EHEST
Component of ESSI

HELICOPTER AIRMANSHIP

METHODS TO IMPROVE HELICOPTER PILOTS SAFETY

TRAINING LEAFLET

HE 2

CONTENT

FINAL REPORT
EHEST ANALYSIS OF 2000 – 2005

For a download simply scan the QR-Code or visit *http://easa.europa.eu/essi/ehest/wp-content/uploads/2010/10/EHEST-Brochure.pdf*

Introduction

Airmanship is defined by EASA Part FCL as:

The consistent use of good judgement and well-developed knowledge, skills and attitudes to accomplish flight objectives.

The EHEST review of helicopter accidents 2000 to 2005[1] revealed 140 general aviation helicopter accidents in Europe identifying the following (causal and contributing) factors:

- Pilot decision making and risk assessment
- Mission Planning
- Pilot misjudged own limitations/capabilities, overconfidence
- Pilot inexperienced
- Inadequate consideration of weather/wind
- Failed to follow procedures
- Pilot control/ handling deficiencies
- Failed to recognise cues to terminate current course of action or manoeuvre
- Inadvertent entry into IMC, vision restricted by meteorological conditions
- Wilful disregard for rules and SOPs

The majority of these factors are related to airmanship.

Comprehensive **knowledge**, careful **pre-flight preparations**, frequent **flying practice** and avoidance of complacency are the best insurance against becoming an accident statistic.

[1] Document ref.: Final Report - EHEST Analysis of 2000 – 2005 European helicopter accidents (ISBN 92-9210-095-7)

1. KNOWLEDGE

1.1 Learning from the mistakes of others

Learn from the mistakes of others and you might live long enough not to make **all** of the mistakes yourself! Improve your knowledge by reading authorative aviation safety materials such as from EHEST, IHST, HAI, Skybrary and FAAST; Air Accident reports from the Accident Investigation Bureaus and EASA, National Aviation Authority and manufacturer safety publications.

1.2 Recurrent Training

Revise your basic knowledge and flying skills by attending a Manufacturer's Safety Course or having a **regular** training flight with an instructor, which may include, but not necessarily be limited to:

- in single engine helicopters, practice engine failures so that it is a reflex response to lower the collective IMMEDIATELY and to enter autorotation
- in multi engine helicopters, practice simulated OEI procedures
- sloping ground take-offs and landings
- review the appropriate emergency procedures for the type of helicopter
- AWARENESS of (but not necessarily demonstrated) height/velocity curve, dynamic roll-over, vortex ring, ground resonance, LTE and engine icing situations. *(See EHEST training leaflet HE1[2].)*
- awareness of the importance of maintaining rotor rpm/energy, and recovery low/high rotor rpm conditions
- operation from confined areas and off airfield landing sites *(see EHEST training leaflet HE3[3].)*

Study the Rotorcraft Flight Manual (RFM) / Pilot's Operating Handbook (POM) so that you are thoroughly familiar with:

- limitations; including rotor speeds/power settings and the HV diagram
- normal, abnormal and emergency procedures, consider your actions should you encounter abnormal or emergencies in flight
- weight and balance calculations

[2] Document ref.: EHEST training leaflet HE1, Safety Considerations, Methods to Improve Helicopter Pilot's Capabilities

[3] Document ref.: EHEST training leaflet HE3, Off Airfield Landing Site Operations

HELICOPTER PREFLIGHT PLANNING CHECKLIST
For a download simply scan the QR-Code or visit *http://easa.europa.eu/essi/ehest/wp-content/uploads/2010/10/EHEST-Pre-flight-planning-Checklist.pdf*

Whenever possible, particularly if you have not recently flown, sit in the helicopter and re-familiarise yourself with the cockpit layout as well as normal/abnormal/emergency checklist drills.

