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Civil Aviation Department

The Government of the

Hong Kong Special Administrative Region

CAD 360 – Helicopter Supplement

Guidance Document for Helicopter AOC Holders

First Edition - January 2009

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Guidance Document for Helicopter AOC Holders

Foreword

Status

The Guidance Document for Helicopter AOC Holders is not law; failure to comply is not an offence. The material it contains describes "best practice" means of compliance with the Air Navigation (Hong Kong) Order 1995 (AN(HK)O) following the provisions detailed in Annex 6 to the Convention on International Civil Aviation. Operators will therefore have to provide cogent reasons, justified in safety terms, for wishing to adopt an alternative means of compliance.

Aim

The aim of this document is not to duplicate information found in the CAD 360. It is designed to provide information to helicopter AOC holders and amplification of items that the operator may wish to include in the operations manual in addition to the CAD 360 Air Operator's Certificate Requirements. Some material may be used verbatim; other information may need to be adapted to apply to the specific operation. Finally, it offers useful information that may be of interest and relevance to the operator.

Definitions

Where a term is used which is defined in a relevant International Civil Aviation Organization (ICAO) Annex or Procedures for Air Navigation Services (PANS) document, that definition will apply unless there is a different definition in the AN(HK)O. Differences to ICAO definitions and Standard and Recommended Practices are identified in the Aeronautical Information Publication (AIP).

Chapter 1 - Definitions

When the following terms are used in the Hong Kong Civil Aviation Department (HKCAD) for international operations with helicopters, they have the following meanings:

Aerodrome. A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

Alternate heliport. A heliport to which a helicopter may proceed when it becomes either impossible or inadvisable to proceed to or to land at the heliport of intended landing. Alternate heliports include the following:

Take-off alternate. An alternate heliport at which a helicopter can land should this become necessary shortly after take-off and it is not possible to use the heliport of departure

En-route alternate. A heliport at which a helicopter would be able to land after experiencing an abnormal or emergency condition while en route.

Destination alternate. An alternate heliport to which a helicopter may proceed should it become either impossible or inadvisable to land at the heliport of intended landing.

Note. The heliport from which a flight departs may be an en-route or a destination alternate heliport for the flight.

Approach and landing operations using instrument approach procedures.

Categories of precision approach and landing operations:

Category I (Cat I) operation. A precision approach and landing with a decision height not lower than 60 m (200 ft), and with either a visibility not less than 800 m or a runway visual range not less than 550 m.

Category II (Cat II) operation. A precision instrument approach and landing with a decision height lower than 60 m (200 ft), but not lower than 30 m (100 ft), and a runway visual range not less than 300 m.

Category III (Cat III) operation. A precision approach and landing with a decision height lower than 30 m (100 ft) or no decision height and a runway visual range less than 300 m or no runway visual range limitations.

Approach and landing phase – helicopters. That part of the flight from 300 m (1000 ft) above the elevation of the FATO, if the flight is planned to exceed this height, or from the commencement of the descent in the other cases, to a landing or to the balked landing point.

Congested hostile environment. A hostile environment within a congested area.

Crew member. A person assigned by an operator of an aircraft to be involved in the operation of the aircraft during any portion of a flight.

Defined point after take-off (DPATO). The point, within the take-off and initial climb phase, before which the helicopter's ability to continue the flight safely, with one engine inoperative, is not assured and a forced landing may be required.

Note. Defined points apply to helicopters operating in performance class 2 only.

Defined point before landing (DPBL). The point, within the approach and landing phase, after which the helicopter's ability to continue the flight safely, with one engine inoperative, is not assured and a forced landing may be required.

Duty. Any task that flight or cabin crew members are required by the operator to perform, including, for example, flight duty, administrative work, training, positioning and standby when it is likely to induce fatigue.

Duty period. A period which starts when a flight or cabin crew member is required by an operator to report for or to commence a duty and ends when that person is free from all duties.

Elevated heliport. A heliport located on a raised structure on land which is at least 3m from the surrounding surface.

En-route phase. That part of the flight from the end of the take-off and initial climb phase to the commencement of the approach and landing phase.

Fatigue. A physiological state of reduced mental or physical performance capability resulting from sleep loss, extended wakefulness, circadian phase, and/or workload (mental and/or physical activity) that can impair a person's alertness and ability to adequately perform safety-related operational duties.

Fatigue risk management system (FRMS). A data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness.

Final approach and take-off area (FATO). A defined area over which the final phase of the approach manoeuvre to hover or landing is completed and from which the take-off manoeuvre is commenced. When the FATO is to be used by helicopters in performance Class 1, the defined area includes the rejected take-off area available.

Flight duty period. A period which commences when a flight or cabin crew member is required to report for duty that includes a flight or series of flights and which finishes when the aircraft finally comes to rest and the engines are shut down at the end of the last flight on which he/she is a crew member.

Flight Safety Documents System. A set of interrelated documentation established by the operator, compiling and organizing information necessary for flight and ground

operations, comprising as a minimum, the operations manual and the operator's control manual

Flight Simulation Device. Any one of the following three types of apparatus in which flight conditions are simulated on the ground.

