



CAR OPS 2H

GENERAL AVIATION OPERATIONS (HELICOPTER)

FOREWORD

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REVISION RECORD

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FOREWORD

- (a) The Civil Aviation Authority of San Marino is known in these regulations as the “Authority”.
- (b) CAR OPS 2H replaces the helicopter regulations in CAR OPS 2, which has been repealed and addresses General Aviation operations for helicopters. It is based on ICAO Annex 6, Part III, Section III.
- (c) The editing practices used in this document are as follows:
 - (1) ‘Shall’ is used to indicate a mandatory requirement.
 - (2) ‘Should’ is used to indicate a recommendation.
 - (3) ‘May’ is used to indicate discretion by the Authority, the industry or the applicant, as appropriate.
 - (4) ‘Will’ indicates a mandatory requirement.

Note: The use of the male gender implies the female gender and vice versa.

- (d) Paragraphs and sub-paragraphs with new, amended and corrected text will be enclosed within brackets until a subsequent amendment is issued.
- (e) Unless otherwise stated, the definitions and abbreviations contained in CAR DEF are applicable to these regulations.



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REVISION RECORD

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**SUBPART A****APPLICABILITY****OPS 2H.001 Applicability**

CAR OPS 2H applies to all international General Aviation helicopter operations.

OPS 2H.003 Exemptions

The Authority may exceptionally grant an exemption from the provisions of CAR OPS 2H when satisfied that there is a need and subject to compliance with any supplementary condition the Authority considers necessary in order to ensure an acceptable level of safety in the particular case.



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**SUBPART B****GENERAL****OPS 2H.101 Compliance with Laws, Regulations and Procedures**

- (a) The pilot-in-command shall comply with the laws, regulations and procedures of those States in which operations are conducted.
- (b) The pilot-in-command shall be responsible for the operation and safety of the helicopter and for the safety of all crew members, passengers and cargo on board, from the moment the engine(s) are started until the helicopter finally comes to rest at the end of the flight, with the engine(s) shut down and the rotor blades stopped.
- (c) The pilot-in-command shall have responsibility for operational control.
- (d) If an emergency situation which endangers the safety or security of the helicopter or persons necessitates the taking of action which involves a violation of local regulations or procedures, the pilot-in-command shall notify the appropriate local authority without delay. If required by the State in which the incident occurs, the pilot-in-command shall submit a report on any such violation to the appropriate authority of such State; in that event, the pilot-in-command shall also submit a copy of it to the Authority, as the State of Registry of the helicopter. Such reports shall be submitted as soon as possible and normally within ten days.
- (e) The pilot-in-command shall be responsible for notifying the nearest appropriate authority by the quickest available means of any accident involving the helicopter, resulting in serious injury or death of any person or substantial damage to the helicopter or property.
- (f) The pilot-in-command shall ensure that flight crew members demonstrate the ability to speak and understand the English language.

OPS 2H.103 Dangerous Goods

- (a) The transport of dangerous goods by air shall be conducted in accordance with Annex 18 to the Chicago Convention as last amended and amplified by the Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Doc 9284-AN/905), including its supplements and any other addenda or corrigenda.
- (b) Dangerous goods shall only be transported by the operator approved by the Authority except when;
 - (1) they are not subject to the Technical Instructions in accordance with Part 1 of those Instructions; or
 - (2) they are carried by passengers or the pilot-in-command, or are in baggage, in accordance with Part 8 of the Technical Instructions.
- (c) The pilot-in-command shall take all reasonable measures to prevent dangerous goods from being carried on board inadvertently.
- (d) The pilot-in-command shall, in accordance with the Technical Instructions, report without delay to the Authority and the appropriate authority of the State of occurrence in the event of any dangerous goods accidents or incidents.



- (e) The pilot-in-command shall ensure that passengers are provided with information about dangerous goods in accordance with the Technical Instructions.

OPS 2H.105 Use of Psychoactive Substances

Note: Refer to CAR OPS 0

OPS 2H.107 Specific Approvals

- (a) An operator shall not operate a helicopter for the purpose of General Aviation operations otherwise than under, and in accordance with, the approvals and limitations of Specific Approvals issued for that helicopter.
- (b) The pilot-in-command shall not conduct operations for which a specific approval is required unless such approval has been issued by the Authority.
- (c) Specific approvals shall follow the layout listed in ICAO Annex 6, Part III, Appendix 5 and contain the information on the following required approvals;
 - (1) Low Visibility Operations;
 - (2) Operational credit for use of HUD/EVS;
 - (3) Performance Based Operations (PBN);
 - (4) Carriage of Dangerous Goods;
 - (5) Use of EFB (installed or portable);
 - (6) Use of CPDLC;
 - (7) Use of ADS-B Out;
 - (8) Use of ADS C;
 - (9) Shipborne operations;
 - (10) Required Communications Performance (RCP); and
 - (11) Required Surveillance Performance (RSP).

[OPS 2H.109 Aeroplane operated under an Article 83 *bis* agreement

- (a) A helicopter, when operating under an Article 83 *bis* agreement entered into between the State of Registry and the State of the principal location of a general aviation operator, shall carry a certified true copy of the agreement summary, in either an electronic or hard copy format. When the summary is issued in a language other than English, an English translation shall be included.
- (b) The agreement summary of an Article 83 *bis* agreement shall be accessible to a civil aviation safety inspector to determine which functions and duties are transferred under the agreement by the State of Registry to the State of the principal location of a general aviation operator, when conducting surveillance activities such as ramp checks.



- (c) The agreement summary shall be transmitted to ICAO together with the Article 83 *bis* Agreement for registration with the ICAO Council by the State of Registry or the State of the principal location of a general aviation operator.

Note: The agreement summary transmitted with the Article 83 bis agreement registered with the ICAO Council contains the list of all aircraft affected by the agreement. However, the certified true copy to be carried on board will need to list only the specific aircraft carrying the copy.

- (d) The agreement summary should contain the information in ICAO 6, Part III, Appendix 6 for the specific aircraft and should follow the layout of Appendix 6, paragraph 3.]



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**SUBPART C****FLIGHT OPERATIONS****OPS 2H.201 Adequacy of Operating Facilities**

The pilot-in-command shall not commence a flight unless it has been ascertained by every reasonable means available that the ground and/or water facilities available and directly required for such flight and for the safe operation of the helicopter, are adequate including communication facilities and navigation aids.

OPS 2H.203 Heliport or Landing Location Operating Minima

- (a) [The pilot-in-command shall establish operating minima in accordance with criteria specified by the Authority, as the State of Registry, for each heliport or landing location to be used in operations. When establishing aerodrome operating minima, any conditions that may be prescribed in the list of specific approvals shall be observed. Such minima shall not be lower than any that may be established by the State of the Aerodrome, except when specifically approved by that State.
- (b) The Authority, as the State of Registry, shall authorize operational credit(s) for operations with helicopters equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS. Where the operational credit relates to low visibility operations, the Authority shall issue a specific approval. Such authorizations shall not affect the classification of the instrument approach procedure.]

Note: Operational credit includes:

- (1) *for the purposes of an approach ban, a minima below the heliport or landing location operating minima;*
- (2) *reducing or satisfying the visibility requirements; or*
- (3) *requiring fewer ground facilities as compensated for by airborne capabilities.*

OPS 2H.205 Briefing

- (a) The pilot-in-command shall ensure that passengers are made familiar with the location and use of:
 - (1) seat belts;
 - (2) emergency exits;
 - (3) life jackets, if the carriage of life jackets is prescribed;
 - (4) oxygen dispensing equipment if the use of oxygen is anticipated; and
 - (5) other emergency equipment provided for individual use, including passenger emergency briefing cards.
- (b) The pilot-in-command shall ensure that all persons on board are aware of the location and general manner of use of the principal emergency equipment carried for collective use.

**OPS 2H.207 Duties of the pilot-in-command**

- (a) The pilot-in-command shall be responsible for the operation and safety of the helicopter and for the safety of all crew members, passengers and cargo on board, from the moment the engine(s) are started until the helicopter finally comes to rest at the end of the flight, with the engine(s) shut down and the rotor blades stopped.
- (b) A flight shall not be commenced until the pilot-in-command is satisfied that:
 - (1) the helicopter is airworthy, duly registered and that appropriate certificates with respect thereto are aboard the helicopter;
 - (2) the instruments and equipment installed in the helicopter are appropriate, taking into account the expected flight conditions;
 - (3) any necessary maintenance has been performed in accordance with Subpart G of these regulations;
 - (4) the mass of the helicopter and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;
 - (5) any load carried is properly distributed and safely secured; and
 - (6) the helicopter operating limitations, contained in the flight manual, or its equivalent, will not be exceeded.

OPS 2H.209 Weather Reports and Forecasts

Before commencing a flight the pilot-in-command shall be familiar with all available meteorological information appropriate to the intended flight. Preparation for a flight away from the vicinity of the place of departure, and for every flight under the instrument flight rules, shall include:

- (a) a study of available current weather reports and forecasts; and
- (b) the planning of an alternative course of action to provide for the eventuality that the flight cannot be completed as planned, because of weather conditions.

OPS 2H.211 Flight in Accordance with VFR

A flight to be conducted in accordance with VFR shall not be commenced unless current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions along the route or that part of the route to be flown under the VFR will, at the appropriate time, be such as to enable compliance with these rules.

OPS 2H.213 Flight in Accordance with IFR

- (a) When an alternate is required.

A flight to be conducted in accordance with IFR shall not be commenced unless the available information indicates that conditions, at the heliport of intended landing and at least one alternate heliport will, at the estimated time of arrival, be at or above the heliport operating minima.



- (b) When no alternate is required.

A flight to be conducted in accordance with IFR to a heliport when no alternate heliport is required shall not be commenced unless available current meteorological information indicates that the following meteorological conditions will exist from two hours before to two hours after the estimated time of arrival, or from the actual time of departure to two hours after the estimated time of arrival, whichever is the shorter period:

- (1) a cloud base of at least 120 m (400 ft) above the minimum associated with the instrument approach procedure; and
- (2) visibility of at least 1.5 km more than the minimum associated with the procedure.

OPS 2H.215 Heliport Operating Minima

- (a) A flight shall not be continued towards the heliport of intended landing unless the latest available meteorological information indicates that conditions at that heliport, or at least one alternate heliport, will, at the estimated time of arrival, be at or above the specified heliport operating minima.
- (b) An instrument approach shall not be continued below 300 m (1 000 ft) above the heliport elevation or into the final approach segment unless the reported visibility or controlling RVR is at or above the heliport operating minima.
- (c) If, after entering the final approach segment or after descending below 300 m (1 000 ft) above the heliport elevation, the reported visibility or controlling RVR falls below the specified minimum, the approach may be continued to DA/H or MDA/H. In any case, a helicopter shall not continue its approach-to-land beyond a point at which the limits of the heliport operating minima would be infringed.

OPS 2H.217 Flight in Icing Conditions

A flight to be operated in known or expected icing conditions shall not be commenced unless the helicopter is certificated and equipped to cope with such conditions.

OPS 2H.219 Alternate Heliports

- (a) For a flight to be conducted in accordance with IFR, at least one alternate heliport or landing location shall be specified in the operational flight plan and the flight plan, unless:
 - (1) the weather conditions in OPS 2H.213(b) prevail; or
 - (2)
 - (i) the heliport or landing location of intended landing is isolated and no alternate heliport or landing location is available; and
 - (ii) an instrument approach procedure is prescribed for the isolated heliport of intended landing; and
 - (iii) a point of no return (PNR) is determined in case of an offshore destination.
- (b) Suitable offshore alternates may be specified subject to the following:



- (1) the offshore alternates shall be used only after passing a PNR. Prior to a PNR, onshore alternates shall be used;
- (2) mechanical reliability of critical control systems and critical components shall be considered and taken into account
- (3) when determining the suitability of the alternate;
- (4) one engine inoperative performance capability shall be attainable prior to arrival at the alternate;
- (5) to the extent possible, deck availability shall be guaranteed; and
- (6) weather information must be reliable and accurate.

Note: Offshore alternates should not be used when it is possible to carry enough fuel to have an onshore alternate. Offshore alternates should not be used in a hostile environment.

OPS 2H.221 Fuel and Oil Requirements

- (a) All helicopters.

A flight shall not be commenced unless, taking into account both the meteorological conditions and any delays that are expected in flight, the helicopter carries sufficient fuel and oil to ensure that it can safely complete the flight. In addition, a reserve shall be carried to provide for contingencies.

- (b) VFR operations.

The fuel and oil carried in order to comply with paragraph (a) shall, in the case of VFR operations, be at least the amount to allow the helicopter to:

- (1) fly to the landing site to which the flight is planned;
- (2) have a final reserve fuel to fly thereafter for a period of 20 minutes at best-range speed; and
- (3) have an additional amount of fuel to provide for the increased consumption on the occurrence of potential contingencies, as determined by the State and specified in the State regulations governing general aviation.

- (c) IFR operations.

The fuel and oil carried in order to comply with paragraph (a) shall, in the case of IFR operations, be at least the amount to allow the helicopter:

- (1) When no alternate is required, in terms of OPS 2H.213(b), to fly to and execute an approach at the heliport or landing location to which the flight is planned, and thereafter to have:
 - (i) a final reserve fuel to fly 30 minutes at holding speed at 450 m (1 500 ft) above the destination heliport or landing location under standard temperature conditions and approach and land; and



- (ii) an additional amount of fuel to provide for the increased consumption on the occurrence of potential contingencies.
- (2) When an alternate is required, in terms of OPS 2H.213(a), to fly to and execute an approach, and a missed approach, at the heliport or landing location to which the flight is planned, and thereafter:
 - (i) fly to and execute an approach at the alternate specified in the flight plan; and then
 - (ii) have a final reserve fuel to fly for 30 minutes at holding speed at 450 m (1 500 ft) above the alternate under standard temperature conditions, and approach and land; and
 - (iii) have an additional amount of fuel to provide for the increased consumption on the occurrence of potential contingencies.
- (3) When no alternate heliport or landing location is available (i.e. the heliport of intended landing is isolated and no alternate is available), to fly to the heliport to which the flight is planned and thereafter for a period as specified by the State of the Operator.
- (d) In computing the fuel and oil required in paragraph (a), at least the following shall be considered:
 - (1) meteorological conditions forecast;
 - (2) expected air traffic control routings and traffic delays;
 - (3) for IFR flight, one instrument approach at the destination heliport, including a missed approach;
 - (4) the procedures for loss of pressurisation, where applicable, or failure of one engine while en route; and
 - (5) any other conditions that may delay the landing of the helicopter or increase fuel and/or oil consumption.

Note: Nothing in this regulation precludes amendment of a flight plan in flight in order to replan the flight to another heliport, provided that the requirements can be complied with from the point where the flight has been replanned.

- (e) The use of fuel after flight commencement for purposes other than originally intended during pre-flight planning shall require a re-analysis and, if applicable, adjustment of the planned operation.

OPS 2H.223 In-Flight Fuel Management

- (a) The pilot-in-command shall monitor the amount of usable fuel remaining on board to ensure it is not less than the fuel required to proceed to a landing site where a safe landing can be made with the planned final reserve fuel remaining.