1.3 Personal Limitations

You must **know** your own level of competence / experience and operational limitations. A more cautious approach is necessary in the case of experienced fixed wing pilots, who have little helicopter experience. You may be confident and relaxed in the air but will not yet have developed the reflex responses, control feel, coordination and sensitivity necessary in a helicopter. You may well react incorrectly to a low rotor rpm warning. Also take special care when transitioning to a new type or activity as your past experience may not be relevant and could lead to over confidence.

2. PRE-FLIGHT PREPARATIONS

2.1 Paperwork

EASA regulations require that a valid licence and valid medical certificate must be carried by the pilot when exercising the privileges of the licence; in addition a pilot is also required to carry personal ID containing a photograph. The exercise of the privileges granted by the licence is dependent on the validity of the ratings; therefore the pilot must ensure that the relevant ratings and any recent experience requirements are also in date.

Helicopter documentation including Certificate of Airworthiness, ARC, Maintenance Releases, Certificate of Registration, Aircraft Radio Licence and Insurance must be in date and carried during flight.

2.2 Weather

Ensure you get an aviation weather forecast from an authorised source, **heed what it says**, (decodes are available on the internet) and make a carefully reasoned GO/NO GO decision. Do not let self induced or passenger pressure influence your judgement. The necessity to get home (Homeitis) has been a frequent casual course of accidents. Establish clearly in your mind the en-route conditions, the forecast, and possible diversions in case of deteriorating weather. Have a planned detour route if you are likely to fly over high ground which may be cloud covered.

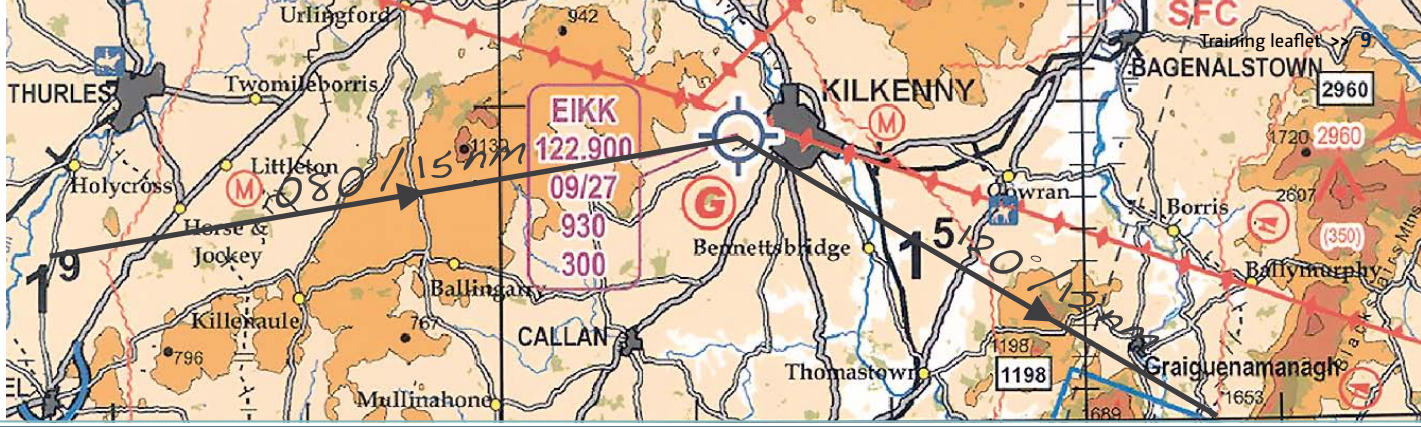
In piston engine helicopters be aware of the conditions that lead to the formation of engine icing, comply with the Rotorcraft Flight Manual (RFM) / Pilot's Operating Handbook (POM) instructions regarding the use of Carb heat or Engine anti-ice and remember to include Carb Air Temp and OAT in your regular instrument scan.

In wet weather beware of misting of windshield and windows, especially when carrying passengers with wet clothes and carry a cloth to assist demisting the windshield prior to take-off.

