

HELICOPTER PRECAUTIONARY LANDINGS IN DETERIORATING WEATHER.

1 Introduction

1.1 Helicopter flight into conditions of deteriorating visibility and weather is a hazard that may be encountered at any time of the year in the UK. The dangers of deteriorating visibility are never more acute than when they degrade to the point of actual Instrument Meteorological Conditions (IMC). At greatest risk are the smaller 'Visual Flight Rules-only' ('VFR-only') helicopters, i.e. those not certified or equipped for flight in IMC, and especially during the en-route phase of flight. The majority of these helicopters fall into the CS-27/FAR-27 certification category which encompasses helicopters that have a maximum weight of 3175 kg (7000 lb) and with nine or fewer passenger seats. CS-27/FAR-27 helicopters make up the bulk of the UK general aviation fleet used by private owners, and for self-fly hire.

1.2 The UK element of the European Helicopter Safety Analysis Team (EHSAT) conducted an analysis of CS-27/FAR-27 helicopter accidents and incidents in the UK and combined it with Air Accidents Investigation Branch (AAIB) pilot report data over the period 2000-2010. This analysis has identified that of the recorded accidents or incidents that occurred following inadvertent flight into IMC, *68% resulted in a fatal accident*. The records across Europe as a whole show that over a similar period, *66% of accidents/incidents that occurred following inadvertent flight into IMC led to a fatal outcome*. These results serve to clearly emphasise the risks that can be faced by 'VFR' helicopters operating in IMC, whether deliberately or inadvertently. A previous study by the CAA into Helicopter Flight in Degraded Visual Conditions was reported on in CAA Paper 2007/03.

1.3 Although encountering actual IMC poses the greatest hazard, it is the loss of sufficient visual cues for safe VFR flight that is the predominant causal factor. The loss of visual cues has been described as flight into degraded visual conditions/environment and has many causes including bad weather, dust or snow obscuration, night flight without ground illumination, flight over calm seas, etc. Flight into degraded visual conditions is in many cases a gradual process that the pilot may find hard to recognise until the visibility deteriorates to a near-critical level. Studies have shown that as the situation deteriorates so too does the average pilot's ability to deal with it. Gaining the ability to recognise the onset of degrading visibility is an airmanship skill that every pilot must work to develop. Obtaining this skill requires time, study, practice, learning from the experiences of others, dealing with the expectations of passengers and recognising one's own personality traits. The aim should be to develop a continual awareness and an ability to think ahead of the developing situation. The subject of helicopter flight in degraded visual conditions is covered thoroughly in AIC 100/2007 (Pink 129) which should be read in conjunction with this AIC.

1.4 Clearly, for the typical VFR-only pilot who is flying a helicopter neither certified nor equipped for flight in IMC, the best choice is to avoid flight into worsening visual conditions. To achieve this, the pilot has several options including returning to base, diverting, routeing around the weather or making a precautionary landing. This AIC considers the practicalities of when to make a helicopter precautionary landing and some of the issues and perceptions that surround doing so.

2 Aim

2.1 The aim of this AIC is to provide guidance on when to carry out a precautionary landing to avoid the hazards inherent in continued flight into degraded visual conditions.

3 When is it Appropriate to Make a Precautionary Landing?

3.1 A precautionary landing can be defined as a landing made in order to prevent a perceived hazard from seriously affecting the continued safety of the flight. The perceived hazard does not have to be imminently dangerous but can include the anticipation of a specific hazard arising, based on the pilot's knowledge, experience and reasonable evidence (e.g. worsening weather). Although a precautionary landing may be carried out at an airstrip or aerodrome, in many cases the landing site may have to be a suitable non-aerodrome site in close proximity to the track of the aircraft.