Note: The protection of final reserve fuel is intended to ensure safe landing at any heliport or landing location when unforeseen occurrences may not permit a safe completion of an operation as originally planned.



- (b) The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific landing site, the pilot calculates that any change to the existing clearance to that landing site, or other air traffic delays, may result in landing with less than the planned final reserve fuel.

Note 1: The declaration of MINIMUM FUEL informs ATC that all planned landing site options have been reduced to a specific landing site of intended landing, that no precautionary landing site is available, and any change to the existing clearance, or air traffic delays, may result in landing with less than the planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

Note 2: A precautionary landing site refers to a landing site, other than the site of intended landing, where it is expected that a safe landing can be made prior to the consumption of the planned final reserve fuel.

- (c) The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL, when the usable fuel estimated to be available upon landing at the nearest landing site where a safe landing can be made is less than the required final reserve fuel in compliance with 2.8.

Note 1: The planned final reserve fuel refers to the value calculated in OPS 2H.221 and is the minimum amount of fuel required upon landing at any landing site. The declaration of MAYDAY MAYDAY MAYDAY FUEL informs ATC that all available landing options have been reduced to a specific site and a portion of the final reserve fuel may be consumed prior to landing.

Note 2: The pilot estimates with reasonable certainty that the fuel remaining upon landing at the nearest safe landing site will be less than the final reserve fuel taking into consideration the latest information available to the pilot, the area to be overflown (i.e. with respect to the availability of precautionary landing areas), meteorological conditions and other reasonable contingencies.

OPS 2H.225 Oxygen Supply

- (a) A flight to be operated at altitudes at which the cabin pressure in personnel compartments will be higher than 10 000 ft shall not be commenced unless sufficient stored breathing oxygen is carried to supply:
- (1) all crew members and 10 per cent of the passengers for any period in excess of 30 minutes that the cabin pressure in compartments occupied by them will be between 10 000 ft and 13 000 ft; and
 - (2) the crew and passengers for any period that the cabin pressure in compartments occupied by them will be greater than 13 000 ft.
- (b) A flight to be operated with a pressurised helicopter shall not be commenced unless a sufficient quantity of stored breathing oxygen is carried to supply all the crew members and passengers, as is appropriate to the circumstances of the flight being undertaken, in the event of loss of pressurisation, for any period that the cabin pressure in any compartment occupied by them would be more than 10 000 ft.

**OPS 2H.227 Use of Oxygen**

The pilot-in-command shall ensure that he/she and flight crew members engaged in performing duties essential to the safe operation of a helicopter in flight use supplemental oxygen continuously whenever the circumstances prevail for which its supply has been required in OPS 2H.225.

OPS 2H.229 In-flight Emergency Instruction

In an emergency during flight, the pilot-in-command shall ensure that all persons on board are instructed in such emergency action as may be appropriate to the circumstances.

OPS 2H.231 Weather Reporting by Pilots

When weather conditions likely to affect the safety of other aircraft are encountered, they should be reported as soon as possible.

OPS 2H.233 Hazardous Flight Conditions

Hazardous flight conditions, other than those associated with meteorological conditions, encountered en route should be reported as soon as possible. The reports so rendered should give such details as may be pertinent to the safety of other aircraft.

OPS 2H.235 Fitness of Flight Crew Members

The pilot-in-command shall be responsible for ensuring that a flight:

- (a) will not be commenced if any flight crew member is incapacitated from performing duties by any cause such as injury, sickness, fatigue, the effects of alcohol or drugs; and
- (b) will not be continued beyond the nearest suitable heliport when flight crew members' capacity to perform functions is significantly reduced by impairment of faculties from causes such as fatigue, sickness, lack of oxygen.

OPS 2A.237 Flight Crew Members at Duty Stations

- (a) Take-off and landing.

All flight crew members required to be on flight deck duty shall be at their stations.

- (b) En route.

All flight crew members required to be on flight deck duty shall remain at their stations except when their absence is necessary for the performance of duties in connection with the operation of the helicopter or for physiological needs.

- (c) Seat belts.

All flight crew members shall keep their seat belts fastened when at their stations.



(d) Safety harness.

When safety harnesses are provided, any flight crew member occupying a pilot's seat shall keep the safety harness fastened during the take-off and landing phases; all other flight crew members shall keep their safety harnesses fastened during the take-off and landing phases unless the shoulder straps interfere with the performance of their duties, in which case the shoulder straps may be unfastened but the seat belt must remain fastened.

Note: Safety harness includes shoulder strap(s) and a seat belt which may be used independently.

OPS 2H.239 Instrument Flight Procedures

- (a) One or more instrument approach procedures designed to support instrument approach operations shall be approved and promulgated by the State in which the heliport is located, or by the State which is responsible for the heliport when located outside the territory of any State, to serve each final approach and take-off area or heliport utilised for instrument flight operations.
- (b) All helicopters operated in accordance with the instrument flight rules shall comply with the instrument approach procedures approved by the State in which the heliport is located, or by the State which is responsible for the heliport when located outside the territory of any State.

OPS 2H.241 Instruction - General

A helicopter rotor shall not be turned under power for the purpose of flight without a qualified pilot at the controls.

OPS 2H.243 Refuelling with Passengers on Board

- (a) A helicopter shall not be refuelling when passengers are embarking, on board or disembarking, or when the rotor is turning unless it is attended by the pilot-in-command or other qualified personnel ready to initiate an evacuation of the helicopter by the most practical and expeditious means available.
- (b) When refuelling with passengers embarking, on board or disembarking, two-way communication shall be maintained by the helicopter's intercommunication system or other suitable means between the ground crew supervising the refuelling and the pilot-in-command or other qualified personnel on board the helicopter.
- (c) The helicopter shall not be refuelled with aviation gasoline (AVGAS) or wide-cut type fuel or a mixture of these types of fuel, or when an open line is used, when passengers are embarking, on board or disembarking.

OPS 2H.245 Over-Water Flights

All helicopters on flights over water in a hostile environment in accordance OPS 2H.419(a) shall be certificated for ditching. Sea state shall be an integral part of ditching information.

**SUBPART D****PERFORMANCE OPERATING LIMITATIONS****OPS 2H.301 General**

(See Appendix 1 to OPS 2H.301)

- (a) A helicopter shall be operated;
 - (1) in compliance with the terms of its airworthiness certificate or equivalent approved document; and
 - (2) within the operating limitations prescribed by the certifying authority and the Authority, as the State of Registry; and
 - (3) within the operating limitations prescribed in Appendix to OPS 2H.301 by the Authority, as the State of Registry; and
 - (4) if applicable, within the mass limitations imposed by compliance with the applicable noise certification Standards in Annex 16, Volume I, unless otherwise authorised in exceptional circumstances for a certain heliport where there is no noise disturbance problem, by the competent authority of the State in which the heliport is situated.
- (b) Placards, listings, instrument markings, or combinations thereof, containing those operating limitations prescribed by the Authority, as the State of Registry for visual presentation, shall be displayed in the helicopter.
- (c) Where helicopters are operating to or from heliports in a congested hostile environment, the competent authority of the State in which the heliport is situated shall take such precautions as are necessary to control the risk associated with an engine failure.



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**Appendix 1 to OPS 2H.301****Helicopter Performance and Operating Limitations**

(See OPS 2H.301)

1. General**1.1 Purpose and scope**

This attachment comprises the code of performance for helicopters operated under these regulations.

1.2 Performance - general**1.2.1 Categories**

Category A. With respect to helicopters, means a multi-engine helicopter designed with engine and system isolation features specified in ICAO Annex 8, Part IVB, and capable of operations using take-off and landing data scheduled under a critical engine failure concept which assures adequate designated surface area and adequate performance capability for continued safe flight or safe rejected take-off.

Category B. With respect to helicopters, means a single engine or multi-engine helicopter which does not meet Category A standards. Category B helicopters have no guaranteed capability to continue safe flight in the event of an engine failure, and a forced landing is assumed.

1.3 General requirements

- a) Helicopters operating in performance Classes 1 and 2 shall be certificated in Category A.
- b) Helicopters operating in performance Class 3 shall be certificated in either Category A or Category B (or equivalent).
- c) Except as permitted by the Authority:
 - 1) Take-off or landing from/to heliports in a congested hostile environment shall only be conducted in performance Class 1.
 - 2) Operations in performance Class 2 shall only be conducted with a safe forced landing capability during take-off and landing.
 - 3) Operations in performance Class 3 shall only be conducted in a non-hostile environment.
- d) In order to permit variations from c), d) and e), the Authority shall, in cooperation with the operator, undertake a risk assessment, considering factors such as:
 - 1) the type of operation and the circumstances of the flight;
 - 2) the area/terrain over which the flight is being conducted;
 - 3) the probability of a critical engine failure and the consequence of such an event;
 - 4) the procedures to maintain the reliability of the engine(s);



- 5) the training and operational procedures to mitigate the consequences of the critical engine failure; and
- 6) installation and utilization of a usage monitoring system.

Note: If there are routes with access to suitable forced landing areas, these should be used for flights into and out of the congested area. Where no such routes exist, evaluation of the operation could include consideration of mitigating factors such as the reliability of the propulsion system in the short periods when flight over a suitable forced landing area is not possible.

1.4 Abbreviations Specific to Helicopter Operations

D	Maximum dimension of helicopter
DPBL	Defined point before landing
DPATO	Defined point after take-off
DR	Distance travelled (helicopter)
FATO	Final approach and take-off area
HFM	Helicopter flight manual
LDP	Landing decision point
LDAH	Landing distance available (helicopter)
LDRH	Landing distance required (helicopter)
R	Rotor radius of helicopter
RTODR	Rejected take-off distance required (helicopter)
TDP	Take-off decision point
TLOF	Touchdown and lift-off area
TODAH	Take-off distance available (helicopter)
TODRH	Take-off distance required (helicopter)
V _{TOSS}	Take-off safety speed

1.5 Definitions

1.5.1 Only applicable to operations in performance Class 1

Landing distance required (LDRH). The horizontal distance required to land and come to a full stop from a point 15 m (50 ft) above the landing surface.

Rejected take-off distance required (RTODR). The horizontal distance required from the start of the take-off to the point where the helicopter comes to a full stop following an engine failure and rejection of the take-off at the take-off decision point.

Take-off distance required (TODRH). The horizontal distance required from the start of the take-off to the point at which V_{TOSS}, a selected height and a positive climb gradient are achieved, following failure of the critical engine being recognized at TDP, the remaining engines operating within approved operating limits.

Note: The selected height stated above is to be determined with reference to either:

- a) the take-off surface; or
- b) a level defined by the highest obstacle in the take-off distance required.



1.5.2 Applicable to operations in all performance classes

D. The maximum dimension of the helicopter.

Distance DR. DR is the horizontal distance that the helicopter has travelled from the end of the take-off distance available.

Landing distance available (LDAH). The length of the final approach and take-off area plus any additional area declared available and suitable for helicopters to complete the landing manoeuvre from a defined height.

R. The rotor radius of the helicopter.

Take-off distance available (TODAH). The length of the final approach and take-off area plus the length of helicopter clearway (if provided) declared available and suitable for helicopters to complete the take-off.

Take-off flight path. The vertical and horizontal path, with the critical engine inoperative, from a specified point in the take-off to 300 m (1 000 ft) above the surface.

Touchdown and lift-off area (TLOF). A load bearing area on which a helicopter may touch down or lift off.

VTSS. Take-off safety speed for helicopters certificated in Category A.

V_y. Best rate of climb speed.

2. Requirements

2.1 Applicability

- 2.1.1 Helicopters with a passenger seating configuration of more than 19, or helicopters operating to or from a heliport in a congested hostile environment shall be operating in performance Class 1.
- 2.1.2 Helicopters with a passenger seating configuration of 19 or less but more than 9 shall be operating in performance Class 1 or 2, unless operating to or from a congested hostile environment in which case the helicopters shall be operating in performance Class 1.
- 2.1.3 Helicopters with a passenger seating configuration of 9 or less shall be operating in performance Class 1, 2 or 3, unless operating to or from a congested hostile environment in which case the helicopters shall be operating in performance Class 1.

2.2 Significant performance factors

To determine the performance of the helicopter, account shall be taken of at least the following factors:

- a) mass of the helicopter;
- b) elevation or pressure-altitude and temperature; and



- c) wind; for take-off and landing, accountability for wind shall be no more than 50 per cent of any reported steady headwind component of 5 knots or more. Where take-off and landing with a tailwind component is permitted in the flight manual, not less than 150 per cent of any reported tailwind component shall be allowed. Where precise wind measuring equipment enables accurate measurement of wind velocity over the point of take-off and landing, these values may be varied.

2.3 Operating conditions

2.3.1 For helicopters operating in performance Class 2 or 3 in any flight phase where an engine failure may cause the helicopter to force-land:

- a) a minimum visibility shall be defined by the operator, taking into account the characteristics of the helicopter, but shall not be less than 800 m for helicopters operating in performance Class 3; and
- b) the operator shall verify that the surface below the intended flight path permits the pilot to execute a safe forced landing.

2.3.2 Performance Class 3 operations are not to be performed:

- a) out of the sight of the surface; or
- b) at night; or
- c) when the cloud ceiling is less than 180 m (600 ft).

2.4 Obstacle accountability area

2.4.1 For the purpose of the obstacle clearance requirements in 4 below, an obstacle shall be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than:

- a) for VFR operations:
 - 1) half of the minimum width of the FATO (or the equivalent term used in the helicopter flight manual) defined in the helicopter flight manual (or when no width is defined, 0.75 D), plus 0.25 times D (or 3 m, whichever is greater), plus:
 - 0.10 DR for VFR day operations
 - 0.15 DR for VFR night operations
- b) for IFR operations:
 - 1) 1.5 D (or 30 m, whichever is greater), plus:
 - 0.10 DR for IFR operations with accurate course guidance
 - 0.15 DR for IFR operations with standard course guidance
 - 0.30 DR for IFR operations without course guidance



- c) for operations with initial take-off conducted visually and converted to IFR/IMC at a transition point, the criteria required in 2.4.1 a) apply up to the transition point then the criteria required in 2.4.1 b) apply after the transition point.

2.4.2 For a take-off using a backup take-off procedure (or with lateral transition), for the purpose of the obstacle clearance requirements in 4 below, an obstacle located below the backup flight path (lateral flight path) shall be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than half of the minimum width of the FATO (or the equivalent term used in the helicopter flight manual) defined in the helicopter flight manual (when no width is defined, 0.75 D plus 0.25 times D, or 3 m, whichever is greater) plus:

- a) 0.10 distance travelled from the back edge of the FATO for VFR day operations;
- b) 0.15 distance travelled from the back edge of the FATO for VFR night operations.

2.4.3 Obstacles may be disregarded if they are situated beyond:

- a) 7 R for day operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;
- b) 10 R for night operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;
- c) 300 m if navigational accuracy can be achieved by appropriate navigation aids; and
- d) 900 m in the other cases.

Note: Standard course guidance includes ADF and VOR guidance. Accurate course guidance includes ILS, MLS, or other course guidance providing an equivalent navigational accuracy.

2.4.4 The transition point shall not be located before the end of TODRH for helicopters operating in performance Class 1 and before the DPATO for helicopters operating in performance Class 2.