2.3 VFR Navigation

Use appropriate current aeronautical charts, **folded to show the planned track**, (as it may be difficult to re-fold when you are airborne.) Other non aeronautical charts or maps of a more detailed nature maybe useful particularly when landing off airfield.

Check from an authorised source NOTAMs, AICs, Temporary Navigation Warnings, such as air displays, frequency changes or Emergency Restricted Airspace.



Prepare a thorough route plan with particular reference to transit altitudes, safety altitudes and suitable diversions. Familiarise yourself with geographical features, way points, airspace and any helicopter special procedures. GPS may be used as a back-up for navigation planning **NOT** a substitute for it.

In a single engine helicopter avoid flying over congested areas or hostile terrain where a safe forced landing is not assured. In most countries it is forbidden to fly over High Security Prisons and Nuclear Facilities. Note high ground, masts and other obstructions in planning your safe altitudes.

Plan to reach your destination at least one hour before sunset, unless qualified, equipped and prepared for night flying. *Note:* Commercial Air Transport night flying is prohibited in single engine helicopters in most States.

Be aware of and comply with local regulations pertaining to low flying and generally fly no lower than is necessary to avoid annoyance to persons on the ground and reach a safe landing site in the event of an emergency.

2.4 Radio

Have all necessary radio frequencies to hand, including those for en-route, destination and diversion aerodromes, ATIS, VOLMET, NAV AIDS (including Morse decode) etc. Remember in an emergency 121.5 is available.

Review periodically radio procedures, phraseology etc. *(See EGAST radiotelephony guide[4].)*

Carry a mobile phone in case you make a precautionary landing or your destination is outside radio coverage.

2.5 Weight and Balance

Use the RFM empty weight and centre of gravity (C of G) of the **actual** helicopter you are operating. Ensure that the helicopter's maximum/minimum weights are complied with.

Check that the C of G is within limits for take-off, in-flight, landing and as a worse case scenario zero fuel. Be aware of and recalculate C of G changes when loading or off-loading passengers and or baggage, and if you have to carry ballast; make sure it is suitable and properly secured.

[4] Document ref.: EGAST A Guide to Phraseology for General Aviation Pilots in Europe

Never attempt to fly a helicopter which is outside the permitted weight/C of G range and performance limitations. Not only is it illegal but it is dangerous as you may have insufficient cyclic authority or power to control the helicopter.

2.6 Performance

Refer to the performance section of the RFM/POM for the relevant information on the helicopter type you are flying, i.e. Hover In Ground Effect (HIGE), Hover Out of Ground Effect (HOGE) etc.

Use the recommended take-off and landing profiles. **Avoid / Minimise** flight within the avoid areas of the height-velocity diagram.

2.7 Fuel Planning

Ideally plan to land with no less than a 1/4 tank of fuel or the stated VFR/IFR planning minima for the operation. Do not rely solely on the gauge(s) or low fuel warning light; wherever possible dip the tanks before takeoff; know the hourly fuel consumption of your helicopter; in flight, check that the gauge(s) agree with your calculations.

Frequent use of carb heat will increase fuel consumption.

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

↑ VIEW FROM HELICOPTER

2.8 Destination

Check for any special procedures due to activities at your destination, such as parachuting, gliding, micro-lighting etc and the location of the helicopter operating area. If your destination is a private landing site, the surroundings and information available may be very different from the licensed aerodrome at which you learnt to fly *(see EHEST training leaflet HE3[5]).*

Try to chose 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 power available on a hot day.
Always minimise the time that the helicopter is at greatest risk from an engine failure.

In a helicopter, you cannot just land anywhere – prior permission may be required (PPR) from the land owner and also at most aerodromes. Certain States have additional regulations pertaining to off airfield landings.

[5] Document ref.: EHEST training leaflet HE3, Off Airfield Landing Site Operations

3. FLYING PRACTICE

3.1 Pre-Flight

Remove and stow blade tie-downs, pitot and engine covers before completing a thorough pre-flight, external and internal inspection in accordance with the manufacturers/operators checklist.