A flight simulator, which provides an accurate representation of the flight deck of a particular aircraft type to the extent that the mechanical, electrical and electronic, etc. aircraft systems control functions, the normal environment of flight crew members, and the performance and flight characteristics of that type of aircraft are realistically simulated.

A flight procedures trainer, which provides a realistic flight deck environment, and which simulates instrument responses, simple control functions of mechanical, electrical, electronics, etc. aircraft systems, and the performance and flight characteristics of aircraft of a particular class.

A basic instrument flight trainer, which is equipped with appropriate instruments, and which simulates the flight deck environment of an aircraft in flight in instrument flight conditions.

Flight time – helicopters. The total time from the moment a helicopter moves under its own power for the purpose of taking off until the moment it comes to rest at the end of the flight.

Helicopter. A heavier than air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axes.

Helideck. A heliport located on a floating or fixed offshore structure.

Heliport. An aerodrome of a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

Note. Helicopters may be operated to and from areas other than a heliport.

Heliport Operating Minima. The limits of usability of a heliport for:

1. *Take-off,* expressed in terms of runway visual range and/or visibility and, if necessary, cloud conditions.
2. *Landing in precision and landing operations,* expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H) as appropriate to the operations
3. *Landing in approach and landing operations with vertical guidance,* expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H) and
4. *Landing in non-precision approach and landing operations,* expressed in terms of visibility and/or runway visual range, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions.

Hostile Environment. An environment in which:

1. A safe forced landing cannot be accomplished because the surface and surrounding environment are inadequate or
2. The helicopter occupants cannot be adequately protected from the elements or
3. Search and rescue response/capability is not provided consistent with the anticipated exposure or
4. There is an unacceptable risk of endangering persons or property on the ground.

Human factors Principles. Principles that apply to aeronautical designs, certification training, operations and maintenance and which seek safe interface between human and other system components by proper consideration to human performance.

Human Performance. Human capabilities and limitations which have impact on the safety and efficiency of aeronautical operations.

Integrated survival suit. A survival suit which meets the combined requirements of the survival suit and life jacket.

Landing Decision Point (LDP). The point used in determining landing performance from which, a power unit failure occurring at this point, the landing may be safely continued or a balked landing initiated.

Note. LDP applies only to helicopters operating in performance Class 1.

Low-visibility operations (LVO). Approach operations in runway visual ranges less than 440 m and/or with decision height less than 60 m (200 ft) or take-off operations in runway visual ranges less than 400 m.

Non-congested hostile environment. A hostile environment outside a congested area.

Non-hostile environment. An environment in which:

1. A safe landing can be accomplished because the surface and surrounding environment are adequate.
2. The helicopter occupants can be adequately protected from the elements.
3. Search and rescue response/capability is provided consistent with anticipated exposure, and
4. The assessed risk of endangering persons or property on the ground is acceptable.

Note. Those parts of a congested area satisfying the above requirements are considered non-hostile.

Obstacle clearance altitude (OCA) or obstacle clearance height (OCH). The lowest altitude or lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable, used in establishing compliance with appropriate obstacle clearance criteria.

Off shore operations. Operations which routinely have a substantial proportion of the flight conducted over sea areas to or from offshore locations. Such operations include, but are not limited to, support of offshore oil, gas and mineral exploitation and sea-pilot transfer.

Operation. The activity or group of activities which are subject to the same or similar hazards and which require a set of equipment to be specified, or the achievement and maintenance of a set of pilot competencies, to eliminate or mitigate the risk of such hazards.

Note. Such activities could include, but would not be limited to, offshore operations or emergency medical service.

Operations in performance class 1 or performance Group A. Operations with performance such that, in the event of a critical power unit failure, performance is available to enable the helicopter to safely continue the flight to an appropriate landing area, unless the failure occurs prior to reaching the take-off decision point (TDP) or after passing the landing decision point (LDP), in which case the helicopter must be able to land within the rejected take-off or landing area.

Operations in performance class 2 or performance Group A (Restricted). Operations with performance such that, in the event of a critical power unit failure, performance is available to enable the helicopter to safely continue the flight to an appropriate landing area , except when the failure occurs early during the take-off manoeuvre or late in the landing manoeuvre, in which cases a forced landing may be required.

Operations in performance class 3 or performance Group B. Operations with performance such that, in the event of a power unit failure at any time during the flight, a forced landing may be required.

Safe forced landing. Unavoidable landing or ditching with reasonable expectancy of no injuries to persons in the aircraft or on the surface.

Rest period. A continuous and defined period of time, subsequent to and/or prior to duty, during which flight or cabin crew members are free of all duties.

Safety area. A defined area on a heliport surrounding the FATO which is free of obstacles, other than those required for air navigation purposes, and intended to reduce the risk of damage to helicopters accidentally diverging from the FATO.

Series of flights. Series of flights are consecutive flights that:

(a) begin and end within a period of 24 hours; and

(b) are conducted by the same pilot-in-command

State of the Aerodrome. The state in whose territory the aerodrome is located.