3.2 The helicopter has two unique properties that are well suited to making a precautionary landing: the ability to come to rest at a defined point in space in a closely-controlled manner, and the ability to land at and take off from an area not much larger than the aircraft itself. With these properties, a helicopter can make safe use of a far greater variety and number of potential landing sites than can a fixed-wing aircraft. By definition then, the helicopter pilot is in many cases far better placed to take effective action to avoid hazards developing into a life-threatening situation. Making a precautionary landing should be regarded as a legitimate choice available for use in the appropriate circumstances, much as an aeroplane pilot considers a go-around a standard procedure when the situation dictates.

3.3 Despite these unique properties of the helicopter, analysis of fatal accidents resulting from VFR-certified helicopters continuing to fly into worsening visibility appears to show reluctance by the pilots to utilise these capabilities fully and in good time. It may well be that the pilots believed that since they did not need to use an aerodrome, then the decision to take positive action could be delayed in the expectation, or hope, that conditions would improve. Despite off-aerodrome landing site operations (including confined areas) forming an important part of helicopter flight training, and which provide the basic tools to carry out a precautionary landing, accident reports continue to feature instances where an early decision to land would most likely have prevented the accident occurring at all.

3.4 Flight into degraded visual conditions ultimately presents two major hazards to all pilots:

- Loss or degradation of visual references - leading to disorientation and Loss of Control;
- Loss of situational awareness - the pilot remains in control of the aircraft but has a false mental picture of the aircraft flight path and the position of surrounding terrain - leading to Controlled Flight Into Terrain (CFIT).

Both of these hazards are known killers. Loss of Control and CFIT continue to feature at the top of recorded fatal accident statistics and are of particular hazard to any aircraft operating close to the ground or without an autopilot system.

4 The Legal Position: UK Aviation Legislation

4.1 The ability to carry out a precautionary landing does not provide helicopter pilots with the freedom to land wherever and whenever they like in a non-urgent situation. Nevertheless, carrying out a precautionary landing should be seen as a part of normal aviation practice when circumstances dictate. Many glider and balloon pilots routinely land away from an aerodrome and it is seen as a normal part of their operations. Making a precautionary landing in a helicopter should not be seen as a highly unusual or unlawful operation; it is a legitimate response to deteriorating conditions and may well be the safest option.

4.2 If, whilst making a precautionary landing, pilots can avoid congested areas then it is unlikely there would be any conflict with the Rules of the Air Regulations. It is accepted that the vast majority of flights needing to make a precautionary landing will be able to do so away from congested areas.

4.3 Even when there is a danger of breaching the regulations, the Air Navigation Order (ANO) does make exceptions for certain circumstances where the safety of flight takes precedence. An example of this would be where an aircraft becomes trapped by weather and worsening visibility over a large congested area and the pilot then decides his only option is to make a precautionary landing in an open space within that congested area. Although this action would normally be in breach of Rule 5(3)(c) of the Rules of the Air 2007 ('The 1000 feet rule'), the ANO can provide for such a case through ANO 2009 Article 160(3)(a) 'Rules of the Air' which states:

'It is lawful for the Rules of the Air to be departed from to the extent necessary... (a) for avoiding immediate danger'.

This is to allow for the hazard to be avoided and is a lawful departure from the rules in order to avoid a much greater danger. In cases where ANO 2009 Article 160 is invoked, the pilot may afterwards be called upon to substantiate the nature of the 'immediate' danger but this does not mean he/she will have to do so in court. The commander of the aircraft must ensure that written details of the departure from the Rules of the Air are given to the CAA within 10 days (see ANO 2009 Article 160(5)) and this can be accomplished by submitting a Mandatory Occurrence Report (MOR) using form SRG1601 www.caa.co.uk/srg1601 which pilots can submit electronically. The MOR scheme is fully described in CAP 382 'The Mandatory Occurrence Reporting Scheme'.

4.4 Making a precautionary landing is not an alternative to proper planning and prudent airmanship. However, making an early decision about a precautionary landing could result in a far wider selection of landing sites being available and thus avoid any question of a breach of the Rules of the Air Regulations.