Check engine and transmission oil levels and don't be deceived by a 'stain' or 'tide line' on the sight glass.

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

KNOW THE HELICOPTER GROUND OPERATIONS SIGNALS SHOWN AT THE END OF THIS LEAFLET.

3.2 Fuelling

Determine visually, using a dip stick if appropriate to type, that you have enough fuel of the right type. Don't let anyone confuse AVGAS and JET Fuel. **Personally supervise refuelling** and be aware of the danger of static electricity. Make sure the filler caps are properly secured and the earthing cable disconnected. Sample the fuel for water and other contamination in accordance with the RFM/POM. Only conduct rotor running refuelling when absolutely necessary and approved to do so.

3.3 Passengers and Baggage

Dual controls should be removed to prevent passenger interference.

A passenger brief shall include the location and use of doors, emergency exits and safety harnesses as well as emergency procedures. Pilots are responsible for checking that doors and hatches are 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. Passengers may behave oddly and do unexpected things, children's' hands should be firmly held.

If it is necessary for passengers to be embarked or disembarked with the rotors turning, brief someone to escort passengers to and from the helicopter. Always instruct the

HELICOPTER GROUND OPERATION SIGNALS
For a download simply scan the QR-Code or visit *http://easa.europa.eu/essi/ehest/2011/12/he2_helicopter_ground_operations_ground_signals/*

passengers to approach in view of the pilot from the front or sides, to wait outside the rotor disc until you give them the 'thumbs up' and then to stoop slightly to ensure clearance of the main rotor disc. **NEVER** walk uphill away from a helicopter or downhill towards a helicopter with rotors turning.

CAUTION – Check that passengers do not suffer from any medical conditions that might affect them adversely in flight, i.e. epilepsy, air sickness etc.

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

Make sure all baggage doors are properly closed and locked.

3.4 Take-off

Check the following, particularly if you have picked up passengers or baggage:

- C of G and power margin – perform a power check in the hover to assess the take-off profiles available.
- Crosswind and downwind limits.

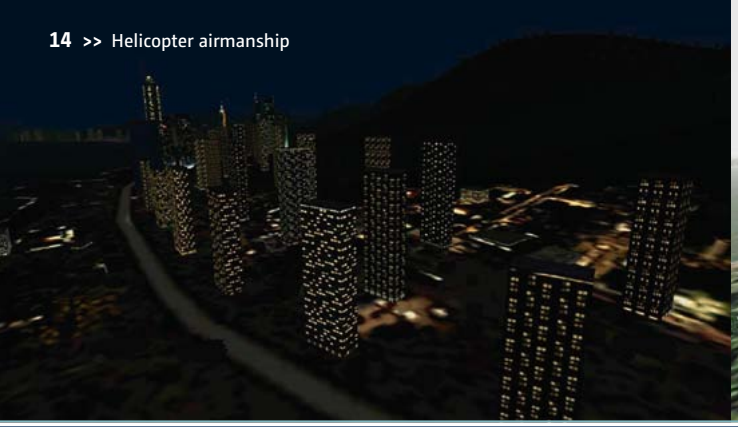
3.5 En-route

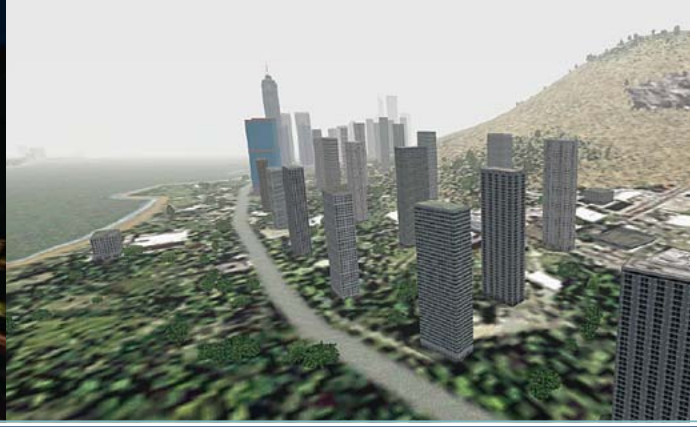
Always keep a good look-out (and listen-out on the radio) for other aircraft, particularly in the vicinity of radio beacons, Visual Reference Points and in the vicinity of aerodromes. The most hazardous conflicts are those aircraft with the least relative movement to your own as these are difficult to see. Scan effectively by moving your head, or the helicopter, to cover all these areas.

