratically when surrounded by the wind and noise of the rotors. If absolutely necessary, brief a responsible person to escort passengers to and from the helicopter, open and close the doors correctly and ensure they know how to remain safe:

- Approach and depart from the front or side of the helicopter, in view of the pilot. When approaching, wait outside the rotor disc until the pilot has given the thumbs up. Children should be firmly held by the hand.
- When approaching the rotor disc, lower the upper body and ensure any items are carried below waist level. Do not raise arms – passengers may try to turn and wave to bystanders, either when approaching the helicopter or when stepping inside.
- Items such as hats may blow away in the rotor wash. Firmly hold any loose items – if something blows away do not attempt to catch or chase it.
- Never walk towards the rear of the helicopter, due to the danger of the tail rotor, which may not be visible when turning.
- If there is any slope around the helicopter, do not walk uphill away from it or downhill towards it – there will be less clearance with the rotor disc.

GOING FLYING

Departure

Starting engines

Centralise the controls and switch on the beacon/strobe light. Do not start the engine until all ground personnel are well clear of the helicopter. Know the location and how to use the helicopter's fire extinguisher, as well as the location of any other extinguisher in the vicinity. Use the appropriate checklist and closely monitor the relevant parameters during start.

If parked on snow or ice, the helicopter may not have sufficient friction with the ground and therefore start to yaw when the rotors are engaged. Open and close the throttle carefully and be ready to counter any yaw tendency with the pedals, or shut down the engine.

Taxi out and takeoff

Know the helicopter marshalling signals – see CAP 637, chapters 6 and 7.

Know the sideways airspeed limitation and factor this for your experience and recency. Take particular care if you must lift off into a cross wind, or downwind. With wind from a critical side, there may only be marginal control. Ensure skids are not stuck to the ground by mud – this has caused helicopters to roll over on lifting.

Beware of hovering close to buildings and hangars; there is a possibility that the 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 produce 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.

Consider the effects of downwash on other nearby aircraft, especially if they are low mass. Taxi as far from other aircraft as possible, and not less than the recommended distance of three rotor diameters.

Before taking off, conduct a clearing spot turn of 30° to 45° each side, if safe to do so (for example, considering crosswind limitations). Assess your options such that an engine failure will not be a risk to persons or property.

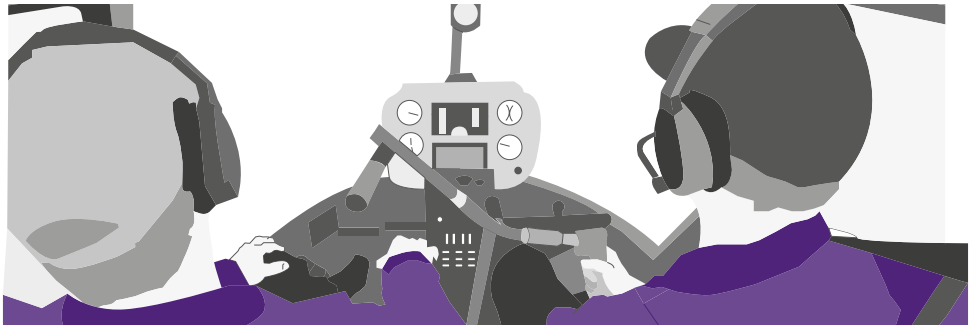
If you take off into a strong wind and then turn downwind with a constant pitch attitude, the speed perceived from ground references will appear to increase by an amount equivalent to the wind speed.

Lift off slowly into a low hover and check engine gauges, including manifold pressure, RPM and control effectiveness.

If you then attempt to reduce the perceived speed by increasing pitch attitude, this may lead to low airspeed, and eventually a reduced rate of climb (in severe cases, a high sink rate), with a high power setting. You may place yourself in a dangerous vortex ring condition, similar to that which may occur during a badly flown approach. Read p.4 for further details and how to recover from vortex ring.

GOING FLYING

In-flight handling



Minimise time in the avoid area of the height-velocity diagram. Maintain rotor speed: needles should be at the top of the green band rather than the bottom.

In most helicopters, particularly two-bladed teetering rotor types and gyroplanes, you must avoid any push-over manoeuvre resulting in negative G. This can cause the main rotor to strike the tail boom, with catastrophic consequences.

When manoeuvring at high speed, or in turbulence, it is possible for some helicopters to experience uncommanded pitch up and roll inputs, and even apparent control restrictions due to retreating blade stall. Recover by reducing collective pitch and slowing the aircraft.