Note. State of the Aerodrome includes heliports and landing locations.

Take-off and initial climb phase. That part of the flight from the start of take-off to 300 m (1,000 ft) above the elevation of the FATO, if the flight is planned to exceed this height, or to the end of the climb in the other cases.

Take-off decision point (TDP). The point used in determining the take-off performance from which, a power unit failure occurring at this point, either a rejected take-off may be made or a take-off safely continued.

Vross. The minimum speed at which climb shall be achieved with the critical power unit inoperative, the remaining power units operation within approved operating limits.

Note. Terms stated under Definitions in Chapter 1, Section 1 of Part III - International Operations Helicopters, Annex 6 to the Convention on International Civil Aviation, are generally accepted unless there is a different definition in the Air Navigation (Hong Kong) Order.

Chapter 2 - Heliport Operating Minima

Whilst the requirements of helicopters follow the same requirements of aeroplanes, there are differences in the Heliport Operating Minima as compared with Aerodrome Operating Minima, CAD 360, Part 1 Chapter 4, Appendix B. This Chapter is designed to assist operators in the preparation for Heliport or landing location Operating Minima for inclusion in the Operations Manual.

1. Heliport or Landing Location Operating Minima – General

1.1. An operator shall establish operating minima for each heliport or landing location to be used in operations. The method of determination of such minima shall be approved by the CAD. 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 such heliports or landing locations by the State of the Aerodrome, except when specifically approved by that State.

1.2. When establishing the operating minima for each heliport or landing location which may apply to any particular operation, an operator must take into full account of:

1.2.1. The type, performance and handling characteristics of the helicopter and any conditions or limitations stated in the flight manual.

1.2.2. The composition of the flight crew, their competence and experience.

1.2.3. The physical characteristics of the heliport, and direction of approach.

1.2.4. The adequacy and performance of the available visual and non-visual ground aids.

1.2.5. The equipment available on the helicopter for the purpose of navigation, acquisition of visual references and/or control of the flight path, as appropriate, during the take-off, the approach, the flare, the hover, the landing, the roll out and the missed approach.

1.2.6. The obstacles in the approach, the missed approach and the climb out areas required in the execution of contingency procedures and necessary clearance.

1.2.6.1. The obstacle clearance altitude/height for the instrument approach procedure.

1.2.6.2. The means to determine and report meteorological conditions.

1.2.7 The conditions prescribed in the operations specifications.

1.2.8 Any minima that may be promulgated by the State of the Aerodrome.

1.3. Category II and III instrument approach and landing operations shall not be authorized unless RVR information is provided.

1.4. For instrument approach and landing operations, heliport or landing location operating minima below 800 m visibility should not be authorized unless RVR information or an accurate measurement or observation of visibility is provided.

2. Instrument Flight Procedures

2.1. Before commencing any operations that involve approach under IFR, operators has to ensure that one or more instrument approach procedures to serve each final approach and take-off area or heliport utilized for instrument flight operations are approved and promulgated by the State in which the heliport is located, or by the State which is responsible.

2.2. All helicopters operated in accordance with IFR 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.

Note 1. Operational procedures recommended for the guidance of operations personnel involved in instrument flight operations are described in PANS-OPS (Doc 8186), Volume 1.

Note 2. Criteria for the construction of instrument flight procedures for the guidance of procedure specialists are provided in PANS-OPS (Doc 8186), Volume II. Obstacle clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons.

3. Terminology

3.1. Terms used have the following meaning:

3.1.1. *Circling.* The visual phase of an instrument approach to bring the aircraft into position for landing which is not suitably located for a straight in approach.

3.1.2. *The Low Visibility Take-off (LVTO).* A take-off where the Runway Visual Range (RVR) is less than 400 m.

3.1.3. *Visual Approach.* An approach by an IFR flight when either part or all of an instrument approach procedure is not completed and the approach is executed with visual reference to the terrain.

3.1.4. *Cloud base.* The height of the lowest observed, or forecast, cloud element in the vicinity of an aerodrome, or heliport, or within a specified area of operations. The height and cloud base is normally

measured above aerodrome elevation, but in the case of offshore operations cloud base is measured above mean sea level.

4. Low Visibility Operations – General operating rules

4.1. An operator shall not conduct Category II or III operations unless:

4.1.1. Each helicopter concerned is certificated for operations with decision heights below 200 ft.
4.1.2. A suitable system for recording approach and/or automatic landing success and failure is established and maintained to monitor the overall safety of the operations.
4.1.3. The operations are specifically approved by the HKCAD.
4.1.4. The flight crew consists of at least 2 pilots.
4.1.5. Decision height is determined by means of a radio altimeter.
4.1.6. RVR information is provided.

4.2. An operator shall not conduct low visibility take-offs unless approved by the HKCAD.

5. Low Visibility Operations – Heliport considerations

5.1. An operator shall not use a heliport for Category II or III operations unless the heliport is approved for such operations by the State in which the heliport is located.

5.2. An operator shall verify that Low Visibility Procedures (LVP) have been established, and will be enforced, at those heliports where low visibility operations are to be conducted.