2.4.5 When considering the missed approach flight path, the divergence of the obstacle accountability area shall only apply after the end of the take-off distance available.

2.5 Source of performance data

The operator shall ensure that the approved performance data contained in the helicopter flight manual is used to determine compliance with this Attachment, supplemented as necessary with other data acceptable to the State of the Operator.

3. Operating area considerations

3.1 FATO

For operations in performance Class 1, the dimensions of the FATO shall be at least equal to the dimensions specified in the helicopter flight manual.

Note: A FATO that is smaller than the dimensions specified in the helicopter flight manual may be accepted if the helicopter is capable of a hover out of ground effect with one engine inoperative (HOG EOI), and the conditions of 4.1 below can be met.



4. Limitations resulting from performance

4.1 Operations in performance Class 1

4.1.1 Take-off

4.1.1.1 The take-off mass of the helicopter shall not exceed the maximum take-off mass specified in the flight manual for the procedure to be used and to achieve a rate of climb of 100 ft/min at 60 m (200 ft) and 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical engine inoperative and the remaining engines operating at an appropriate power rating, taking into account the parameters specified in 2.2 (Figure 1).

4.1.1.2 Rejected take-off

The take-off mass shall be such that the rejected take-off distance required does not exceed the rejected take-off distance available.

4.1.1.3 Take-off distance

The take-off mass shall be such that the take-off distance required does not exceed the take-off distance available.

Note 1: As an alternative, the requirement above may be disregarded provided that the helicopter with the critical engine failure recognized at TDP can, when continuing the take-off, clear all obstacles from the end of the take-off distance available to the end of the take-off distance required by a vertical margin of not less than 10.7 m (35 ft) (Figure 2).

Note 2: For elevated heliports, the take-off technique must have appropriate clearance from the elevated heliport edge (Figure 3).

4.1.1.4 Backup procedures (or procedures with lateral transition)

The operator shall ensure that, with the critical engine inoperative, all obstacles below the backup flight path (the lateral flight path) are cleared by an adequate margin. Only the obstacles specified in 2.4.2 should be considered.

4.1.2 Take-off flight path

From the end of the take-off distance required with the critical engine inoperative:

4.1.2.1 The take-off mass shall be such that the climb path provides a vertical clearance of not less than 10.7 m (35 ft) for VFR operations and 10.7 m (35 ft) plus 0.01 DR for IFR operations above all obstacles located in the climb path. Only obstacles as specified in 2.4 should be considered.

4.1.2.2 Where a change of direction of more than 15 degrees is made, obstacle clearance requirements shall be increased by 5 m (15 ft) from the point at which the turn is initiated. This turn should not be initiated before reaching a height of 60 m (200 ft) above the take-off surface, unless permitted as part of an approved procedure in the flight manual.



4.1.3 En route

The take-off mass is such that it is possible, in case of the critical engine failure occurring at any point of the flight path, to continue the flight to an appropriate landing site and achieve the minimum flight altitudes for the route to be flown.

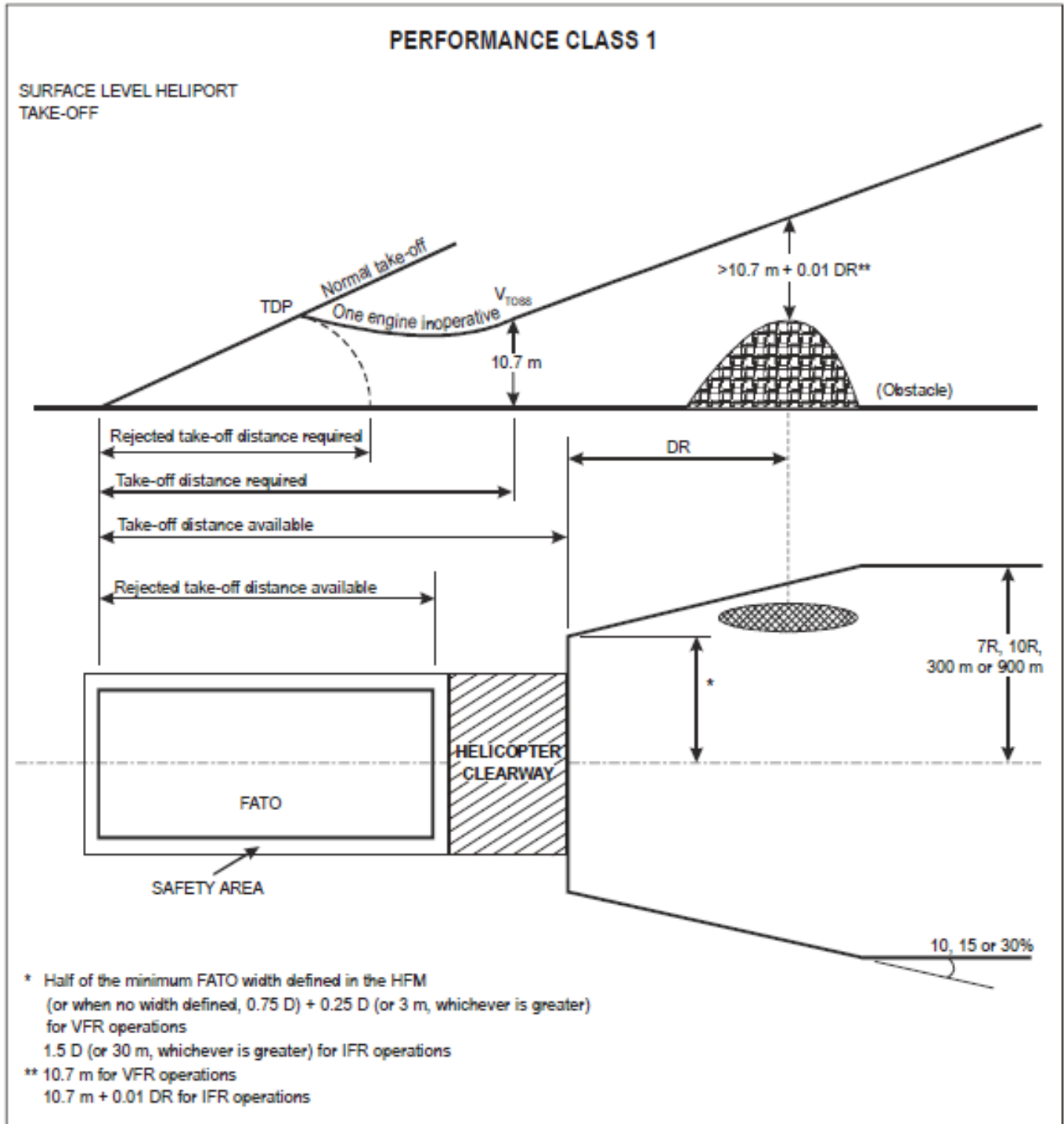


Figure 1

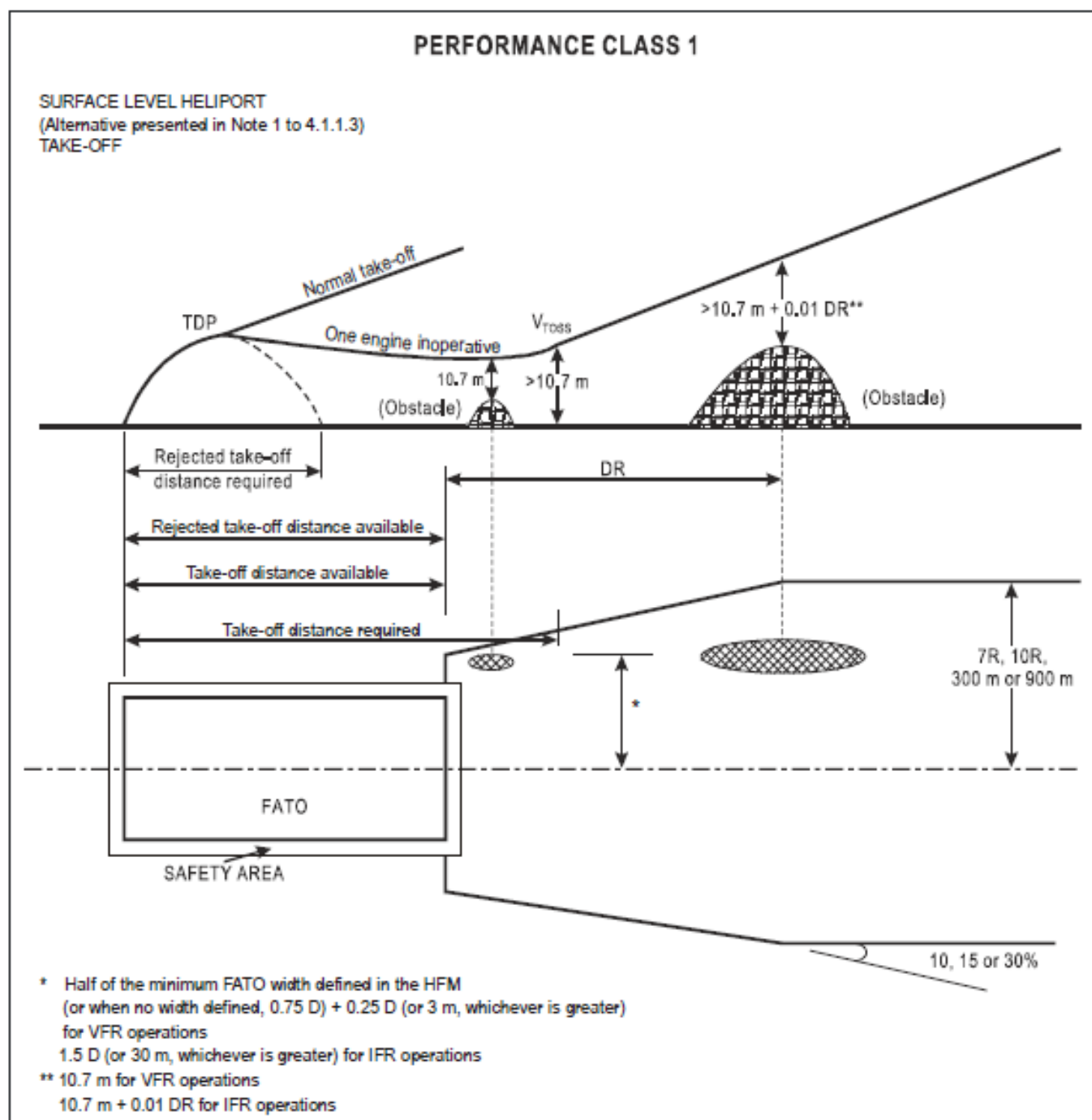


Figure 2

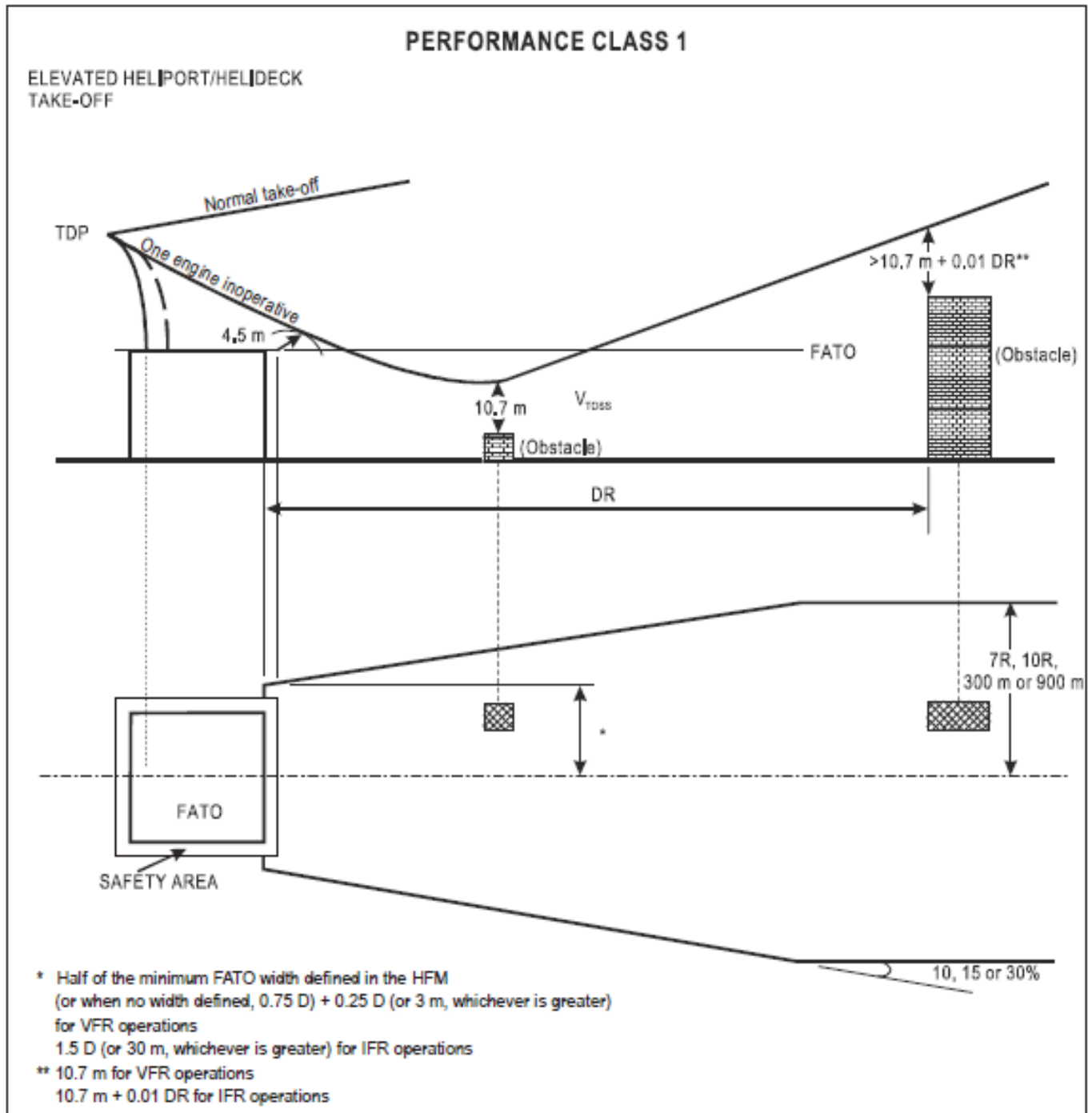


Figure 3

4.1.4 Approach, landing and balked landing (Figures 4 and 5)

The estimated landing mass at the destination or alternate shall be such that:

- it does not exceed the maximum landing mass specified in the flight manual for the procedure to be used and to achieve a rate of climb of 100 ft/min at 60 m (200 ft) and 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical engine inoperative and the remaining engines operating at an appropriate power rating, taking into account the parameters specified in 2.2;



- b) the landing distance required does not exceed the landing distance available unless the helicopter, with the critical engine failure recognized at LDP can, when landing, clear all obstacles in the approach path;
- c) in case of the critical engine failure occurring at any point after the LDP, it is possible to land and stop within the FATO; and
- d) in the event of the critical engine failure being recognized at the LDP or at any point before the LDP, it is possible either to land and stop within the FATO or to overshoot, meeting the conditions of 4.1.2.1 and 4.1.2.2.