Include carburettor air temperature and outside air temperature (OAT) in your regular scan of engine instruments. Remember the conditions that lead to the formation of piston engine icing (see SSL 14 – Piston Engine Icing) and apply the RFM/POH instructions regarding the use of carburettor heat or engine anti-ice.

Beware of turbulent and windy conditions, especially if your experience is limited. Consider changing your route or postponing your flight to a day with more benign weather.

LTE and UY

Remember the conditions conducive to LTE and be aware of the wind conditions and available tail rotor thrust margin represented by the critical pedal position. Conduct any low speed/high power manoeuvres in accordance with the RFM/POH, preferably using accurate wind information. Where this is unavailable, keep your planned escape route in mind so you may safely regain airspeed or lose height during a recovery from LTE. If this cannot be achieved, avoid manoeuvres conducive to LTE.

Be ready to promptly counter any UY. Avoid inadvertent and insidious reduction in airspeed or change in aircraft heading, which may induce LTE or UY. Be vigilant, especially during low-speed orbits and downwind manoeuvres.

If you experience an LTE or UY, apply the recovery technique applicable to your helicopter type, which likely starts with an immediate and positive application of full opposing pedal. With an LTE, if height and obstacles allow, reduce collective pitch and increase airspeed. Otherwise, consider entering autorotation and cushioning the landing.

GOING FLYING

Collision Avoidance

Lookout

During VFR flights, spend as little time as possible with your head inside the cockpit, for example looking at your instruments or VFR moving map device. Fly at a safe speed considering the in-flight visibility and ability to see-and-avoid other aircraft. Keep a good lookout (and listen out), particularly close to radio beacons, visual reference points (VRPs) and in the vicinity of aerodromes.

Conduct an effective visual scan (see SSL 13 – Collision Avoidance). Minimise and recover promptly from any distraction or interruption to your scan (see Safety Sense Leaflet 31 – Distraction). Manoeuvre well in advance and avoid other aircraft by a wide margin. Helicopters are usually harder to see than aeroplanes – if you see an aeroplane, the pilot may not have seen you.

The aircraft which you are most likely to collide with (and are most difficult to see) are those with the least relative movement. Beware of blind spots created by the aircraft structure. Move your head, and the aircraft as necessary, to ensure you scan these areas.

Be vigilant for bird activity. Helicopters cause more disturbance to bird habitats than fixed-wing aeroplanes and tend to fly lower, making bird strikes more likely. Read SSL 10 – Bird Avoidance.

See and be seen

If fitted, you should use strobe lights in all conditions. In high density traffic environments and near aerodromes, switch on landing lights.

Your transponder must always be switched to mode C (ALT) when airborne, with the appropriate conspicuity code (VFR – 7000) or Frequency Monitoring Code (FMC) set, unless instructed otherwise.

Pilots are encouraged to use electronic conspicuity (EC) devices. Ensure you understand the functionality and limitations of any EC systems you use and do not become fixated on EC returns to the expense of your more general lookout.

Rules of the Air

Observe the Rules of the Air when manoeuvring in response to other aircraft. Remember that on converging tracks, a powered heavier-than-air aircraft (such as a helicopter) must give way to airships, gliders, balloons, and powered aircraft towing other aircraft (such as a glider) or objects. See 'Rules for the Prevention of Collisions' in the *Skyway Code.*

When converging with another powered aircraft, you should give way if the aircraft is on your right. When following a line feature, it is recommended to fly on the right-hand side of it, even if your helicopter is flown from the right.

GOING FLYING

Helicopter noise reduction

Understand the noise footprint of your helicopter and fly in a considerate manner.

This includes flying smoothly and avoiding high energy manoeuvres which cause 'blade slap', such as rapid roll rates and pitch changes. Avoid prolonged hovering and conduct steep takeoff and descent profiles, where possible and if proficient in doing so safely. Cruise at as high of an altitude as practical.

Adhere to noise abatement procedures and do not fly over noise-sensitive or other areas in place for environment protection, such as bird sanctuaries. Bird sanctuaries and similar locations are listed in ENR 5.6 of the UK AIP.

When practicing simulated emergencies or manoeuvres, select a site firstly regarding safety, but also the noise and environmental impact. Use the 'location' element of your HASELL check as a reminder, for example during practice auto-rotations.