6. Low Visibility Operations – Training and Qualifications

6.1. An operator shall ensure that, prior to conducting Low Visibility Take-off, Category II and III operations:

6.1.1. Each crew member:

6.1.1.1. Completes the training and checking requirements prescribed in Appendix 2 to Chapter 8 including flight simulator training in operating to the limiting values of RVR and Decision Height appropriate to the operator's Category II/III approval.

6.1.1.2. Is qualified in accordance to Appendix 2 to Chapter 8.

6.1.2. The training and checking is conducted in accordance with a detailed syllabus approved by the HKCAD and included in the Operations Manual.

6.1.3. The flight crew qualification is specific to the operation and helicopter type.

7. Low Visibility Operations – Operating Procedures (LVPs)

7.1. An operator must establish procedures and instructions to be used for Low Visibility Take-off and Category II and III operations. These procedures must be included in the Operations Manual and contain the duties of flight crew members during taxying, take-off, approach, flare, the hover, landing, roll-out and missed approach as appropriate.

7.2. The commander shall satisfy himself that:

7.2.1. The status of the visual and non-visual facilities is sufficient prior to commencing a Low Visibility Take-off or a Category II or III approach.

7.2.2. The appropriate LVPs are in force according to information received from Air Traffic Services, before commencing a Low Visibility Take-off or a Category II or III approach.

7.2.3. The flight crew members are properly qualified prior to commencing a Low Visibility Take-off or a Category II or III approach.

8. Low Visibility Operations – Minimum equipment

8.1. An operator must include in the Operations Manual the minimum equipment that has to be serviceable at the commencement of a Low Visibility Take-off or a Category II or III approach in accordance to the helicopter Flight Manual.

8.2. The commander shall satisfy himself that the status of the helicopter and the relevant airborne systems is appropriate for the specific operations to be conducted.

9. VFR Operating Minima

9.1. An operator shall ensure that:

9.1.1. VFR flights are conducted in accordance with the Visual Flight Rules and in accordance with the table in Appendix 3.

9.1.2. Subject to sub-paragraph 9.1.3. and 9.1.4. below, helicopters are operated in flight visibility of not less than 1500 m during daylight and not less than 5 km by night. Low level overwater flights out of sight of land are only to be conducted under VFR when the cloud ceiling is greater than 600 ft by day and 1200 ft by night.

9.1.3. In Class G airspace, when flying between helidecks where the over water sector is less than 10 km, VFR flights are conducted in accordance to Appendix 4.

9.1.4. Special VFR complies with the Zone minima in force.

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Appendix 1 to Chapter 2 – Helicopter Operating Minima

1. Alternate Heliports

1.1. *General*

1.1.1. *Take-off Alternate.* A take-off alternate heliport shall be selected and specified in the operational flight plan if the weather conditions at the heliport of departure are at or below the applicable heliport operating minima.

1.1.2. For a heliport to be selected as a take-off alternate, the available information shall indicate that, at the estimated time of use, the conditions will be at or above the heliport operating minima for that operation.

1.1.3. *Destination alternate heliport.* For a flight to be conducted in accordance to IFR, at least one destination alternate shall be specified in the operational flight plan, unless:

1.1.3.1. The duration of the flight and the meteorological conditions prevailing are such that there is reasonable certainty that, at the estimated time of arrival at the destination heliport or landing location, and for a reasonable period before and after such time, the approach and landing may be made under visual meteorological conditions; or

1.1.3.2. The heliport of intended landing is isolated and no alternate is available. A point of no return (PNR) shall be determined.

1.1.4. For a heliport to be selected as a destination alternate, the available information shall indicate that, at the estimated time of use, the conditions will be at or above the heliport operating minima for that operation.

1.1.5. For a flight departing to a destination which is forecast to be below the heliport operating minima, two destination alternates should be selected. The first destination alternate should be at or above the heliport operating minima for destination and the second at or above the heliport operating minima for alternate.

1.1.6. To ensure that an adequate margin of safety is observed in determining whether or not an approach and landing can be safely carried out at each alternate heliport or landing location, the operator shall specify appropriate incremental values for height of cloud base and visibility, acceptable to the CAD, to be added to the operator's established heliport or landing location operating minima.

Note: Guidance on the selection of these incremental values is contained in the Flight Planning and Fuel Management Manual (FPFMM) (Doc 9976).

2. Take-off Minima

2.1. *General*

2.1.1. Take-off minima established by the operator must be expressed as visibility or RVR limits, taking into account all relevant factors for each heliport planned to be used and the helicopter characteristics. Where there is a specific need to see and avoid obstacles on departure and/or a forced landing, additional conditions (e.g. ceiling) must be specified.

2.1.2. The commander shall not commence take-off unless the weather conditions at the heliport of departure are equal to or better than applicable minima for landing at that heliport unless a suitable take-off alternate heliport is available.

2.1.3. When the reported meteorological visibility is below that required to take-off and RVR is not reported, a take-off may only be commenced if the commander can determine that the RVR/Visibility along the take-off FATO/runway is equal to or better than the required minima.