5 Civil Law of Trespass

5.1 This AIC cannot cover all of the circumstances that may be encountered when making a precautionary landing. However, within the United Kingdom, land trespass is generally not regarded as a criminal offence unless it occurs with specific aggravating conditions. Scotland has a right of responsible access and an agreed code to assist this right, based on acting responsibly and avoiding damage.

5.2 Experience gained by the glider and balloon community demonstrates that precautionary landings do not automatically lead to civil actions from the landowner; such disputes, though rare, tend to be over damage caused by the aircraft, or its recovery, and possibly the behaviour of those involved. All parties have an obligation to obey the law and to act responsibly no matter where the dispute occurs. Pilot apprehension about unlikely civil consequences needs to be weighed proportionately against the very real dangers of continuing on in rapidly worsening conditions. It is better to avoid a fatal accident and to be faced with dealing with mundane issues on the ground, than to lose your life, or that of others, by not making the right decision to land in time.

6 Training and Information

6.1 The new European pilot licensing regulation (Part-FCL) has introduced enhanced training requirements for the Private Pilot's Licence (Helicopters) (PPL(H)) syllabus at Exercise 25(b) and (c). These exercises now include the following teaching points and, if not previously taught, should now be considered by pilots during refresher training with a Flight Instructor (FI):

- actions in the event of encountering Degraded Visual Environment (DVE);
- decision to divert or conduct a precautionary landing;
- bad weather circuit and landing;
- appropriate procedures and choice of landing area;
- precautionary landings; and
- hazards of over-reliance on the use of GNSS (GPS) in the continuation of flight in DVE.

Pilots undergoing training for a Light Aircraft Pilot's Licence (Helicopters) (LAPL(H)) should consider requesting training in these areas as well as they are not yet specifically mentioned in that syllabus.

6.2 Advice and guidance on conducting off-aerodrome landing operations together with airmanship, decision-making and safety considerations has been developed by the European Helicopter Safety Team (EHEST) and their pamphlets are available at <http://easa.europa.eu/essi/ehest/>. Additionally, the CAA publishes many Safety Sense Leaflets and these can be accessed at www.caa.co.uk/safetysense.

7 Summary

7.1 Precautionary landings are a legitimate and justifiable response to a flight safety hazard realistically perceived by the pilot and should be given full consideration when encountering deteriorating weather conditions where visual cues are beginning to prove inadequate. In the main:

- Plan ahead thoroughly, including a realistic assessment of the weather, to avoid getting caught out and having to consider the need for a precautionary landing.
- Before flight, brief your passengers that in the event of bad weather you may have to return to base, divert or carry out a precautionary landing. For VFR helicopter flights in the UK it is important, before flight, to manage the expectations of passengers, many of whom will only have experienced flying in large passenger jets on a scheduled service.
The EHESST has produced two videos (one for pilots and one for passengers) that cover this subject and are free to use along with other EHESST safety material¹: <http://www.easa.europa.eu/essi/ehest/> → 'publications' → 'videos'. Ideally, passengers' clothing and footwear should reflect the reality that you may have to make an off-airport landing.
- Make a decision to carry out a precautionary landing earlier rather than later; this will give you a much wider selection of potential landing sites and avoids the stress of last-minute action.
- Carry out the drills for an off-airport landing and secure the aircraft once you have landed. Try to avoid landing close to livestock.
- Ensure that you minimise damage and that you and your passengers respect the countryside code and the landowner's property.
- Contact the landowner whenever possible giving your details, aircraft registration, contact information, the reason you needed to land within their property and when and how you intend to leave. Treat the landowner with courtesy and respect and ensure that your passengers do the same. A good attitude and a co-operative manner will go a long way to establishing good relations.
- Report the occurrence to the CAA within 10 days via the MOR Scheme described in CAP 382, if you believe there have been aggravating circumstances.

Note: ¹ EHESST have produced downloadable material on the following helicopter-specific subjects:

DVD: Flight into DVE.

Leaflets:

HE1 Safety Considerations,
HE2 Airmanship,
HE3 Off Airfield Landing Site Operations,
HE4 Decision Making

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