Enroute diversion

If flying VFR, you must always remain within VMC minima. IFR flight is only permitted with an instrument rating and an IFR certified helicopter. You may fly VFR above the clouds in some circumstances (see the *Skyway Code*), however it is not recommended due to the risk of being unable to visually descend, particularly in an emergency.

If you encounter deteriorating weather, return to your point of departure, divert or land, before you are caught in cloud. A 180° turn in cloud can easily lead to loss of control and a fatal accident. You must avoid 'scud running' – flying lower and lower to avoid cloud and potentially hitting the ground. Maintain a safe cruising altitude.

Unless you have a current instrument rating, you must not continue in a flight visibility of less than 1,500 metres. You are strongly advised to discontinue the flight if visibility falls below 3,000 metres. Read AIC P 137/2019 – Helicopter Flight in Degraded Visual Conditions.

Divert if your periodic cruise check, such as FREDAW (fuel, radio, engine, DI, altimeter, weather) indicates you will not have 45 minutes fuel reserve (20 minutes is the legal minimum for non-commercial flights) at your destination.

An occasional weather check from VOLMET will help you assess the weather and decide whether to divert or continue to your destination.

GOING FLYING

Precautionary Landing

A precautionary landing is a legitimate response to a flight safety hazard perceived by the pilot, for example, deteriorating weather, equipment malfunction or being unsure of position.

If necessary, decide to carry out a precautionary landing sooner rather than later. This will probably give you a much wider selection of potential safe landing sites, and avoid the stress of last-minute action. Read AIC P 003/2020 – Helicopter precautionary landings in deteriorating weather conditions.

Lost

If you become lost (or temporarily unsure of your position), tell someone. Initially explain the situation on your working frequency. Otherwise contact Distress and Diversion (D&D) on 121.5 MHz and make a PAN or MAYDAY call. See the *Skyway Code* for more information on contacting D&D, as well as the relevant CAA policy statement.

Set 7700 on the transponder, which will alert any surveillance equipped ATSUs nearby. Always select Mode C if fitted. If you are lost and any of the **'HELP ME'** checklist items below apply to you, call for assistance:

H	**High ground/obstructions** *are you near any?*
E	**Entering controlled airspace** *are you close?*
L	**Limited experience, low time or student pilot** *let ATC know.*
P	**PAN call in good time** *do not leave it too late.*
M	**Meteorological conditions** *is the weather deteriorating?*
E	**Endurance** *fuel remaining, is it getting low?*

If it becomes necessary, make a prompt decision to land while you have fuel and daylight to do so. Choose a site with care and after landing, phone ATC to advise that you are safe. Check the weather reports and forecast to establish when it may be safe to continue.

GOING FLYING

Arrival procedures

When joining or re-joining make your radio call early and keep radio transmissions standardized and to the point. If non-radio (or your radio has failed), know the applicable procedures. Review SSL 22 – Radiotelephony and CAP 413 – Radiotelephony Manual.

Ensure that the change from QNH to QFE reduces the altimeter reading by the same amount as the landing site elevation. If landing using QNH, do not 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 such as gliding or parachuting. Read SSL 6 – Aerodrome Sense.

Check the windsock, or any nearby smoke trails, to ensure you land into wind. Be sure of the wind direction and strength, before committing yourself to an approach direction. Know your visual aids – review CAP 637 – Visual Aids Handbook.

Make radio calls in the circuit at the correct points. Look out and listen for other traffic.

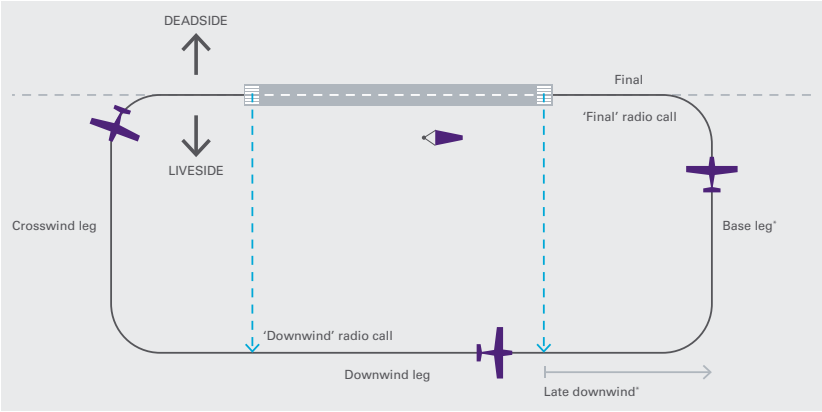
Remember pre-landing checks – easily forgotten when under high workload or if you make a straight-in approach.