2.1.4. When no reported meteorological visibility or RVR is available, a take-off may only be commenced if the commander can determine that the RVR/Visibility along the take-off FATO/runway is equal to or better than the required minima.

2.2. *Visual reference*

2.2.1. The take-off minima must be selected to ensure sufficient guidance to control the helicopter in the event of both a discontinued take-off in adverse circumstances and a continued take-off after failure of a critical power-unit.

2.2.2. For night operations, ground lighting must be available to illuminate the FATO/runway and any obstacles unless otherwise agreed by the HKCAD.

2.3. *Required RVR/Visibility*

2.3.1. For Performance Class 1 operations, an operator must establish an RVR and visibility respectively (RVR/VIS) as take-off minima in accordance with the following table:

Table 1 – RVR/Visibility for take-off

Onshore heliports with IFR departure procedure	**RVR/Visibility**
No lighting and no marking (Day)	250 m or the rejected distance, whichever is greater
No marking (Night)	800 m
Runway edge/FATO lighting and centre line marking	200 m
Runway edge/FATO lighting, centre line marking and RVR information	150 m
Offshore Helideck	
Two pilot operations	250 m (1)

Note 1. The commander must establish that the take-off path is free of obstacles.

2.3.2. For Performance Class 2 operations , the commander must operate to Take-off minima of 1000 m RVR/Vis and a cloud ceiling of 500 ft and remain clear of cloud during the take-off manoeuvre until reaching Performance Class 1 capabilities.

3. Non-precision approach

3.1. System minima

3.1.1. An operator must ensure that system minima for non-precision approach procedures, which are based upon the use of ILS without glidepath (LLZ only), VOR, NDB, SRA, and VDF are not lower than the MDH values given in Table 2 below.

Table 2 – System minima for non-precision approach aide.

Facility	**Lowest MDH**
ILS (no glide path – LLZ)	250 ft
SRA (terminating at ½ nm)	250 ft
SRA (terminating at 1 nm)	300 ft
SRA (terminating at 2 nm)	350 ft
VOR	300 ft
VOR/DME	250 ft
NDB	300 ft
VDH (QDM & OCH)	300 ft

3.1.2 *Minimum Descent Height.* An operator must ensure that the minimum descent height for a non-precision approach is not lower than either:

3.1.2.1. The OCH/OCL for the category of helicopter; or
3.1.2.2. The system minimum

3.1.3. *Visual Reference.* A pilot may not continue an approach below MDA/MDH unless at least one of the following visual references for the intended FATO/runway is distinctly visible and identifiable to the pilot:

3.1.3.1. Elements of approach light system
3.1.3.2. The threshold
3.1.3.3. The threshold markings
3.1.3.4. The threshold lights
3.1.3.5. The threshold identification lights
3.1.3.6. The visual glide slope indicator
3.1.3.7. The touchdown zone or touchdown zone markings
3.1.3.8. The touchdown zone lights
3.1.3.9. FATO/Runway edge lights
3.1.3.10. Other visual references accepted by HKCAD

3.1.4. *Required RVR*

3.1.4.1. For non-precision approaches by helicopters operated in Performance Class 1, the minima given in the following Table shall apply:

Table 3 – Onshore non-precision approach minima

Onshore Non-precision Approach Minima (5)(6)				
MDH (ft)	**Facilities/RVR**			
	Full (1)	**Intermediate (2)**	**Basic (3)**	**Nil (4)**
250-299 ft	600 m	800 m	1 000 m	1 000 m
300-449 ft	800 m	1 000 m	1 000 m	1 000 m
450 ft and above	1 000 m	1 000 m	1 000 m	1 000 m

Note 1. Full facilities comprise FATO/runway markings, 720 m or more of Hi/Mi approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights must be on.

Note 2. Intermediate facilities comprise FATO/runway markings, 420 – 719 m of HI/MI approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights must be on.

Note 3. Basic facilities comprise FATO/runway markings, <420 m Hi/Mi approach lights, any length of LI approach lights. FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights must be on.

Note 4. Nil approach lights facilities comprise FATO/runway markings. FATO/runway edge lights, threshold lights, FATO/runway end lights or no lights at all.

Note 5. The tables are only applicable to conventional approaches with a nominal descent slope of not greater than 4 degrees. Greater descent slopes will usually require that visual guide slope guidance (e.g. PAPI) is also visible at Minimum Descent Height.

Note 6. The MDH mentioned in Table 3 refers to the initial calculation of MDH. When selecting the associated RVR, there is no need to take account of a rounding up to the nearest ten feet, which may be done for operational purposes e.g. conversion to MDA.

3.1.4.2. When the missed approach point is within ½ nm of the landing threshold, the approach minima given for full facilities may be used regardless of the length of approach lighting available. However FATO/runway edge lights, threshold lights, end lights and FATO/runway markings are still required.

3.1.4.3. *Night operations.* For night operations ground lighting must be available to illuminate the FATO/runway and any obstacles unless otherwise agreed by the HKCAD.