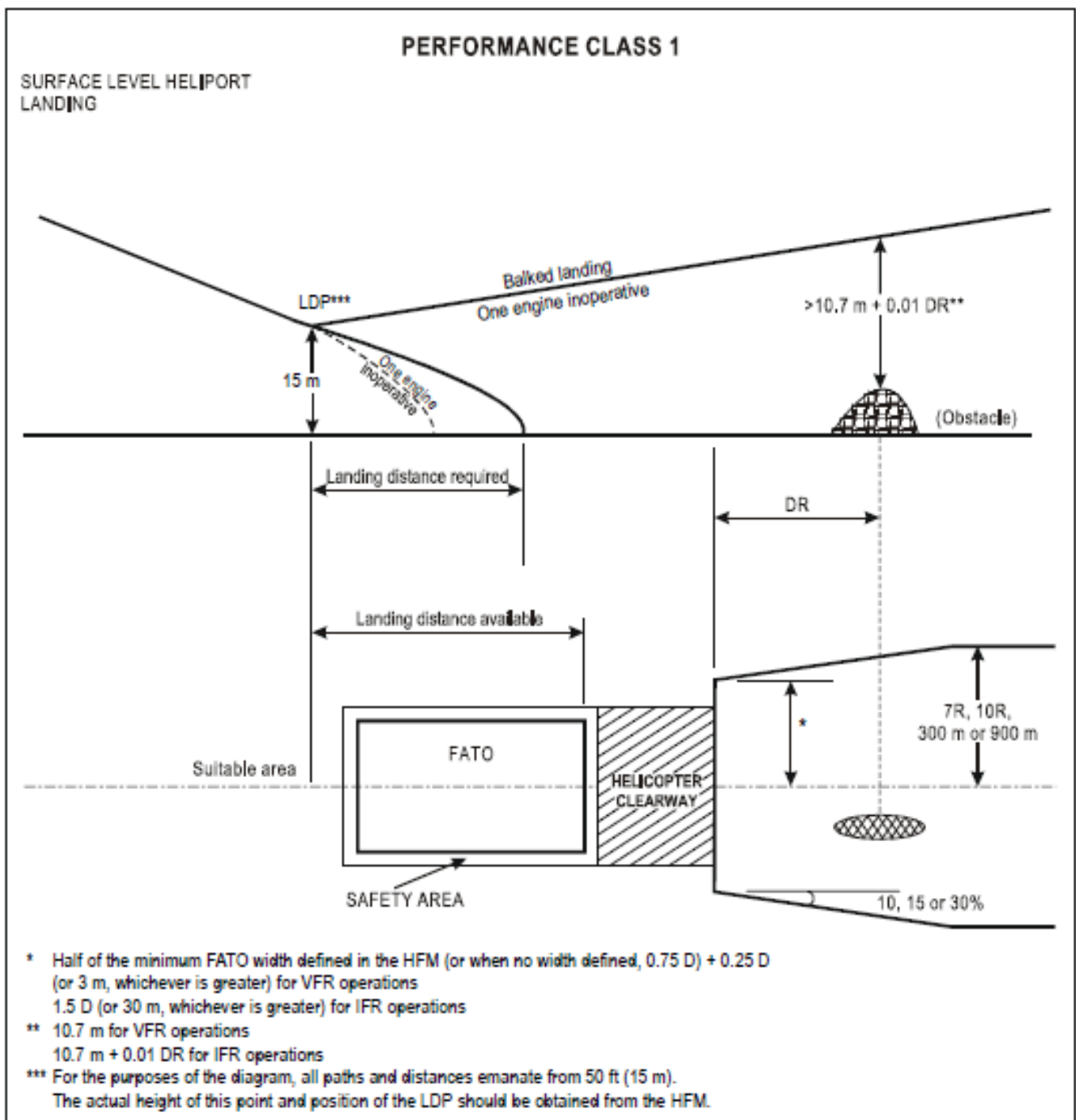


Figure 4

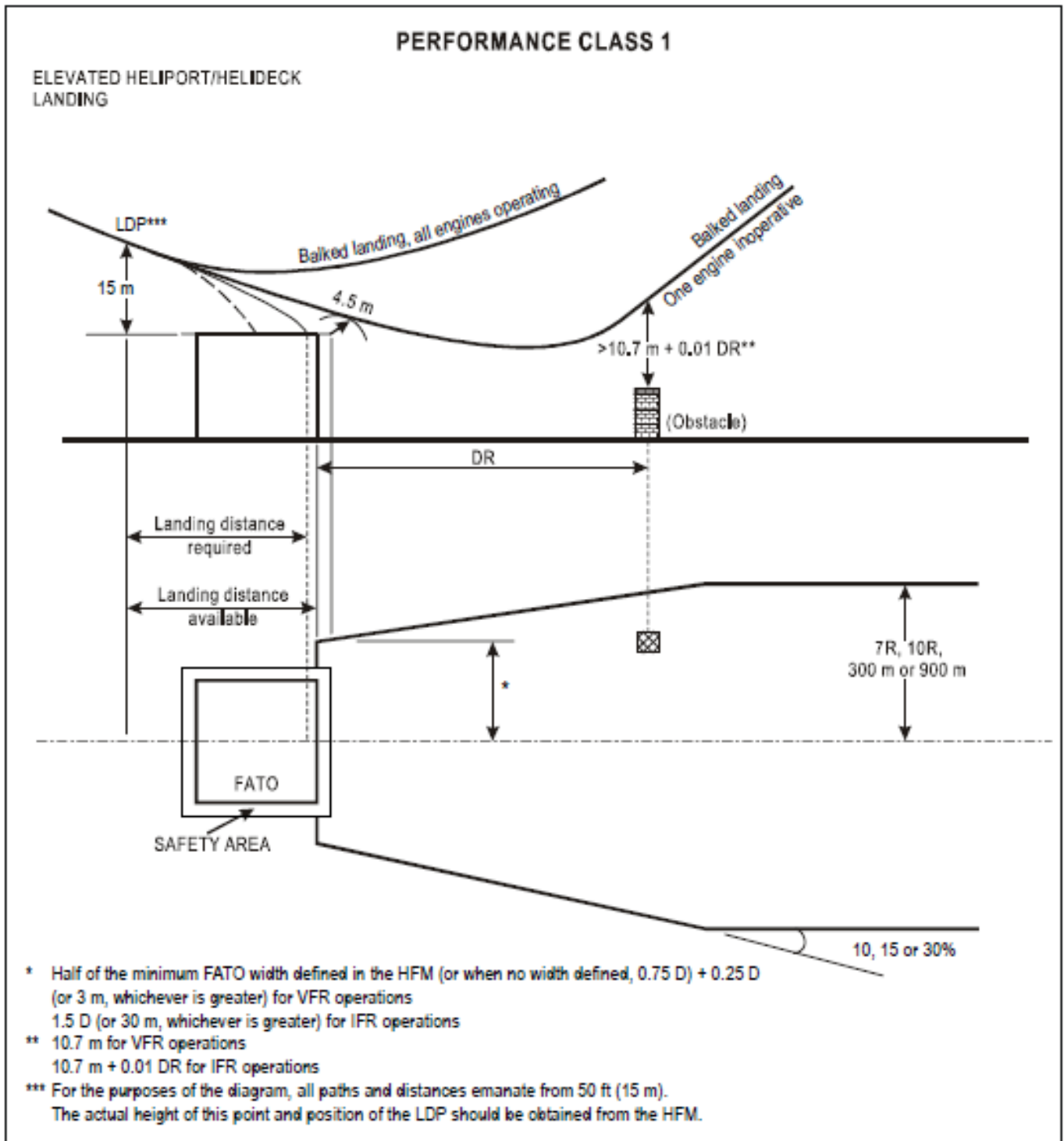


Figure 5

4.2 Operations in performance Class 2

4.2.1 Take-off (Figures 6 and 7)

The mass of the helicopter at take-off shall not exceed the maximum take-off mass specified in the flight manual for the procedures to be used and to achieve a rate of climb of 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical engine inoperative and the remaining engines operating at an appropriate power rating, taking into account the parameters specified in 2.2.



4.2.2 Take-off flight path

From DPATO or, as an alternative, no later than 60 m (200 ft) above the take-off surface with the critical engine inoperative, the conditions of 4.1.2.1 and 4.1.2.2 shall be met.

4.2.3 En route

The requirements of 4.1.3 shall be met.

4.2.4 Approach, landing and balked landing (Figures 8 and 9)

The estimated landing mass at the destination or alternate shall be such that:

- a) it does not exceed the maximum landing mass specified in the flight manual for a rate of climb of 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical engine inoperative and the remaining engines operating at an appropriate power rating, taking into account the parameters specified in 2.2;
- b) it is possible, in case of the critical engine failure occurring at or before the DPBL, either to perform a safe forced landing or to overshoot, meeting the requirements of 4.1.2.1 and 4.1.2.2.

Note: Only obstacles as specified in 2.4 should be considered.