Remember the Rules of the Air which include flying on the right-hand side of line features and give way to traffic on your right. Although always assume the other aircraft hasn't seen you.

In a busy circuit environment or reduced visibility, use all available lights.

Spend as little time as possible with your head 'in the office'; remember a good principle is look out – check in.





3.6 Airspace

Do not enter controlled airspace unless properly authorised. Anticipate with an early radio call however be prepared to orbit and wait for permission to enter. Keep out of Danger and other Prohibited Areas. If you need to transit, contact the Danger Area / Prohibited Area controlling Air Traffic Services Unit (ATSU).

3.7 Radio/Transponder

Use ATSUs whenever possible which may be available from many military and civil aerodromes. Know what to do in the event of a radio failure.

Transponders should be used at all times as they advise TCAS equipped aircraft of your position. When operating in the vicinity of controlled/military/restricted/prohibited airspace ensure your transponder is on and communicate with the controlling ATSU. They may forewarn you if your course looks like you will infringe their airspace. Allocation of a discrete transponder code does **NOT** necessarily mean that you are receiving an air traffic service.

Common assigned transponder codes include; 7000 ICAO standard VFR code, 7500 unlawful interference, 7600 communications failure and 7700 general emergency.

3.8 En-route Diversion

An en-route diversion maybe necessary due to insufficient fuel to reach your destination with an adequate reserve, deteriorating weather or an un-well passenger etc. In such cases in-flight planning considerations may require:

- circle around your known position
- draw a line on your chart or follow a line feature to your alternate
- estimate the distance and time to the alternate and hence the fuel required plus reserve
- check the terrain, hazards and airspace along the proposed route
- use GPS to supplement your navigation.

3.9 Degraded Visual Environment (DVE)

If you encounter a deteriorating visual environment (DVE) make a timely decision to **turn back, divert or land before you become disorientated**. A 180° turn in cloud

DVE-VIDEO

For the EHEST-video simply scan the QR-Code or visit *http://easa.europa.eu/essi/ehest/2011/07/video/*

can easily become a death spiral for those pilots not proficient in instrument flight. *(See EHEST training leaflet HE1[6] and EHEST DVE video[7].)*

3.10 Lost

Immediately that you suspect you are lost, if the cloud base permits climb to your Safety Altitude, make a note of the time, and if you are in contact with an ATSU, request assistance. If you have lost contact on that frequency or they cannot help you, then change to 121.5 MHz.

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

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

Consider landing while you have the fuel and daylight to do so. *(See EHEST training leaflet HE3[8].)*

3.11 Control Considerations

Fly at a safe speed in relation to visibility.

Stay out of the 'height/velocity avoid curve'.

In most helicopters, particularly two bladed teetering rotor types, you **MUST** avoid a push-over manoeuvre resulting in negative 'g' which can result in mast bumping / tail strike.

Beware of retreating blade stall, especially when operating with the 5 highs; airspeed, mass, density altitude, turbulence and manoeuvre. This may cause pitch up and roll. Recover by reducing speed and pitch.

Avoid flight in turbulent and windy conditions, especially if your experience is limited and ensure you know the recommended airspeed for operating in turbulent conditions.