4. Precision Approach – Category I operations

4.1. *General.* A category I operations is a precision instrument approach and landing using ILS, MLS or PAR with a decision height not lower than 200 ft and with a runway visual range not less than 500 m.

4.2. *Decision Height.* An operator must ensure that the decision height to be used for a Category I precision approach is not lower than:

4.2.1. The minimum decision height specified in the Helicopter Flight Manual if stated;
4.2.2. The minimum height to which the precision approach aid can be used without the required visual reference;
4.2.3. The OCH/OCL for the category of helicopter; or
4.2.4. 200 ft.

4.3. *Visual Reference.* A pilot may not continue the approach below the Category I decision height, determined in accordance with sub-paragraph 3.2. above, unless one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot:

4.3.1. Elements of approach light system
4.3.2. The threshold
4.3.3. The threshold markings
4.3.4. The threshold lights
4.3.5. The threshold identification lights
4.3.6. The visual glide slope indicator

4.3.7. The touchdown zone or touchdown markings
4.3.8. The touchdown zone lights
4.3.9. FATO/runway edge lights

4.4. *Required RVR.* For Category I operations by Performance Class 1 helicopters the following minima shall apply:

Table 4 – Onshore Precision Approach Minima – Category I

Onshore Precision Approach Minima – Category I (5)(6)(7)				
	Facilities/RVR			
	Full (1)	**Intermediate (2)**	**Basic (3)**	**Nil (4)**
200 ft	500 m	600 m	700 m	1 000 m
201-250 ft	550 m	650 m	750 m	1 000 m
251-300 ft	600 m	700 m	800 m	1 000 m
301 ft & above	750 m	800 m	900 m	1 000 m

Note 1. Full facilities comprise FATO/runway markings, 720 m or more of Hi/Mi approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights must be on.

Note 2. Intermediate facilities comprise FATO/runway markings, 420 – 719 m of HI/MI approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights must be on.

Note 3.Basic facilities comprise FATO/runway markings, <420 m Hi/Mi approach lights, any length of LI approach lights. FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights must be on.

Note 4. Nil approach lights facilities comprise FATO/runway markings. FATO/runway edge lights, threshold lights, FATO/runway end lights or no lights at all.

Note 5. The Table is applicable to conventional approaches with a glide slope angle up to and including 4 degrees.

Note 6. The DH mentioned in Table 4 refers to the initial calculation of DH. When selecting the associated RVR, there is no need to take account of a rounding up to the nearest ten feet, which may be done for operational purposes e.g. conversion to DA.

Note 7. The DH mentioned in Table 4 refers to the initial calculation of DH. When selecting the associated RVR, there is no need to take account of a rounding up to the nearest ten feet, which may be done for operational purpose (e.g. conversion to DH).

4.4.1. *Night operations.* For night operations ground lighting must be available to illuminate the FATO/runway and any obstacles unless otherwise agreed by the HKCAD.

5. Onshore circling

5.1. Circling is the term used to describe the visual phase of an instrument approach, to bring an aircraft into position for landing on a FATO/runway which is not suitably located for a straight in approach.

5.2. For circling the specified MDH shall not be less than 250 ft, and the meteorological visibility shall not be less than 800 m.

Note. Visual manoeuvring (circling) with prescribed tracks is an accepted procedure within the meaning of this paragraph.

6. Visual approach. An operator shall not use an RVR of less than 800 m for a visual approach.

7. Heliport Operating Minima. For instrument approach and landing operations, heliport operating minima below 800 m visibility should not be authorized unless RVR information or an accurate measuring instrument or observation of visibility is provided.

8. Airborne Radar Approach (ARA)

8.1. *General*

8.1.1. An operator shall not conduct ARAs unless authorized by the HKCAD.

8.1.2. ARAs are permitted to rigs or vessels under way when a multi-crew concept is used.

8.1.3. A commander shall not undertake an ARA unless the radar can provide course guidance to ensure obstacle clearance.

8.1.4. Before commencing the final approach the commander shall ensure that a clear path exists on the radar screen for the final and missed approach segments. If lateral clearance from any obstacle will be less than 1.0 nm, the commander shall:

8.1.4.1. Approach to a nearby target structure and thereafter proceed visually to the destination structure; or

8.1.4.2. Make the approach from another direction leading to a circling manoeuvre.

8.1.5. The commander shall ensure that the cloud ceiling is sufficiently clear above the helideck to permit a safe landing.

8.2. *Minimum Descent Height(MDH).* Notwithstanding the minima at sub-paragraphs (i) and (ii) below, the MDH shall not be less than 50 ft above the elevation of the helideck.

8.2.1. The MDH is determined from a radio altimeter. The MDH for an ARA shall not be lower than:

8.2.1.1. 200 ft by day
8.2.1.2. 300 ft by night

8.2.2. The MDH for an approach leading to a circling manoeuvre shall not be lower than:

8.2.2.1. 300 ft by day
8.2.2.2. 500 ft by night

8.3. *Minimum Descent Altitude (MDA).* An MDA may only be used if the radio altimeter is unserviceable. The MDA shall be a minimum of MDH + 200 ft and shall be based on a calibrated barometer at the destination or the lowest forecast QNH for the region.