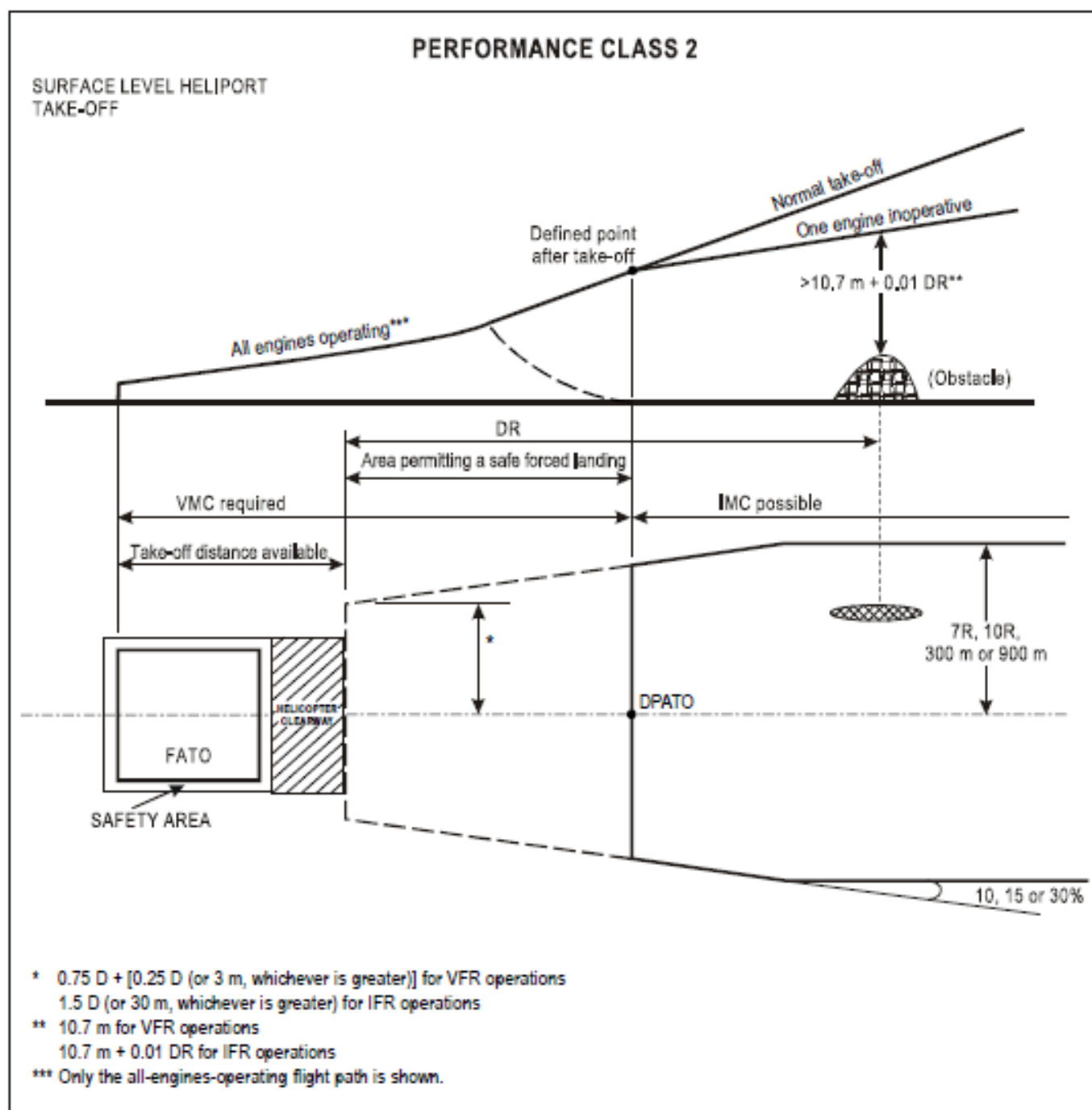


Figure 6

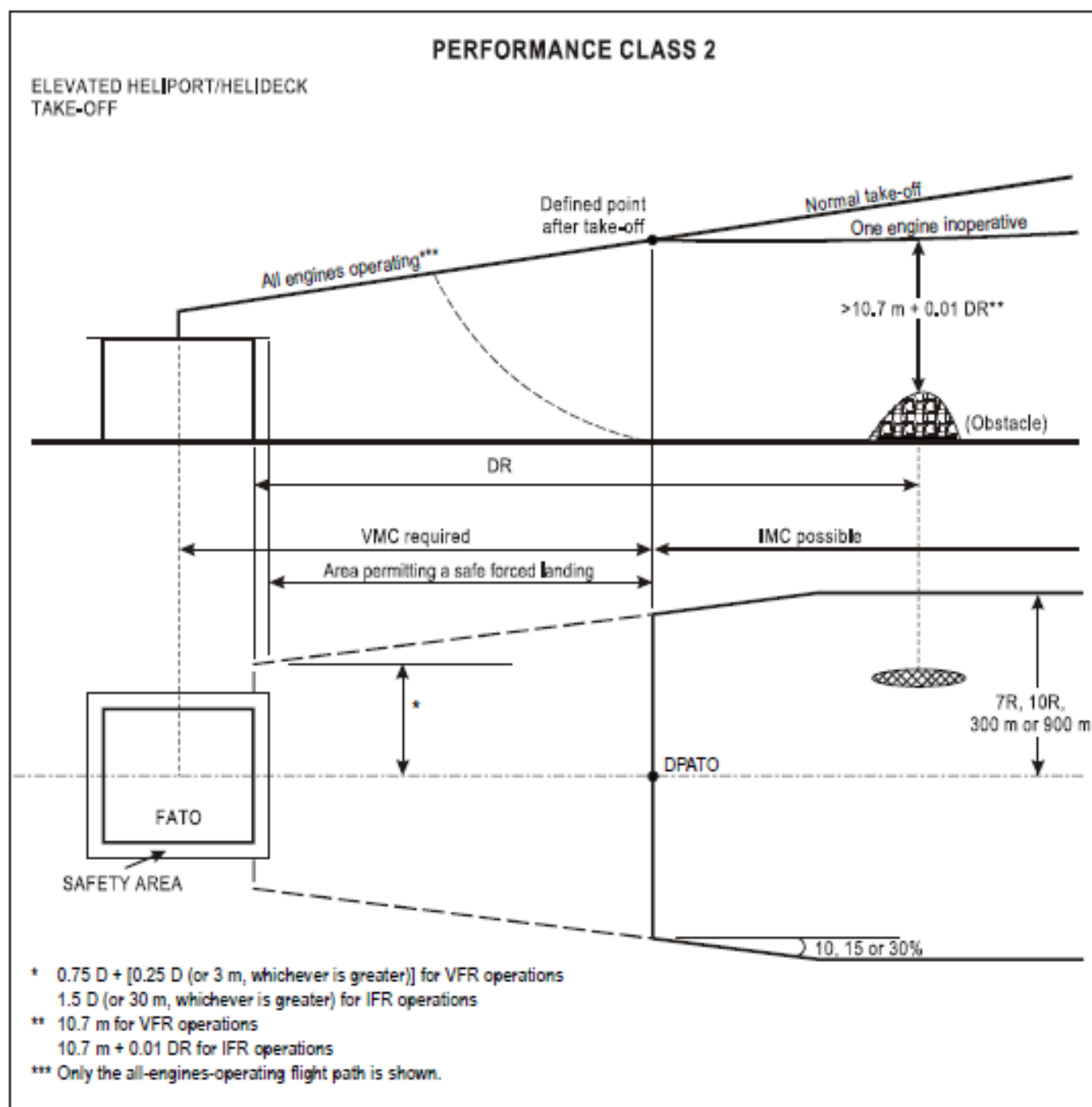


Figure 7

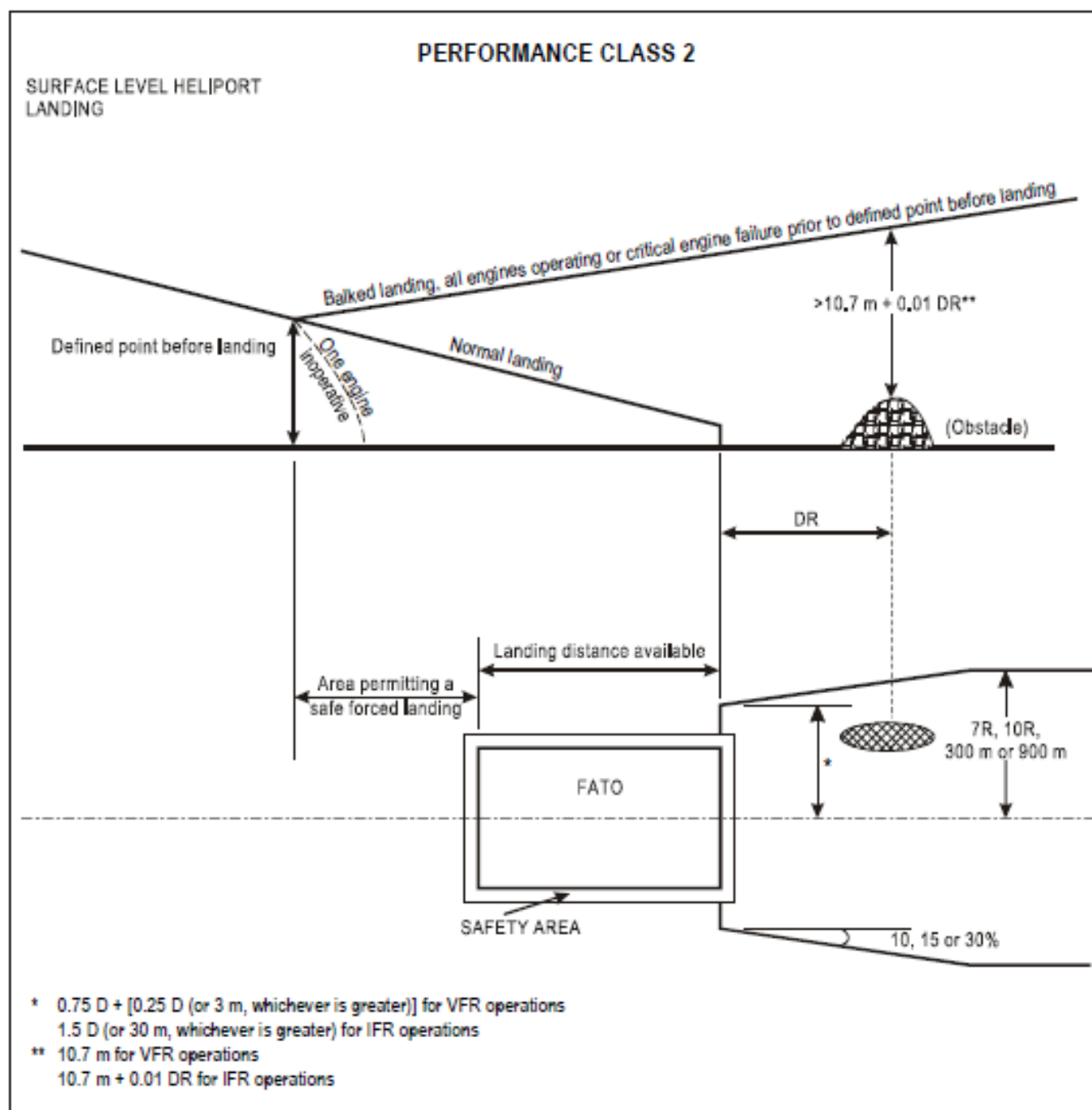


Figure 8

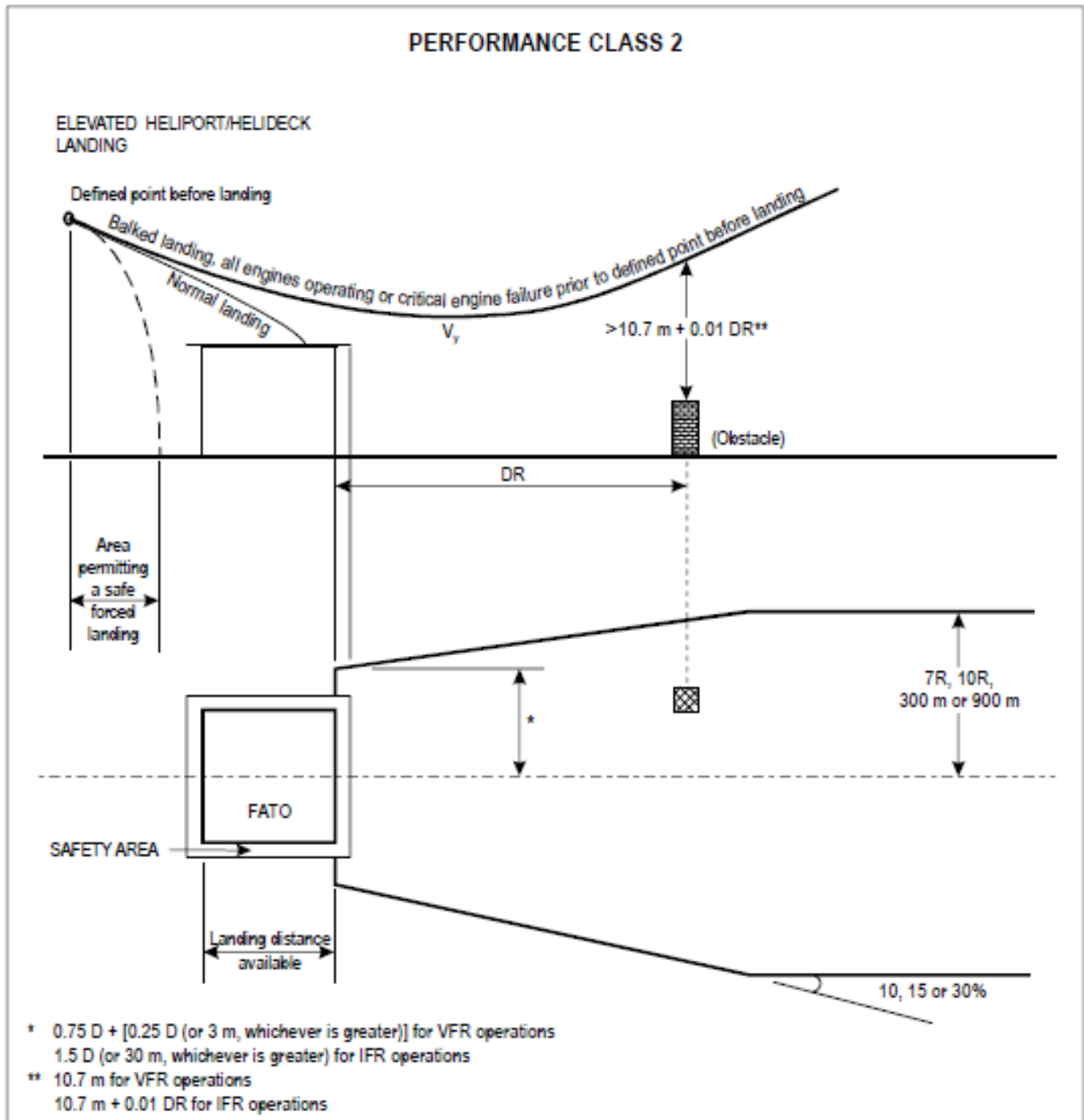


Figure 9

4.3 Operations in performance Class 3

4.3.1 Take-off

The mass of the helicopter at take-off shall not exceed the maximum take-off mass specified in the flight manual for a hover in ground effect with all engines operating at take-off power, taking into account the parameters specified in 2.2. If conditions are such that a hover in ground effect is not likely to be established, the take-off mass shall not exceed the maximum mass specified for a hover out of ground effect with all engines operating at take-off power, taking into account the parameters specified in 2.2.



4.3.2 Initial climb

The take-off mass shall be such that the climb path provides adequate vertical clearance above all obstacles located along the climb path, all engines operating.

4.3.3 En route

The take-off mass is such that it is possible to achieve the minimum flight altitudes for the route to be flown, all engines operating.

4.3.4 Approach and landing

The estimated landing mass at the destination or alternate shall be such that:

- a) it does not exceed the maximum landing mass specified in the flight manual for a hover in ground effect with all engines operating at take-off power, taking into account the parameters specified in 2.2. If conditions are such that a hover in ground effect is not likely to be established, the take-off mass should not exceed the maximum mass specified for a hover out of ground effect with all engines operating at take-off power, taking into account the parameters specified in 2.2;
- b) it is possible to perform a balked landing, all engines operating, at any point of the flight path and clear all obstacles by an adequate vertical interval.



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**SUBPART E****INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS****OPS 2H.401 General**

- (a) In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments, equipment and flight documents prescribed in the following paragraphs shall be installed or carried, as appropriate, in helicopters according to the helicopter used and to the circumstances under which the flight is to be conducted. The prescribed instruments and equipment, including their installation, shall be acceptable to the Authority as the State of Registry.
- (b) Instruments and equipment minimum performance standards are those prescribed in the applicable Technical Standard Orders (TSO) unless different performance standards are prescribed in the operational or airworthiness codes. Instruments and equipment complying with design and performance specifications other than TSO may remain in service, or be installed, unless additional requirements are prescribed in this Subpart. Instruments and equipment that have already been approved do not need to comply with a revised TSO or a revised specification, other than TSO, unless a retroactive requirement is prescribed.

OPS 2H.403 Instruments

A helicopter shall be equipped with instruments which will enable the flight crew to control the flight path of the helicopter, carry out any required procedural manoeuvres and observe the operating limitations of the helicopter in the expected operating conditions.

OPS 2H.405 Equipment

A helicopter on all flights shall be equipped with, or carry on board;

- (a) an accessible first-aid kit (Refer to AMC OPS 1.745 to CAR OPS 1 for example of contents);
- (b) portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the helicopter. At least one shall be located in:
 - (1) the pilot's compartment; and
 - (2) each passenger compartment that is separate from the pilot's compartment and not readily accessible to the pilot or co-pilot; and
- (c)
 - (1) a seat or berth for each person who is aged 24 months or more; and
 - (2) a seat belt for each seat and restraining belts for each berth;
- (d) the following manuals, charts and information:
 - (1) the flight manual or other documents or information concerning any operating limitations prescribed for the helicopter by the certificating authority of the State of Registry, required for the application of CAR OPS 2H, Subpart C;
 - (2) any specific approval issued by the Authority under OPS 2H.107 for the operation(s) to be conducted.



- (3) current and suitable charts for the route of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted;
 - (4) procedures, as prescribed in CAR OPS 0, for pilots-in-command of intercepted helicopter;
 - (5) a list of visual signals for use by intercepting and intercepted helicopter, as contained in CAR OPS 0; and
 - (6) the journey log book for the helicopter.
- (e) where the helicopter is fitted with fuses that are accessible in flight, spare electrical fuses of appropriate ratings for replacement of those fuses.

OPS 2H.407 Fire Extinguishing Agent

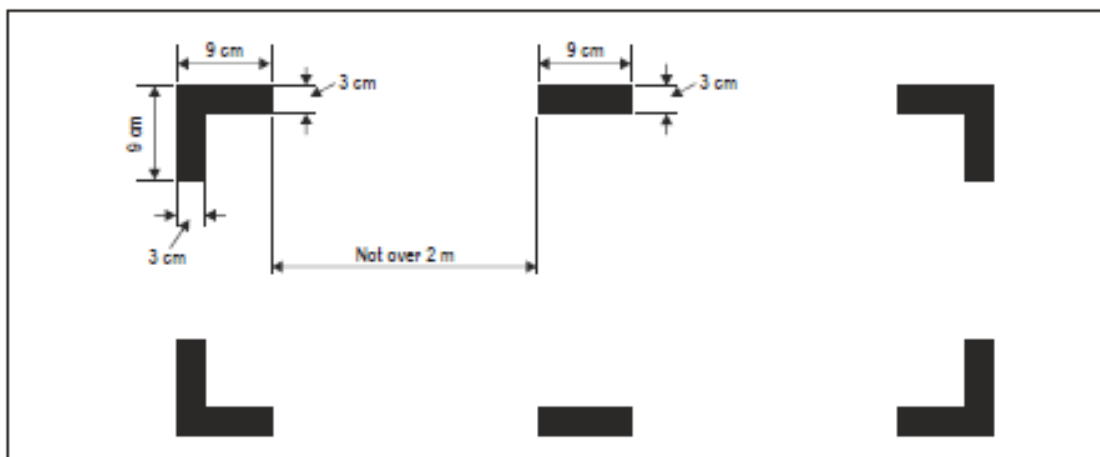
Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in a helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2011 and any extinguishing agent used in a portable fire extinguisher in a helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2018 shall:

- (a) meet the applicable requirements of the Authority as the State of Registry; and
- (b) not be of a type listed in Annex A, Group II of the *Montreal Protocol on Substances That Deplete the Ozone Layer*, 8th Edition, 2009.

OPS 2H.409 Marking of Break-in Points

- (a) If areas of the fuselage suitable for break-in by rescue crews in emergency are marked on a helicopter such areas shall be marked as shown below (see figure following). The colour of the markings shall be red or yellow, and if necessary they shall be outlined in white to contrast with the background.
- (b) If the corner markings are more than 2 m apart, intermediate lines 9 cm x 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.

Note: This regulation does not require any helicopter to have break-in areas.