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[6] Document ref.: EHEST training leaflet HE1, Safety Considerations, Methods to Improve Helicopter Pilot's Capabilities
[7] Video ref.: EHEST Degraded Visual Environment video (http://easa.europa.eu/essi/ehest/2011/07/video/)
[8] Document ref.: EHEST training leaflet HE3, Off Airfield Landing Site Operations

↑ WAKE VORTICES

3.12 Environmental

The public doesn't like helicopter noise, so fly as high as reasonably practical. Several aerodromes and landing sites are noise sensitive, so it is vital to be a good neighbour. Avoid 'blade slap' when turning or descending 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 States AIP or other Flight Guides or may be established on a local basis.

NEVER be tempted to 'beat up' the countryside. Comply with State low flying regulations.

3.13 Wake Turbulence and Rotor Wash

Always be mindful of the effect your own rotor wash can have on parked aircraft and other surface objects i.e. tables, chairs and tents etc.

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

Beware of wake turbulence behind heavier aircraft on take-off, during the approach or on landing. ATC may impose mandatory separation behind aircraft for wake turbulence reasons.

Note: Wake turbulence and vortices linger **when wind conditions are very light.** Hover-taxying helicopters, particularly large ones, generate very powerful vortices. Wake turbulence and vortices are **invisible**. Heed Air Traffic warnings.

3.14 Circuit Procedures

Use the appropriate joining procedures at your destination aerodrome, 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 circuit height and altimeter settings and whether circuit is flown on QFE or QNH and if landing using QNH, don't forget to add the site elevation to your planned circuit height. Look out for other aviation activity, i.e. gliding, parachuting.

Maintain a listening watch at all times and make radio calls in the circuit at the proper places and listen and look for other traffic.

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.

Take care at aerodromes where identification of the runways can be confused, i.e. 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**.

For private sites or aerodromes with no radio check the windsock or nearby smoke to ensure you land into wind. Be very sure of the wind direction and strength before committing yourself to an approach direction. The unplanned downwind approach is hazardous and can result in Vortex Ring.

Remember pre-landing checks – easily forgotten if you make a straight-in approach.

In piston engine helicopters, apply carb heat as appropriate in accordance with the RFM/POM procedures.

3.15 Landing

A good landing is a result of a good approach. Monitor your Rate Of Descent (ROD), power margin and closing speed and be prepared, if any get excessive, for a go around.

Avoid conditions likely to result in Vortex Ring; Power On/Low IAS (below 30 knots)/ High Rate Of Descent (over 300 feet per minute). *(See EHEST training leaflet HE1[9].)*

Don't land in tall dry grass as the hot exhaust could start a fire. In addition the grass maybe hiding tree stumps or sloping ground.

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 Traffic Service Unit.

[9] Document ref.: EHEST training leaflet HE1, Safety Considerations, Methods to Improve Helicopter Pilot's Capabilities

4. SPECIAL CONSIDERATIONS

4.1 Winter Flying Tips

It should be noted that there are **NO light** general aviation helicopters cleared for flight in icing conditions. Flight in falling snow generally requires the fitment of snow guards; refer to your RFM/POM. You should use weather forecasts to avoid snow and icing conditions.

Snow, ice and frost should be completely removed from helicopters before flight. Ice can be shed and endanger persons or property, snow can become loosened and be sucked into engine intakes causing the engine to shutdown. Ice build up not only has a detrimental effect on the efficiency of the rotor blades but also increases the mass of the helicopter and significantly affects the C of G.

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

Snow hides familiar landmarks, making navigation difficult; roads, rivers and railway lines can disappear under snow. Disorientation can occur when snow-covered featureless terrain blends into an overcast (especially high overcast) sky. The horizon disappears and disorientation can quickly set in.

Extreme caution should be exercised when landing helicopters on snow, particularly at an unfamiliar site. A zero speed landing technique should be used for the landing, avoiding coming to the hover, therefore keeping the ground cushion and any re-circulating snow to a minimum.

4.2 Flying Over Water Tips

State regulations may require the wearing of life jackets, carriage of a life raft and fitment of floatation equipment to single engine helicopters operating over water beyond safe autorotational distance from shore. You are strongly urged to carry a Personal Locator Beacon (PLB) and flares.