8.4. *Decision range.* The decision range shall not be less than 0.75 nm unless an operator has demonstrated to the HKCAD that a lesser Decision Range can be used at an acceptable level of safety.

8.5. *Visual reference.* No pilot may continue an approach beyond Decision Range or below MDH/MDA unless he is visual with the destination.

8.6. *Single pilot operations.* The MDA/MDH for a single pilot ARA shall be 100 ft higher than that calculated using sub-paragraphs 8.2. and 8.3. above.

Appendix 2 to Chapter 2 – Low Visibility Operations

1. General Operating Rules

1.1. *General.* The following procedures apply to the introduction and approval of low visibility operations.

1.2. *In–service proving.* Specific approval will only be given by HKCAD for helicopter types that have the State's approval in the use of Category II or III operations in the State of manufacture. In addition an operator will have to satisfy the in-service proving requirements contained in this paragraph.

1.2.1. The system must demonstrate reliability and performance in line operations consistent with the operational concepts. A sufficient number of successful landings, as determined by the HKCAD, must be accomplished in line operations, including training flights, using the auto-land and roll-out system installed in each helicopter type.

1.2.2. The demonstration must be accomplished using a Category II or III ILS.

1.2.3. If the operator has different variants of the same type of helicopter utilizing the same basic flight control and display systems, or different basic flight control and display on the same type of helicopter, the operator shall show that the variants comply with the system performance criteria, but the operator need not conduct a full operational demonstration for each variant.

1.3. *Continuous Monitoring*

1.3.1. After obtaining the initial authorization, the operations must be continuously monitored by the operator to detect any undesirable trends before they become hazardous. Flight crew reports may be used to achieve this.

1.3.2. The following information must be retained for a period of 12 months:

1.3.2.1. The total number of approaches, by helicopter type, where the airborne Category II or III equipment was utilised to make satisfactory, actual or practice, approaches to the applicable Category II or III minima; and

1.3.2.2. Reports of unsatisfactory approaches and/or automatic landings, by heliport and helicopter registration, in the following categories:

1.3.2.2.1. Airborne equipment faults
1.3.2.2.2. Ground facility difficulties
1.3.2.2.3. Missed approaches because of ATC instructions
1.3.2.2.4. Other reasons

1.4. An operator must establish a procedure to monitor the performance of the automatic landing system of each helicopter.

1.5. *Transitional periods*

1.5.1. *Operators with no previous Category II or III experience*

1.5.1.1. The operator with no previous Category II or III operational experience may be approved for Category II or IIIA operations, having gained a minimum experience of 6 months of Category I operations on the helicopter type.

1.5.1.2. On completing 6 months of Category II or IIIA operations on the helicopter type the operator may be approved for Category IIIB operations. When granting such approval, the HKCAD may impose higher minima than the lowest applicable for an additional period. The increase in minima will normally only refer to RVR and/or a restriction against operations with no decision height and must be selected such that they will not require any change of the operational procedures.

1.5.2. *Operators with previous Category II or III experience.* An operator with previous Category II or III experience may obtain authorization for a reduced period by application to the HKCAD.

1.6. *Maintenance of Category II, Category III and LVTO equipment.* Maintenance instructions for the on-board guidance systems must be established by the operator, in liaison with the manufacturer, and included in the operator's helicopter maintenance programme, which must be approved by the HKCAD.

2. Low Visibility Operations – Operating Procedures

2.1. *General.* Low visibility operations include:

2.1.1. Manual Take-off (with or without electronic guidance systems);

2.1.2. Auto-coupled approach to below DH with manual flare, hover, land and roll out;

2.1.3. Auto-coupled approach followed by auto-flare, hover, land and manual roll out; and

2.1.4. Auto coupled approach auto-flare, hover, land and auto roll-out, when applicable RVR is less than 400 m.

2.2. *Procedures and operating instructions*

2.2.1. The precise nature and scope of procedures and instructions given depend upon the airborne equipment used and the flight deck

procedures followed. An operator must clearly define flight crew duties during take-off, approach, flare, hover, roll-out, and missed approach in the Operations Manual. Particular emphasis must be placed on flight crew responsibilities during transition from non-visual conditions to visual conditions, and on procedures to be used in deteriorating visibility and when failures occur. Special attention must be paid to the distribution of flight deck duties so as to ensure that the workload of the pilot making the decision to land or execute a missed approach enables him to devote himself to supervision and the decision making process.

2.2.2. An operator must specify the detailed operating procedures and instructions in the Operations Manual. The instructions must be compatible with the limitations and mandatory procedures contained in the Helicopter Flight Manual and cover the following items in particular:

2.2.2.1. Checks for the satisfactory functioning of the helicopter equipment, both before departure and in flight.

2.2.2.2. Effect on minima caused by changes in the status of the ground installations and airborne equipment.

2.2.2.3. Procedures for the take-off, approach, flare, hover, landing, roll-out and missed approach.

2.2.2.4. Procedures to be followed in the event of failures, warnings and other non-normal situations.

2.2.2.5. The minimum visual reference required.

2.2.2.6. The importance of correct seating and eye position.

2.2.2.7. Action which may be necessary arising from deterioration of the visual reference.

2.2.2.8. Allocation of crew duties in the carrying out of the procedures according to sub-paragraph 2.2.2.1. to 2.2.2.4. and 2.2.2.7. above, to allow the commander to devote himself mainly to supervision and decision making.