**OPS 2H.411 Instruments and Equipment - Day VFR**

All helicopters operated under VFR by day shall;

- (a) be equipped with;
 - (1) a magnetic compass,
 - (2) a sensitive pressure altimeter,
 - (3) an airspeed indicator,
 - (4) such additional equipment as may be prescribed by the Authority.
- (b) Equipped with, or shall carry, a means of measuring and displaying the time in hours, minutes and seconds.

OPS 2H.413 Instruments and Equipment - Night VFR

All helicopters operated under VFR by night shall be equipped with;

- (a) the equipment specified in OPS 2H.411;
- (b) an attitude indicator (artificial horizon) for each required pilot;
- (c) a slip indicator;
- (d) a heading indicator (directional gyroscope);
- (e) a rate of climb and descent indicator; and
- (f) such additional equipment as may be prescribed by the Authority.

OPS 2H.415 Operating Lights for Night Operations

All helicopters operated at night shall be equipped with the following lights;

- (a) an anti-collision light system;
- (b) navigation/position lights;
- (c) a landing light;

Note: The landing light should be trainable, at least in the vertical plane.

- (d) illumination for all flight instruments and equipment that are essential for the safe operation of the helicopter;
- (e) lights in all passenger compartments; and
- (f) an independent portable light for each crew member station.

**OPS 2H.417 Instruments and Equipment - IFR**

All helicopters when operated in accordance with the instrument flight rules, or when the helicopter cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be;

- (a) equipped with;
 - (1) a magnetic compass;
 - (2) a sensitive pressure altimeter;
 - (3) an airspeed indicating system with a means of preventing malfunctioning due to either condensation or icing;
 - (4) a slip indicator;
 - (5) an attitude indicator (artificial horizon) for each required pilot and one additional attitude indicator;
 - (6) a heading indicator (directional gyroscope);
 - (7) equipped with a means of indicating when the supply of power to the gyroscopic instruments is adequate;
 - (8) a means of indicating on the flight deck the outside air temperature,
 - (9) a rate of climb and descent indicator;
 - (10) such additional equipment as may be prescribed by the Authority; and
 - (11) if operated by night, the lights specified in OPS 2H.415.
- (b) equipped with, or shall carry, a means of measuring and displaying the time in hours, minutes and seconds.

OPS 2H.419 Flight Over Water

- (a) Means of flotation

All helicopters intended to be flown over water shall be fitted with a permanent or rapidly deployable means of flotation so as to ensure a safe ditching of the helicopter when:

- (1) engaged in offshore operations or other over-water operations as prescribed by the Authority, as the State of Registry; or
- (2) flying at a distance from land when;
 - (i) engaged in offshore operations; or
 - (ii) flying over water in a hostile environment at a distance from land corresponding to more than 10 minutes at normal cruise speed when operating in performance Class 1 or 2; or



- (iii) flying over water in a non-hostile environment at a distance from land corresponding to more than 30 minutes at normal cruise speed when operating in performance Class 1; or
- (iv) flying over water beyond autorotational or safe forced landing distance from land when operating in performance Class 3.

(b) Emergency equipment

Helicopters operating in accordance with the provisions of paragraph (a) above shall be equipped with:

- (1) one life jacket, or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat of the person for whose use it is provided;
 - (2) when not precluded by consideration related to the type of helicopter used, life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such life-saving equipment including means of sustaining life as is appropriate to the flight to be undertaken; and
 - (3) equipment for making the pyrotechnical distress signals described in ICAO Annex 2.
- (c) When taking off or landing at a heliport where, in the opinion of the Authority, as State of the Operator, the take-off or approach path is so disposed over water that in the event of a mishap there would be likelihood of a ditching, at least the equipment required in paragraph (b) shall be carried.
- (d) Each life jacket and equivalent individual flotation device shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons.
- (e) On any helicopter for which the individual certificate of airworthiness is first issued on or after 01 January 1991, at least 50 per cent of the life rafts carried should be deployable by remote control.
- (f) Rafts which are not deployable by remote control and which have a mass of more than 40 kg should be equipped with some means of mechanically assisted deployment.

OPS 2H.421 Flights over Designated Land Areas

Helicopters, when operated across land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, shall be equipped with such signalling devices and life-saving equipment (including means of sustaining life) as may be appropriate to the area overflown.

OPS 2H.423 High Altitude Flights

- (a) Non-pressurised helicopters intended to be operated at high altitudes shall carry equipment for storing and dispensing the oxygen supplies required by OPS 2H.225(a).
- (b) Pressurised helicopters intended to be operated at high altitudes should carry emergency oxygen storage and dispensing equipment capable of storing and dispensing the oxygen supplies required by OPS 2H.225(b).

**OPS 2H.425 Noise Certification**

All helicopters required to comply with the noise certification standards of ICAO Annex 16 shall carry a document attesting noise certification in the English language.

OPS 2H.427 Cockpit Voice Recorders

(See Appendix 1 to OPS 2H.427)

(See Appendix 1 to OPS 2H.427 to 2.433 inclusive)

(See Appendix 2 to OPS 2H.427 to 2.433 inclusive)

- (a) Helicopters with an MCTOM of more than 7 000 kg shall be equipped with a CVR.
- (b) For helicopters not equipped with a FDR, at least main rotor speed shall be recorded on the CVR.
- (c) All helicopters required to be equipped with a CVR shall be equipped with a CVR which shall retain the information recorded during at least the last 2 hours of its operation.
- (a) CVRs and CARS shall not use magnetic tape or wire.

OPS 2H.429 Flight Data Recorders

(See Appendix 1 to OPS 2H.427 to 2.433 inclusive)

(See Appendix 2 to OPS 2H.427 to 2.433 inclusive)

(See Appendix 1 to OPS 2H.429)

(See Appendix 2 to OPS 2H.429)

(See Appendix 3 to OPS 2H.429)

(See Appendix 4 to OPS 2H.429)

- (a) Helicopters with a MCTOM of more than 7 000 kg, or having a passenger configuration of more than nineteen, and first issued with an individual C of A on or after 01 January 1989 shall be equipped with a FDR which shall record at least the parameters 1 – 30 listed in the Appendix 3 to OPS 2H.429 unless exempted under sub-paragraph (d) below.
- (b) Helicopters with a MCTOM of more than 3 175 kg and first issued with an individual C of A on or after 01 January 2016 and having a passenger seating configuration, excluding any pilot seats of 10 or more, shall be equipped with a FDR which shall record at least the parameters 1 – 48 listed in the Appendix 3 to OPS 2H.429 unless exempted under sub-paragraph (e) below.
- (c) FDRs, ADRS, AIRs or AIRS shall not use engraving metal foil, frequency modulation (FM), photographic film or magnetic tape.

Note: There is no requirement for helicopters to be fitted with ADRS. Only those helicopters equipped with ADRS need to refer to Appendix 4 to OPS 2H.429 regarding the parameters for ADRS.

- (d) All FDRs shall retain the information recorded during at least the last 10 hours of their operation.
- (e) FDRs that meet the current parameter certification requirements of the FAA, Transport Canada or EASA in respect to private air transport operations shall be exempt from the parameter requirements of OPS 2H.429.



Note 1: The application for type certification is submitted to a Contracting State” refers to the date of application of the original “Type Certificate” for the helicopter type, not the date of certification of particular helicopter variants or derivative models..

Note 2: The documentation requirement concerning FDR and ADRS parameters provided by operators to accident investigation authorities should be in electronic format and take account of industry specifications.

OPS 2H.431 Data Link Recording

(See Appendix 1 to OPS 2H.431)

- (a) [All helicopters for which the individual certificate of airworthiness is first issued on or after 01 January 2016, which use any of the data link communications applications referred to in Appendix 1 to OPS 2H.431 and are required to carry a CVR, shall record the data link communications messages on a crash-protected flight recorder.
- (b) All helicopters for which the individual certificate of airworthiness was first issued before 01 January 2016, that are required to carry a CVR and are modified on or after 01 January 2016 to install and utilize use any of the data link communications applications listed referred to in Appendix 1 to OPS 2H.431 shall record the data link communications messages on a crash-protected flight recorder unless the data link communications equipment is compliant with a type design or aircraft modification first approved prior to 01 January 2016.]
- (c) The recorder shall use a digital method of recording and storing data and information and a method for readily retrieving that data. The recording method shall allow the data to match the data recorded on the ground and also be correlated to the recorded cockpit audio.
- (d) The minimum recording duration shall be equal to the duration of the CVR.
- (e) The requirements applicable to the start and stop logic of the recorder are the same as the requirements applicable to the start and stop logic of the CVR contained in Appendix 1 to OPS 2H.427.

OPS 2H.433 Flight Data and Cockpit Voice Combination Recorder

Compliance with CVR requirements and FDR requirements may be achieved by:

- (a) one flight data and cockpit voice combination recorder if the helicopter has to be equipped with a CVR or an FDR; or
- (b) two flight data and cockpit voice combination recorders if the helicopter has to be equipped with a CVR and an FDR.

OPS 2H.435 Emergency Locator Transmitter (ELT)

- (a) All helicopters operating in performance Class 1 and 2 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in OPS 2H.419(a)(1), with at least one automatic ELT and one ELT(S) in a raft or life jacket.
- (b) All helicopters operating in performance Class 3 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in OPS 2H.419(a)(2), with at least one automatic ELT and one ELT(S) in a raft or life jacket.



- (c) ELT equipment carried to satisfy the requirements shall operate in accordance with the relevant provisions of ICAO Annex 10, Volume III.

Note 1: The judicious choice of numbers of ELTs, their type and placement on the helicopter and associated floatable life support systems will ensure the greatest chance of ELT activation in the event of an accident for helicopters operating over water or land, including areas especially difficult for search and rescue.

Note 2: Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.

OPS 2H.437 Pressure-Altitude Reporting Transponder

Unless exempted by the appropriate authorities responsible for the airspace, all helicopters shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of ICAO Annex 10, Volume IV.

OPS 2H.439 Microphones

All flight crew members required to be on flight deck duty should communicate through boom or throat microphones.

OPS 2H.441 Helicopters Equipped with ALS, HUD, EVS, SVS and/or CVS

- (a) Where helicopters are equipped with automatic landing systems, a HUD and/or or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system, criteria for the use of such systems to gain operational benefit for the safe operation of the helicopter shall be approved by the Authority.
- (b) In establishing operational criteria for the use of automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, the Authority shall require that:
- (1) the equipment meets the appropriate airworthiness certification requirements;
 - (2) the operator/owner has carried out a safety risk assessment associated with the operations supported by the automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS;
 - (3) the operator/owner has established and documented the procedures for the use of, and training requirements for, automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS.

OPS 2H.443 Electronic Flight Bags (EFB)

- (a) EFB equipment

Where portable EFBs are used on board a helicopter, the pilot-in-command and the owner shall ensure that they do not affect the performance of the helicopter systems, equipment or the ability to operate the helicopter.



(b) EFB functions

- (1) Where EFBs are used on board a helicopter the pilot-in-command and/or the owner shall:
 - (i) assess the safety risk(s) associated with each EFB function;
 - (ii) establish the procedures for the use of, and training requirements for, the device and each EFB function; and
 - (iii) ensure that, in the event of an EFB failure, sufficient information is readily available to the flight crew for the flight to be conducted safely.
- (2) [The Authority, as State of the Registry shall issue a specific approval for the operational use of EFB functions to be used for the safe operation of helicopters.

(c) EFB specific approval

When issuing a specific approval for the operational use of EFBs, the State of Registry shall ensure that:]

- (1) the EFB equipment and its associated installation hardware, including interaction with helicopter systems if applicable, meet the appropriate airworthiness certification requirements;
- (2) the owner has assessed the risks associated with the operations supported by the EFB function(s);
- (3) the owner has established requirements for redundancy of the information (if appropriate) contained and displayed by the EFB function(s);
- (4) the owner has established and documented procedures for the management of the EFB function(s) including any databases it may use; and
- (5) the owner has established and documented the procedures for the use of, and training requirements for, the EFB function(s).

OPS 2H.445 Documents to be Carried

Every helicopter engaged in international navigation shall carry the following documents;

- (a) Its certificate of registration;
- (b) Its certificate of airworthiness;
- (c) The appropriate licences for each member of the crew;
- (d) Its journey log book;
- (e) If it is equipped with radio apparatus, the helicopter radio station licence;
- (f) If it carries passengers, a list of their names and places of embarkation and destination; and
- (g) If it carries cargo, a manifest and detailed declarations of the cargo.



Note 1: The procedures for the carriage of an electronic version of the documents listed in (a), (b) and (e) above must be acceptable to the Authority.

Note 2: The Certificate of Registration and Certificate of Airworthiness will now be presented in digital format. The certificates, when issued by the Authority, are rendered valid as the original documents in their digital form. They satisfy the on-board carriage requirements for aircraft engaged in international air navigation in accordance with Articles 29 and 31 of the Convention on International Civil Aviation as well as the requirements of Annex 7 and 8 to the same Convention.

**Appendix 1 to OPS 2H.427****Cockpit Voice Recorder (CVR) and Cockpit Audio Recording System (CARS)**

(See OPS 2H.427)

(a) Start and stop logic

The CVR or CARS shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the CVR or CARS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

(b) Signals to be recorded

(1) The CVR shall record simultaneously on four separate channels, or more, at least the following:

- (i) voice communication transmitted from or received in the helicopter by radio;
- (ii) aural environment on the flight deck;
- (iii) voice communication of flight crew members on the flight deck using the helicopter's interphone system, if installed;
- (iv) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker;
- (v) voice communications of flight crew members using the passenger address system, if installed

(c) The preferred CVR audio allocation should be as follows:

- (1) pilot-in-command audio panel;
- (2) co-pilot audio panel;
- (3) additional flight crew positions and time reference; and
- (4) cockpit area microphone.

(d) The CARS shall record simultaneously on two separate channels, or more, at least the following:

- (1) voice communication transmitted from or received in the helicopter by radio;
- (2) aural environment on the flight deck; and
- (3) voice communication of flight crew members on the flight deck using the helicopter's interphone system, if installed.

(e) The preferred CARS audio allocation should be as follows:

- (1) voice communication; and



- (2) aural environment on the flight deck.



Appendix 1 to OPS 2H.427 to OPS 2H.433 Inclusive
Flight Recorders – General
(See OPS 2H.427 to OPS 2H.433)

Note 1: [The following applies to all crash protected flight recorders which comprise one or more of the following]:

- (1) a flight data recorder (FDR),*
- (2) a cockpit voice recorder (CVR)*
- (3) an airborne image recorder (AIR),*
- (4) a data link recorder (DLR).*

When image or data link information is required to be recorded on a crash-protected flight recorder, it is permissible to record it on either the CVR or the FDR.]

Note 2: The following applies to all lightweight flight recorders which comprise one or more of the following:]

- (1) an aircraft data recording system (ADRS),*
- (2) a cockpit audio recording system (CARS),*
- (3) an airborne image recording system (AIRS)*
- (4) a data link recording system (DLRS).*

When image or data link information is required to be recorded on a lightweight flight recorder, it is permissible to record it on either the CARS or the ADRS.]