If you need to fly a fixed-wing circuit (see figure below), maintain your speed. Do not slow down or hover, thus creating a collision hazard for following traffic. Reduce your rate of descent before reducing airspeed.

Be aware of optical illusions at unfamiliar landing sites, for example those with sloping terrain or a narrower (or wider) runway than you are familiar with.

Be alert at aerodromes where identification of the runways can be confused – for example 02 and 20. Ensure you know whether the circuit is left-hand or right-hand, as this will determine the dead side. If in doubt, ask for clarification.

In most piston-engine helicopters, you apply carburettor heat before reducing power. You may wish to return the carburettor heat to cold around 200 feet above the ground. Follow the appropriate checklist.



*Announce these positions if it would enhance situational awareness or if calls were not possible at the standard positions.

GOING FLYING

Approach, landing and taxi in

A good landing stems from a good approach. If your approach is bad, make a prompt decision and go around.

Avoid conditions likely to result in vortex ring:

- Power on
- Low IAS (below 35 knots)
- High rate of descent (over 300 feet per minute)

An unplanned downwind approach can be particularly hazardous as it may induce the conditions of vortex ring. Be attentive with IAS and in controlling your rate of descent.

If there is a white H marking, use that area. Do not land in tall dry grass – the hot exhaust could start a fire. Do not hover or hover-taxi close to landing or parked aeroplanes. Remember your downwash and wake turbulence are a significant hazard to other airspace users. If you must hold position close to a runway, land while waiting rather than hovering.

It is preferable to shut down and wait until the rotors have stopped, before disembarking passengers. If disembarking with rotors turning, remind passengers of the correct safety procedures before they exit the aircraft, and have someone escort them to safety and off the aerodrome or operating site.

The flight is not over until the engines are shut down, all checks are complete, and the rotors have stopped. Consider securing the rotors with tie-downs.

Follow any booking in procedures and if necessary, close your flight plan – see the *Skyway Code* and SSL 20 – VFR Flight Plans.

FURTHER TOPICS

Flying over water

Before flying over water, read your RFM or POH – some contain specific advice on ditching, including how to apply cyclic or collective control as the helicopter contacts the water, to stop the main rotor blades. If the helicopter has flotation equipment, make sure you are familiar with its operation. SSL 21 – Ditching Light Aircraft on Water contains general advice on ditching.

For operations under Part-NCO, NCO.IDE.H.175 requires that helicopters are equipped with a lifejacket for each person on board when:

- Beyond autorotational distance of land – if the helicopter cannot maintain level flight after failure of the critical engine;
- More than 10 minutes flying time from land, at normal cruising speed – if the helicopter can maintain level flight after failure of the critical engine;
- Taking off or landing at an aerodrome/ operating site where the take-off or approach path is over water.

In a single engine helicopter, occupants should always wear a lifejacket when flying over water – there may not be sufficient time to don the lifejacket before ditching.

When intending to fly more than 30 minutes or 50 NM (whichever is less) from land, NCO.IDE.H.175 also requires the pilot in command to determine the carriage of:

- Equipment for making the distress signals;
- Life-rafts in sufficient numbers to carry all persons on board, stowed to facilitate their ready use in an emergency; and
- Life-saving equipment, as appropriate to the flight.

FURTHER TOPICS

Flying over water

Check the applicable weather reports. The weather conditions over the sea may be very different from that over land. You should consider the sea state and wind speeds, particularly if crossing water in a single engine helicopter. Rough seas make ditching more challenging and reduces the likelihood of successful rescue.

The water around the UK is very cold, even during the summer. Survival time for people in the water may be limited. An insulated immersion suit, with warm clothing underneath, should provide a survival time of over three hours.

A life raft is strongly recommended – this will allow survivors to remove themselves from the water after a ditching. A life raft is also much easier to see than someone in the water, so will assist rescue. The raft should be properly secured, but easily accessible as a helicopter will sink faster than an aeroplane. Rafts are normally heavy, so ensure it can be accommodated within weight and balance.

Ensure that lifejackets, life raft and immersion suits have been serviced recently by an appropriate organisation and in accordance with manufacture instructions.

Carry an approved Emergency Locator Transmitter (ELT) or a Personal Locator Beacon (PLB) capable of transmitting on 406 MHz, and flares. Note that carrying an ELT or PLB is a legal requirement under NCO.IDE.H.170 for all flights in Part 21 helicopters.