The weather over the sea can often be very different from the land, with reduced visibility there maybe no distinct horizon and the sea blends into the sky resulting in spatial disorientation.

↑ SNOW HIDING FAMILIAR LANDMARKS

↑ HELICOPTER EQUIPPED FOR OVER WATER FLIGHT

Plan your route, if possible, to be in close proximity to shipping lanes etc to reduce rescue times if you are forced to ditch.

The water around the coasts of Northern Europe are cold even in summer and survival time may be less than 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.

Remain on an appropriate aeronautical radio station, and consider filing a flight where possible.

4.3 Flying Abroad Tips

All aircraft on international flights must comply with ICAO requirements whilst over international waters.

Before crossing an International FIR boundary you **must** file an ICAO Flight Plan, check that it has been accepted. ICAO flight plans can be found on the internet and some States will accept the on-line filing of flight plans.

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

Carry all the appropriate helicopter's documents, your licence, passport and a copy of ICAO Annex 2 – App A,2.2 interception signals and procedures. *(These will be included in the future EASA Rules of the Air Regulation.)*

Don't forget certain States have Visa and Prevention of Terrorism restrictions, notably the UK, which may require further actions by the pilot prior to flight or on arrival in that State. *(Refer to the States AIP GEN section.)*

5. SUMMARY

Good airmanship starts well before the commencement of the flight. Thoroughly plan your flight, expect the unexpected. Complete a comprehensive pre-flight, external and internal check of the helicopter. Operate well within your, and the helicopters, limits and comply with all State regulations.

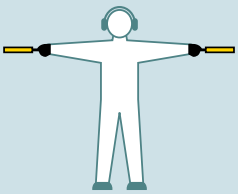
Remember a helicopter has the unique ability to land almost anywhere. If you find yourself in difficulty be it related to weather, fuel, navigation or some other difficulty – simply land and sort out the problem.

In the case of an emergency do not forget your prime task is to continue to fly the helicopter, remember: **fly, navigate and communicate**.

Don't do anything stupid – become an old pilot, **NOT** a bold pilot.

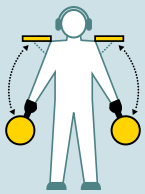
6. HELICOPTER GROUND OPERATIONS SIGNALS

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



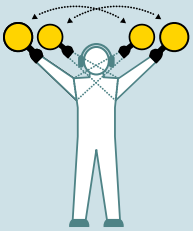
HOVER

Arms horizontally sideways, palms downward.



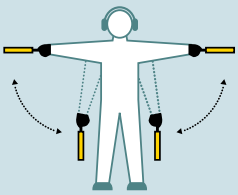
MOVE BACKWARDS

Arms by sides, palms facing forward, arms swept forward and upward repeatedly to should height.



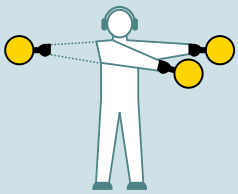
STOP

Arms repeatedly crossed above the head.



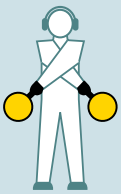
MOVE DOWNWARD

Arms extended horizontally sidways, with palms turned down, beckoning downwards.



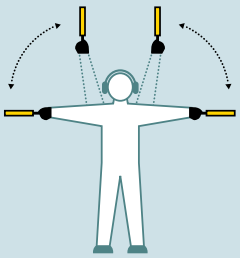
MOVE SIDEWAYS

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



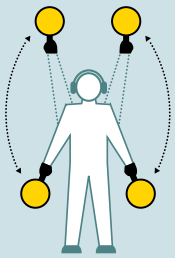
LAND

Arms placed down and crossed in front of the body.



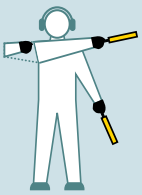
MOVE UPWARD

Arms extended horizontally sideways, with palms up, beckoning upward.



MOVE AHEAD

Arms repeatedly moved upward and backward beckoning onward.



CUT ENGINE(S)

Either arm and hand placed level with the chest, then moved laterally with the palm downwards.