- (a) Non-deployable flight recorder containers shall be painted a distinctive orange colour;
- (b) Non-deployable crash protected flight recorder containers shall;
 - (1) carry reflective material to facilitate their location; and
 - (2) have a device to assist in locating that recorder in water and, not later than 01 January, 2019, have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 kHz that operates for a minimum of 90 days.
- (c) Automatic deployable flight recorder containers shall:
 - (1) be painted a distinctive orange colour, however the surface visible from outside the helicopter may be of another colour;
 - (2) carry reflective material to facilitate their location; and
 - (3) have an integrated automatically activated ELT.
- (d) The flight recorder systems shall be installed so that:



- (1) the probability of damage to the recordings is minimised;
- (2) there is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly; and
- (3) if the flight recorder systems have an erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact; and
- (4) for helicopters for which the individual certificate of airworthiness is first issued on or after 01 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of an inadvertent activation of an erase function during an accident shall also be minimised.

Note: The erase function is intended to prevent access to CVR and AIR recordings by normal replay or copying means, but would not prevent accident investigation authorities access to such recordings by specialised replay or copying techniques.

- (e) [The flight recorder systems shall be installed so that they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorders without jeopardising service to essential or emergency loads.
- (f) The lightweight flight recorders shall be connected to a power source having the characteristics which ensure proper and reliable recording in the operational environment.]
- (g) Means shall be provided for an accurate time correlation between the flight recorder systems functions.
- (h) The manufacturer shall provide the appropriate certificating authority with the following information in respect of the flight recorder systems:
 - (1) manufacturer's operating instructions, equipment limitations and installation procedures;
 - (2) parameter origin or source and equations which relate counts to units of measurement; and
 - (3) manufacturer's test reports.
- (i) Flight recorders shall not be switched off during flight time.
- (j) To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident. The flight recorders shall not be reactivated before their disposition as determined by the investigating authority.
- (k) The pilot-in-command, and/or the owner/operator, or in the case where it is leased, the lessee, shall ensure, to the extent possible, in the event the helicopter becomes involved in an accident or incident, the preservation of all related flight recorder records, and if necessary the associated flight recorders, and their retention in safe custody pending their disposition as determined by the investigating authority.
- (l) Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.



Appendix 2 to OPS 2H.427 to OPS 2H.433 Inclusive
Inspection of Flight Recorder Systems
(See OPS 2H.427 to OPS 2H.433)

- (a) Prior to the first flight of the day, the built-in test features for the flight recorders and flight data acquisition unit (FDAU), when installed, shall be monitored by manual and/or automatic checks.
- (b) FDR systems or ADRS, CVR systems or CARS, and AIR systems or AIRS shall have recording inspection intervals of one year. This period may be extended by the Authority to two years provided these systems have demonstrated a high integrity of serviceability and self-monitoring.
- (c) DLR systems or DLRS shall have recording inspection intervals of two years. This period may be extended by the Authority to four years provided these systems have demonstrated a high integrity of serviceability and self-monitoring.
- (d) Recording inspections shall be carried out as follows:
 - (1) an analysis of the recorded data from the flight recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;
[]
 - (2) the FDR or ADRS recording from a complete flight shall be examined in engineering units to evaluate the validity of all recorded parameters. Particular attention shall be given to parameters from sensors dedicated to the FDR or ADRS. Parameters taken from the helicopter's electrical bus system need not be checked if their serviceability can be detected by other helicopter systems;
 - (3) the readout facility shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals;
 - (4) an annual examination of the recorded signal on the CVR or CARS shall be carried out by replay of the CVR or CARS recording. While installed in the helicopter, the CVR or CARS shall record test signals from each helicopter source and from relevant external sources to ensure that all required signals meet intelligibility standards;
 - (5) where practicable, during the examination, a sample of in-flight recordings of the CVR or CARS shall be examined for evidence that the intelligibility of the signal is acceptable; and
 - (6) an examination of the recorded images on the AIR or AIRS shall be carried out by replay of the AIR or AIRS recording. While installed in the helicopter, the AIR or AIRS shall record test images from each helicopter source and from relevant external sources to ensure that all required images meet recording quality standards.
 - (7) [an examination of the recorded messages on the DLR or DLRS shall be carried out by replay of the DLR or DLRS recording.]
- (e) A flight recorder system shall be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.
- (f) A report of the recording inspection shall be made available on request to regulatory authorities for monitoring purposes.



- (g) Calibration of the FDR system:
- (1) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at least every five years or in accordance with the recommendations of the sensor manufacturer to determine any discrepancies in the engineering conversion routines for the mandatory parameters and to ensure that parameters are being recorded within the calibration tolerances; and
 - (2) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed as recommended by the sensor manufacturer, or at least every two years.

**Appendix 1 to OPS 2H.429****Flight Data Recorder (FDR) and Aircraft Data Recording Systems (ADRS)**

(See OPS 2H.429)

(a) Start and Stop Logic

The FDR or ADRS shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power.

(b) Parameters to be Recorded

(1) The parameters that satisfy the requirements for FDRs are listed in the paragraphs below in Appendix 3 to OPS 2H.429. The number of parameters to be recorded shall depend on helicopter complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of helicopter complexity. In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameter is used by helicopter systems or the flight crew to operate the helicopter. However, other parameters may be substituted with due regard to the helicopter type and the characteristics of the recording equipment.

(2) The following parameters shall satisfy the requirements for flight path and speed;

- Pressure altitude
- Indicated airspeed or calibrated airspeed
- Heading (primary flight crew reference)
- Pitch attitude
- Roll attitude
- Engine thrust/power
- Landing-gear status*
- Total or outside air temperature*
- Time*
- Navigation data*: drift angle, wind speed, wind direction, latitude/longitude
- Radio altitude*

(3) If further FDR recording capacity is available, recording of the following additional information shall be considered:

- (i) operational information from electronic displays, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS).
- (ii) additional engine parameters (EPR, N_1 , fuel flow etc.)

(4) [The parameters that satisfy the requirements for ADRS are the first 7 parameters listed in Appendix 4 to OPS 2H.429.

(5) If further ADRS recording capacity is available, the recording of any parameters from 8 onwards listed in Appendix 4 to OPS 2H.429 shall be considered.]

Note: There is no requirement for helicopters to be equipped with ADRS. Only those helicopters equipped with ADRS need to refer to Appendix 4 to OPS 2H.429 regarding the parameters for ADRS.



(c) Additional Information

- (1) The measurement range, recording interval and accuracy of parameters on installed equipment shall be verified by methods approved by the appropriate certificating authority.
- (2) Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the operator. The documentation needs to be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

**Appendix 2 to OPS 2H.429****Airborne Image Recorder (AIR) and Airborne Image Recording System (AIRS)**

(See OPS 2H.429)

(a) Start and Stop Logic

The AIR or AIRS shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR or AIRS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

(b) Classes

- (1) A Class A AIR or AIRS captures the general cockpit area in order to provide data supplemental to conventional flight recorders.

Note 1: To respect crew privacy, the cockpit area view may be designed as far as practical to exclude the head and shoulders of crew members whilst seated in their normal operating position.

Note 2: There are no provisions for Class A AIR or AIRS in this document.

- (2) A Class B AIR or AIRS captures data link message displays.
- (3) A Class C AIR or AIRS captures instruments and control panels.

Note: A Class C AIR or AIRS may be considered as a means for recording flight data where it is not practical or is prohibitively expensive to record on an FDR or an ADRS, or where an FDR is not required.



Appendix 3 to OPS 2H.429
Parameter Characteristics for Flight Data Recorders
(See OPS 2H.429)

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
1	Time (UTC when available, otherwise relative time count or GNSS time sync)		24 hours	4	$\pm 0.125\%$ /h	1 s
2	Pressure altitude		-300 m (-1 000 ft) to maximum certified altitude of aircraft +1 500 m (+5 000 ft)	1	± 30 m to ± 200 m (± 100 ft to ± 700 ft)	1.5 m (5 ft)
3	Indicated airspeed		As the installed pilot display measuring system	1	$\pm 3\%$	1 kt
4	Heading		360°	1	$\pm 2^\circ$	0.5°
5	Normal acceleration		-3 g to +6 g	0.125	± 0.09 g excluding a datum error of ± 0.045 g	0.004 g
6	Pitch attitude		$\pm 75^\circ$ or 100% of useable range whichever is greater	0.5	$\pm 2^\circ$	0.5°
7	Roll attitude		$\pm 180^\circ$	0.5	$\pm 2^\circ$	0.5°
8	Radio transmission keying		On-off (one discrete)	1	—	—
9	Power on each engine		Full range	1 (per engine)	$\pm 2\%$	0.1% of full range
10	Main rotor:					
	Main rotor speed		50–130%	0.51	$\pm 2\%$	0.3% of full range
	Rotor brake		Discrete		—	—
11	Pilot input and/or control surface position — primary controls (collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal)		Full range	0.5 (0.25 recommended)	$\pm 2\%$ unless higher accuracy uniquely required	0.5% of operating range
12	Hydraulics, each system (low pressure and selection)		Discrete	1	—	—
13	Outside air temperature		Sensor range	2	$\pm 2^\circ\text{C}$	0.3°C



Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
14*	Autopilot/ autoflight/AFCs mode and engagement status		A suitable combination of discretes	1	—	—
15*	Stability augmentation system engagement		Discrete	1	—	—
16*	Main gearbox oil pressure		As installed	1	As installed	6.895 kN/m ² (1 psi)
17*	Main gearbox oil temperature		As installed	2	As installed	1°C
18	Yaw rate		±400°/second	0.25	±1.5% maximum range excluding datum error of ±5%	±2°/s
19*	Sling load force		0 to 200% of certified load	0.5	±3% of maximum range	0.5% for maximum certified load
20	Longitudinal acceleration		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
21	Lateral acceleration		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
22*	Radio altitude		−6 m to 750 m (−20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft), 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
23*	Vertical beam deviation		Signal range	1	±3%	0.3% of full range
24*	Horizontal beam deviation		Signal range	1	±3%	0.3% of full range
25	Marker beacon passage		Discrete	1	—	—
26	Warnings		Discrete(s)	1	—	—
27	Each navigation receiver frequency selection		Sufficient to determine selected frequency	4	As installed	—
28*	DME 1 and 2 distances		0–370 km (0–200 NM)	4	As installed	1 852 m (1 NM)



Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
29*	Navigation data (latitude/longitude, ground speed, drift angle, wind speed, wind direction)		As installed	2	As installed	As installed
30*	Landing gear and gear selector position		Discrete	4	—	—
31*	Engine exhaust gas temperature (T ₄)		As installed	1	As installed	
32*	Turbine inlet temperature (TIT/ITT)		As installed	1	As installed	
33*	Fuel contents		As installed	4	As installed	
34*	Altitude rate		As installed	1	As installed	
35*	Ice detection		As installed	4	As installed	
36*	Helicopter health and usage monitor system		As installed	—	As installed	—
37	Engine control modes		Discrete	1	—	—
38*	Selected barometric setting (pilot and co-pilot)		As installed	64 (4 recommended)	As installed	0.1 mb (0.01 in Hg)
39*	Selected altitude (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection



Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
44*	Selected flight path (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
45*	Selected decision height		As installed	4	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot and co-pilot)		Discrete(s)	4	—	—
47*	Multi-function/ engine/alerts display format		Discrete(s)	4	—	—
48*	Event marker		Discrete	1	—	—
49*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position) and (operational status)	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Discrete(s)	1	As installed	
50*	TCAS/ACAS (traffic alert and collision avoidance system) and (operational status)	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Discrete(s)	1	As installed	
51*	Primary flight controls – pilot input forces	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Full range	0.125 (0.0625 recommended)	± 3% unless higher accuracy is uniquely required	0.5% of operating range
52*	Computed centre of gravity	Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range
53*	Helicopter computed weight	Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range



Appendix 4 to OPS 2H.429

Parameter Characteristics for Aircraft Data Recording Systems (ADRS)

(See OPS 2H.429)

N°	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading:					
	a) Heading (Magnetic or True)	±180°	1	±2°	0.5°	*Heading is preferred, if not available, yaw rate shall be recorded
	b) Yaw rate	±300°/s	0.25	±1% + drift of 360°/h	2°/s	
2	Pitch:					
	a) Pitch attitude	±90°	0.25	±2°	0.5°	*Pitch attitude is preferred, if not available, pitch rate shall be recorded
	b) Pitch rate	±300°/s	0.25	±1% + drift of 360°/h	2°/s	
3	Roll:					
	a) Roll attitude	±180°	0.25	±2°	0.5°	*-Roll attitude is preferred, if not available, roll rate shall be recorded
	b) Roll rate	±300°/s	0.25	±1% + drift of 360°/h	2°/s	
4	Positioning system:					
	a) Time	24 hours	1	±0.5°	0.1°	UTC time preferred where available
	b) Latitude/longitude	Latitude:±90° Longitude:±180°	2 (1 if available)	As installed (0.00015° recommended)	0.00005°	
	c) Altitude	-300 m (-1 000 ft) to maximum certificated altitude of aircraft +1 500 m (5 000 ft)	2 (1 if available)	As installed (±15 m (±50 ft) recommended)	1.5 m (5 ft)	
	d) Ground speed	0-1 000 kt	2 (1 if available)	As installed (±5 kt recommended)	1 kt	
	e) Track	0-360°	2 (1 if available)	As installed (± 2° recommended)	0.5°	
	f) Estimated error	Available range	2 (1 if available)	As installed	As installed	Shall be recorded if readily available



N°	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
5	Normal acceleration	−3 g to + 6 g	0.25 (0.125 if available)	As installed (±0.09 g excluding a datum error of ±0.05 g recommended)	0.004 g	
6	Longitudinal acceleration	±1 g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
7	Lateral acceleration	±1 g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8	External static pressure (or pressure altitude)	34.4 hPa (1.02 in-Hg) to 310.2 hPa (9.16 in-Hg) or available sensor range	1	As installed (±1 hPa (0.3 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) recommended)	0.1 hPa (0.03 in-Hg) or 1.5 m (5 ft)	
9	Outside air temperature (or total air temperature)	−50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
10	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recommended)	1 kt (0.5 kt recommended)	
11	Main rotor speed (Nr)	50% to 130% or available sensor range	0.5	As installed	0.3% of full range	
12	Engine RPM (*)	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	*For piston- engined helicopters
13	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
15	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
16	Manifold pressure (*)	Full range	Each engine each second	As installed	0.2% of full range	*For piston- engined helicopters



N°	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
17	Engine thrust/power/torque parameters required to determine propulsive thrust/power*	Full range	Each engine each second	As installed	0.1% of full range	*Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power. A margin for possible overspeed should be provided. Only for turbine-engined helicopters.
18	Engine gas generator speed (Ng) (*)	0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
19	Free power turbine speed (Nf) (*)	0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
20	Collective pitch	Full range	0.5	As installed	0.1% of full range	
21	Coolant temperature (*)	Full range	1	As installed (±5°C recommended)	1° C	*Only for piston-engined helicopters
22	Main voltage	Full range	Each engine each second	As installed	1 Volt	
23	Cylinder head temperature (*)	Full range	Each cylinder each second	As installed	2% of full range	*Only for piston-engined helicopters
24	Fuel quantity	Full range	4	As installed	1% of full range	
25	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		*Where available, record up-and-locked and down-and-locked position
29	Novel/unique aircraft features	As required	As required	As required	As required	



Appendix 1 to OPS 2H.431

Data Link Recorder (DLR) Applications to be Recorded

(See OPS 2H.431)

- (a) Where the helicopter flight path is authorised or controlled through the use of data link messages, all data link messages, both uplinks (to the helicopter and downlinks (from the helicopter), shall be recorded on the helicopter. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall be recorded.