Pilots and passengers who regularly fly over water are advised to attend an underwater escape training and sea survival course.

In single-engine helicopters, minimise time over water and maintain radio contact with an appropriate air traffic service unit.

Winter Flying

Helicopter pilots should beware of ‘white-out’ due to blowing snow when taking off or landing on a snow-covered surface. Review weather forecasts with the aim to avoid snow and icing conditions altogether.

Clothes and footwear should be appropriate for the conditions. It is recommended to carry warm clothing in the aircraft, in case of heater failure or a forced / precautionary landing.

If operating from an icy surface, take care to open and close the throttle slowly. Lead with the appropriate yaw pedal, if necessary, to avoid the helicopter rotating on the spot.

See Safety Sense Leaflet 03 – Winter Flying for more general guidance on winter operations.

FURTHER TOPICS

Night Flying

Night flying can be viewed as a combination of visual and instrument flying; the ratio of each depending on the weather and amount of illumination, including moonlight. You must have a night rating and you should be in current instrument flying practice (for example, during the previous 28 days) to fly at night.

For night takeoffs and landings, the site and any relevant obstacles should be illuminated by external means. Several accidents in the UK have been caused by collisions with obstacles at private sites in poor weather or reduced light.

VMC minima at night are sometimes more restrictive than by day. Ensure you know the limits and comply with them. Review SERA.5005 Visual Flight Rules. The *Skyway Code* contains UK guidance for Night VFR and Night Special VFR.

Flying Abroad

Familiarise yourself with essential aeronautical information for the airspace of every state you intend to visit or transit. Check the Eurocontrol website – Aeronautical Information Services around the world. Ensure you have the correct charts and are aware of any significant ICAO differences. Note that the rules of off-airport operations may be less permissive in some states compared to the UK. Always be aware of local requirements.

Ensure you carry all the correct documents, such as your passport, licence and aeromedical certificate. NCO.GEN.135 contains the full list of requirements. Some states may require insurance documentation to be written in the local language. Note that it is a Part-NCO requirement to carry the ICAO Interception Procedures – these are reproduced towards the back of the *Skyway Code*.

Before crossing an international FIR boundary, you must file a full flight plan. Check that it has been accepted and remember to activate the flight plan on departure. Note that in many states, if arriving at an unattended site, the VFR flight plan must be closed by calling a regional flight planning office, otherwise search and rescue may be initiated. For more information see SSL 20 – VFR Flight Plans and the International Flight chapter of the *Skyway Code*.

Ensure you comply with any customs, immigration and police requirements. For the UK, check the latest Border Force requirements and submit a General Aviation Report Form as required.

Aircraft with a permit to fly, rather than a certificate of airworthiness, will normally require permission before visiting a foreign state.

FURTHER TOPICS

Safety Resources

There is a wealth of safety information available online from the CAA and other organisations. You will almost certainly find information relevant to your helicopter type, area of operation, or the nature of your flying in the publications below:

- The CAA General Aviation page covers various Safety Topics, including the other Safety Sense Leaflets.
- The General Aviation Safety Council (GASCo) offers guidance on best practices for general aviation pilots.
- The European Helicopter Safety Team (EHEST) offers 13 useful online leaflets on helicopter safety.
- The European Safety Promotion Network- Rotary (ESPN-R – successor to EHEST) regularly publishes articles and short videos on topics of interest.
- In the USA, the webpages of the US Helicopter Safety Team (USHST) and of the Helicopter Association International (HAI) offer valuable insights and provide links with information from other states, for example Australia.
- The Vertical Aviation Safety Team (VAST) provides an extensive library of articles and documents on safety topics.

Learning from others

- Details of accidents and serious incidents are described in reports published by the Air Accidents Investigation Branch (AAIB).
- The UK Airprox Board reports on situations in which the proximity of aircraft to each other was considered unsafe.
- The Confidential Human Factors Incident Reporting Programme (CHIRP) publishes summaries of incidents reported by general aviation pilots on a voluntary basis. Reporting incidents to CHIRP is encouraged, such that others can learn from your experiences.

GA pilots are required to report certain safety occurrences to the CAA, via the ECCAIRS 2 reporting portal. You are encouraged to report any event you feel could have affected safety, regardless of whether it was a mandatory report. For more information on Occurrence Reporting, see SSL 32.