IMPRINT

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Contact details for enquiries:

European Helicopter Safety Team
E-mail: ehest@easa.europa.eu, www.easa.europa.eu/essi

Downloads:

Final report – EHEST Analysis of 2000 – 2005 European Helicopter accidents
http://easa.europa.eu/essi/ehest/wp-content/uploads/2010/10/EHEST-Brochure.pdf
EHEST HE 1 Training Leaflet – Safety considerations
http://easa.europa.eu/essi/ehest/wp-content/uploads/2010/10/Leaflet_EHSIT_Training_final.pdf
Video – Degraded Visual Environment and Loss of control
http://easa.europa.eu/essi/ehest/2011/07/video/
EHEST – Pre-flight-planning-Checklist
http://easa.europa.eu/essi/ehest/wp-content/uploads/2010/10/EHEST-Pre-flight-planning-Checklist.pdf
EHEST – Helicopter Ground Operations Signals
http://easa.europa.eu/essi/ehest/2011/12/he2_helicopter_ground_operations_ground_signals/

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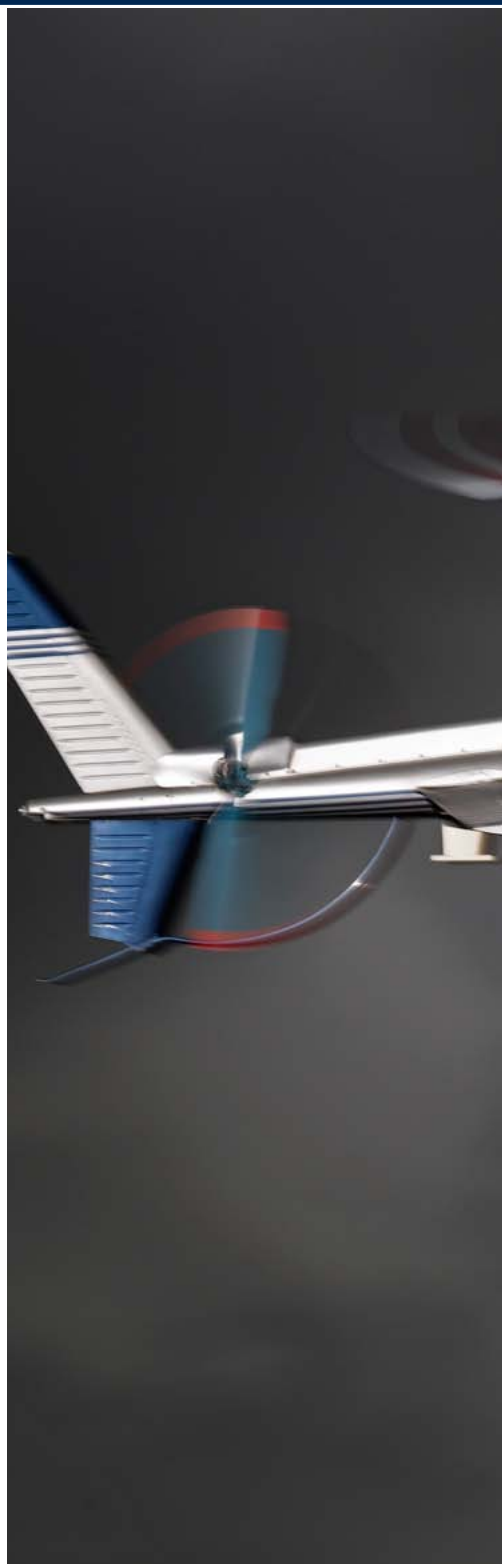

EUROPEAN HELICOPTER SAFETY TEAM (EHEST)
Component of ESSI

European Aviation Safety Agency (EASA)
Safety Analysis and Research Department
Ottoplatz 1, 50679 Köln, Germany

Mail ehest@easa.europa.eu
Web www.easa.europa.eu/essi/ehestEN.html