Note: Sufficient information to derive the content of the data link communications message and the time the messages were displayed to the flight crew is needed to determine an accurate sequence of events on board the helicopter.

- (b) Messages applying to the applications listed below shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity. Applications with an (*) shall be recorded only as far as is practicable given the architecture of the system.

Item No.	Application type	Application description	Recording content
1	Data link initiation	This includes any applications used to log on to or initiate data link service. In FANS-1/A and ATN, these are ATS facilities notification (AFN) and context management (CM) respectively.	C
2	Controller/pilot communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	C
3	Addressed surveillance	This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data. In FANS-1/A and ATN, this includes the automatic dependent surveillance — contract (ADS-C) application. Where parametric data are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	C
4	Flight information	This includes any service used for delivery of flight information to specific aircraft. This includes, for example, data link aviation weather report service (D-METAR), data link-automatic terminal service (D-ATIS), digital Notice to Airmen (D-NOTAM) and other textual data link services.	C
5	Aircraft broadcast surveillance	This includes elementary and enhanced surveillance systems, as well as automatic dependent surveillance — broadcast (ADS-B) output data. Where parametric data sent by the aeroplane are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	M*
6	Aeronautical operational control data	This includes any application transmitting or receiving data used for aeronautical operational control purposes (per the ICAO definition of operational control).	M*

Key:

C: Complete contents recorded.

M: Information that enables correlation to any associated records stored separately from the aeroplane.

*: Applications to be recorded only as far as is practicable given the architecture of the system.



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**SUBPART F****COMMUNICATION, NAVIGATION AND SURVEILLANCE EQUIPMENT****OPS 2H.501 Communication Equipment**

- (a) A helicopter to be operated in accordance with the instrument flight rules or at night shall be equipped with radio communication equipment capable of conducting two-way communication with those aeronautical stations and on those frequencies to meet airspace requirements.
- (b) When compliance with paragraph (a) requires that more than one communication equipment unit be provided, each shall be independent of the other or others to the extent that a failure in any one will not result in failure of any other.
- (c) A helicopter to be operated in accordance with VFR, but as a controlled flight, shall, unless exempted by the appropriate authority, be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.
- (d) A helicopter to be operated on extended over water flights or flights over designated areas shall, unless exempted by the appropriate authority responsible for that airspace, be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.
- (e) Radio communication equipment, if required by paragraphs (a) to (d) above, shall provide for communication on the aeronautical emergency frequency 121.5 MHz.
- (f) For operations where communication equipment is required to meet an RCP specification for performance-based communication (PBC), a helicopter shall, in addition to the requirements specified above;
 - (1) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specification(s);
 - (2) have information relevant to the helicopter RCP specification capabilities listed in the flight manual or other helicopter documentation, approved by the State of Design or State of Registry; and
 - (3) where the helicopter is operated in accordance with a MEL, have information relevant to the helicopter RCP specification capabilities included in the MEL.
- (g) The Authority, as the State of Registry, shall establish criteria for operations where an RCP specification for PBC has been prescribed.
- (h) When establishing criteria for operations where an RCP specification for PBC has been prescribed, ensure that the operator/owner has established and documented:
 - (1) normal and abnormal procedures, including contingency procedures;
 - (2) flight crew qualification and proficiency requirements, in accordance with appropriate RCP specifications;



- (3) a training programme for relevant personnel consistent with the intended operations; and
 - (4) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RCP specifications.
- (i) The Authority shall ensure that, in respect of those helicopters mentioned in sub-paragraph (f) above, adequate provisions exist for:
- (1) receiving the reports of observed communication performance issued by monitoring programmes; and
 - (2) taking immediate corrective action for individual helicopters, helicopter types or operators, identified in such reports as not complying with the RCP specification.

OPS 2H.503 Navigation Equipment

A helicopter shall be equipped with navigation equipment that will enable it to proceed in accordance with:

- (a) the ATS flight plan, if applicable; and
- (b) the requirements of air traffic services.

except when, if not so precluded by the appropriate authority, navigation for flights under VFR is accomplished by visual reference to landmarks.

OPS 2H.505 Performance Based Navigation

- (a) For operations where a navigation specification for performance-based navigation (PBN) has been prescribed, a helicopter shall, in addition to the requirements specified in OPS 2H.503:
- (1) be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s);
 - (2) have information relevant to the helicopter navigation specification capabilities listed in the flight manual or other helicopter documentation, approved by the State of Design or State of Registry; and
 - (3) where the helicopter is operated in accordance with a MEL, have information relevant to the helicopter navigation specification capabilities included in the MEL.
- (b) The Authority, as the State of Registry, shall establish criteria for operations where a navigation specification for PBN has been prescribed.
- (c) When establishing criteria for operations where a navigation specification for PBN has been prescribed, ensure that the operator/owner has established and documented:
- (1) normal and abnormal procedures, including contingency procedures;
 - (2) flight crew qualification and proficiency requirements, in accordance with appropriate navigation specifications;
 - (3) a training programme for relevant personnel consistent with the intended operations; and



- (4) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate navigation specifications.
- (d) The Authority, as the State of Registry, shall issue a specific approval for operations based on PBN authorisation required (AR) navigation specifications.
- (e) The helicopter shall be sufficiently provided with navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment will enable the helicopter to navigate in accordance with OPS 2H.503 and this regulation.

Note: For international general aviation, this requirement may be met by means other than the duplication of equipment.

- (f) On flights in which it is intended to land in instrument meteorological conditions, a helicopter shall be provided with appropriate navigation equipment providing guidance to a point from which a visual landing can be effected. This equipment shall be capable of providing such guidance at each heliport at which it is intended to land in instrument meteorological conditions and at any designated alternate heliports.

OPS 2H.507 Surveillance Equipment

- (a) A helicopter shall be provided with surveillance equipment which will enable it to operate in accordance with the requirements of air traffic services.
- (b) For operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance (PBS), a helicopter shall, in addition to the requirements specified in sub-paragraph (a);
 - (1) be provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specification(s);
 - (2) have information relevant to the helicopter RSP specification capabilities listed in the flight manual or other helicopter documentation approved by the State of Design or Authority; and
 - (3) where the helicopter is operated in accordance with a MEL, have information relevant to the helicopter RSP specification capabilities included in the MEL.
- (c) The Authority, as the State of the Registry, shall establish criteria for operations where an RSP specification for PBS has been prescribed.
- (d) In establishing criteria for operations where an RSP specification for PBS has been prescribed, the Authority shall require that the operator/owner has established and documented;
 - (1) normal and abnormal procedures, including contingency procedures;
 - (2) flight crew qualification and proficiency requirements, in accordance with appropriate RSP specifications;
 - (3) a training programme for relevant personnel consistent with the intended operations; and
 - (4) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RSP specifications.



- (e) The Authority, as the State of Registry, shall ensure that, in respect of those helicopters mentioned in sub-paragraph (b), adequate provisions exist for;
 - (1) receiving the reports of observed surveillance performance issued by monitoring programmes; and
 - (2) taking immediate corrective action for individual helicopter, helicopter types or operators, identified in such reports as not complying with the RSP specification.

OPS 2H.509 Electronic Navigation Data Management

- (a) An operator of helicopter shall not employ electronic navigation data products that have been processed for application in the air and on the ground unless the State of Registry has approved the operator's procedures for ensuring that the process applied and the products delivered have met acceptable standards of integrity and that the products are compatible with the intended function of the equipment that will use them. The State of Registry shall ensure that the operator continues to monitor both process and products.
- (b) An operator shall implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all helicopters that require it.

**SUBPART G****MAINTENANCE**

Note: For the purpose of this chapter “helicopter” includes: engines, power transmissions, rotors, components, accessories, instruments, equipment and apparatus including emergency equipment.

OPS 2H.601 Owner’s Maintenance Responsibilities

- (a) The owner of a helicopter, or in the case where it is leased, the lessee, shall ensure, in accordance with the applicable regulations contained in CAR AIR, CAR GEN or CAR 21, that;
 - (1) the helicopter is maintained in an airworthy condition;
 - (2) the operational and emergency equipment necessary for an intended flight is serviceable; and
 - (3) the certificate of airworthiness of the helicopter remains valid.
- (b) The owner or the lessee shall not operate the helicopter unless it is maintained and released to service under a system acceptable to the State of Registry.
- (c) The owner or the lessee shall not operate a helicopter unless maintenance on the helicopter, including any associated engine, rotor and part is carried out, and released to service by an organisation appropriately approved/accepted in accordance with CAR 145 except that pre-flight inspections need not necessarily be carried out by the CAR 145 organisation.
- (d) When the maintenance release is not issued by an approved maintenance organisation, the person signing the maintenance release shall be licensed in accordance with ICAO Annex 1.
- (e) The owner or the lessee shall ensure that the maintenance of the helicopter is performed in accordance with a maintenance programme acceptable to the Authority as the State of Registry.
- (f) The owner or the lessee shall appoint an Airworthiness Coordinator who shall be responsible for the control of the maintenance system and the maintenance control manual, if applicable.

OPS 2H.603 Continuing Airworthiness Records

- (a) The owner of a helicopter, or in the case where it is leased, the lessee, shall ensure that the following records are kept for the periods mentioned in (b) below:
 - (1) the total time in service (hours, calendar time and cycles, as appropriate) of the helicopter and all life limited components;
 - (2) the current status of compliance with all applicable mandatory continuing airworthiness information;
 - (3) appropriate details of modifications and repairs to the helicopter;
 - (4) the time in service (hours, calendar time and cycles, as appropriate) since the last overhaul of the helicopter or its components subject to a mandatory overhaul life;
 - (5) the current status of the helicopter’s compliance with the maintenance programme; and



- (6) the detailed continuing airworthiness records to show that all requirements for the signing of a maintenance release have been met.
- (b) The records in (a)(1) to (5) above shall be kept for a minimum period of 90 days after the unit to which they refer has been permanently withdrawn from service and the records in (a)(6) for a minimum period of one year after the signing of the maintenance release.
- (c) In the event of a temporary change of owner or lessee, the records shall be made available to the new owner or lessee. In the event of any permanent change of owner or lessee, the records shall be transferred to the new owner or lessee.
- (d) The operator shall ensure that a system has been established to keep, in a form and format that ensures readability, security and integrity of the records at all times and is acceptable to the Authority.

Note: The form and format of the records may include, for example, paper records, film records, electronic records or any combination thereof.

OPS 2H.605 Modifications and repairs

All modifications and repairs shall comply with airworthiness requirements acceptable to the Authority, as the State of Registry. Procedures shall be established to ensure that the substantiating data supporting compliance with the airworthiness requirements are retained.

OPS 2H.607 Maintenance Release

- (a) A maintenance release shall be completed and signed, as prescribed by the Authority, as the State of Registry, to certify that the maintenance work performed has been completed satisfactorily and in accordance with data and procedures as stated in CAR GEN.
- (b) When maintenance is carried out by an approved maintenance organisation, the maintenance release shall be issued by the approved maintenance organisation in accordance with the provisions of CAR 145.
- (c) When maintenance is not carried out by an approved maintenance organisation, the maintenance release shall be completed and signed by a person appropriately licensed in accordance with ICAO Annex 1 to certify that the maintenance work performed has been completed satisfactorily and in accordance with approved data and the procedures as stated in CAR GEN.

OPS 2H.609 Operator's Maintenance Control Manual

- (a) The operator of a helicopter certificated for a maximum take-off mass exceeding 3 175 kg shall provide a maintenance control manual for the use and guidance of maintenance and operations personnel.
- (b) The operator's maintenance control manual shall be developed according to industry codes of practice or to the Authority's guidance material, and shall at a minimum contain information about;
 - (1) the means for complying with the helicopter maintenance procedures;
 - (2) the means of recording the names and duties of the person or persons required;



- (3) the maintenance programme;
- (4) the methods used for the completion and retention of the operator's required continuing airworthiness records;
- (5) the procedures for complying with the service information reporting requirements;
- (6) the procedures for implementing action resulting from mandatory continuing airworthiness information;
- (7) a system of analysis and continued monitoring of the performance and efficiency of the maintenance programme, in order to correct any deficiency in that programme;
- (8) the helicopter types and models to which the manual applies;
- (9) the procedures for ensuring that unserviceabilities affecting airworthiness are recorded and rectified; and
- (10) procedures for advising the Authority, as the State of Registry of significant in-service occurrences.

Note: The design of the manual should observe Human Factors principles.

OPS 2H.611 Maintenance Programme

- (a) The operator shall provide, for the use and guidance of maintenance and operational personnel concerned, a maintenance programme, acceptable to the State of Registry, containing the information;
 - (1) maintenance tasks and the intervals at which these are to be performed, taking into account the anticipated utilisation of the helicopter;
 - (2) when applicable, a continuing structural integrity programme;
 - (3) procedures for changing or deviating from (a) and (b) above as approved by the State of Registry; and
 - (4) when applicable and approved by the State of Registry, condition monitoring and reliability programme descriptions for helicopter systems, components and engines.
- (b) Maintenance tasks and intervals that have been specified as mandatory in approval of the type design, or approved changes to the maintenance programme, shall be identified as such.

Note: The maintenance programme should be based on maintenance programme information made available by the State of Design or by the organisation responsible for the type design, and any additional applicable experience.

- (c) The design and application of the operator's maintenance programme shall observe Human Factors principles according to the State of Registry's guidance material.
- (d) Copies of all amendments to the maintenance programme shall be furnished promptly to all organisations or persons to whom the maintenance programme has been issued.

**OPS 2H.613 Continuing Airworthiness Information**

The owner of a helicopter over 3 175 kg maximum certificated take-off mass, or in the case where it is leased, the lessee, shall, as required by the Authority, ensure that the information resulting from maintenance and operational experience with respect to continuing airworthiness is transmitted to the organisation responsible for type design of that helicopter.

OPS 2H.615 Technical log

The operator of a helicopter certificated for a maximum take-off mass exceeding 3 175 kg shall provide a Technical Log for the helicopter in accordance with the requirements of CAR AIR.

**SUBPART H****FLIGHT CREW****OPS 2H.701 Qualifications**

- (a) The pilot-in-command shall:
 - (1) ensure that each flight crew member holds a valid licence issued by the Authority, as the State of Registry, or if issued by another Contracting State, rendered valid by the Authority as the State of Registry;
 - (2) ensure that flight crew members are properly rated; and
 - (3) be satisfied that flight crew members have maintained competency.
- (b) The pilot-in-command of a helicopter equipped with an airborne collision avoidance system (ACAS II) shall ensure that each flight crew member has been appropriately trained to competency in the use of ACAS II equipment and the avoidance of collision.

OPS 2H.703 Composition of the Flight Crew

The number and composition of the flight crew shall not be less than that specified in the flight manual or other documents associated with the certificate of airworthiness.



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