2.2.2.9. The requirement for all height calls below 200 ft to be used on the radio altimeter and for one pilot to continue to monitor the helicopter instruments until the landing is completed.

2.2.2.10. The requirement for the Localiser Sensitive Area to be protected.

2.2.2.11. The use of information relating to wind velocity, wind shear, turbulence, runway contamination and use of multiple RVR assessments.

2.2.2.12. Procedures to be used for practice approaches and landing on runways at which the full Category II or III heliport procedures are not in force.

2.2.2.13. Operating limitations resulting from airworthiness certification.

2.2.2.14. Information on the maximum deviation allowed from the ILS glide path and/or localizer.

Appendix 3 to Chapter 2

Minimum Visibilities for VFR Operations

Airspace Class	A,C	F	G
		Above 900 m (3 000 ft) AMSL or 300 m (1 000 ft) above terrain whichever is the higher	At or below 900 m (3 000 ft) above terrain, whichever is the higher
Distance from cloud	1 500 m horizontally 300 m (1000 ft) vertically		Clear of cloud in sight of surface
Flight Visibility	8 km at or above 3 050 m (10 000 ft) 5 km below 3 050 (10 000 ft) AMSL (Note 2)		5 km (Note 2)

Note 1. When the height of the transition altitude is lower than 3050 m (10 000 ft) AMSL, FL 100 should be used in lieu of 10 000 ft.

Note 2. Helicopters may be operated in Special VFR in flight visibility down to 1 500 m by day, provided ATC permits use of flight visibility less than 5 km, and the circumstances are such, that the probability of encounters with other traffic is low, and the IAS is 140 kts or less.

Appendix 4 to Chapter 2

Minima for flying between helidecks located in Class F,G airspace

	Day		Night	
	Height (Note 1)	**Visibility**	**Height (Note 1)**	**Visibility**
Single Pilot	300 ft	3 km	500 ft	5 km
Two Pilots	300 ft	2 km (Note 2)	500 ft	

Note 1. The cloud base shall be such as to allow flight at the specified height below and clear of cloud.

Note 2. Helicopters may be operated in flight visibility down to 1 500 m provided the destination or an intermediate structure are continuously visible.

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Chapter 3 - Fuel & Oil Requirements and Additional Fuel Planning & Management Procedures for Helicopters

1. Fuel Planning and Management

1.1. Whilst the requirements for helicopters follow the same general rules as those for aeroplanes, the ability of the helicopter to land away from aerodromes has been taken into account.

1.2. A minimum in-flight indicated fuel state must be stated for each type of helicopter and operation, with instructions on what actions to take when the fuel state is reached. Particular attention must be given to specialized activities, such as aerial crane work and winching operations. Operators are invited to discuss fuel requirements for these types of operations with their assigned HOI.

1.3. The majority of paragraph 8, of Chapter 4 of CAD 360 is applicable to helicopters and must be taken into account for fuel calculations when relevant.

1.4. Where helicopters have the facility for cross feeding or balancing of fuel in flight, instructions on the procedures to be followed should be contained in the operations manual.

1.5. The following points are to be considered in the preparation of instructions on minimum quantities of usable fuel and oil to be carried.

1.5.1. Flights under Instrument Flight Rules (IFR), Offshore and over Hostile Terrain (i.e. where forced landings are not possible or which present a consequential survival problem.); the total fuel carried must be at least the amount to allow the helicopter:

1.5.1.1. When an alternate is required, to fly to and execute an approach, and missed approach, at the heliport or landing location to which the flight is planned, and thereafter;

1.5.1.2. Fly to and execute an approach at the alternate specified in the plan; and then

1.5.1.3. Have a reserve of 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

1.5.1.4. Have an additional amount of fuel, to provide for the increased consumption on the occurrence of potential contingencies specified by the operator to the satisfaction of CAD;

1.5.1.5. When an alternate is not required, to fly to and execute an approach at the heliport or landing location to which the flight is planned, and thereafter to have:

1.5.1.5.1. 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

1.5.1.5.2. An additional amount of fuel, to provide for the increased consumption on the occurrence of potential contingencies.

1.5.2. Flights by day under Visual Flight Rule (VFR) over non-hostile terrain (i.e. where a forced landing may be carried out with a high degree of confidence that there is not likely to be a consequential survival problem); the total fuel carried must be at least the amount to allow the helicopter to:

1.5.2.1. Fly to the landing site to which the flight is planned;

1.5.2.2. Have final reserve fuel to fly thereafter for a period of 20 minutes at best-range speed; and

1.5.2.3. Have an additional amount of fuel to provide for the increased consumption on the occurrence of any of the potential contingencies specified by the operator to the satisfaction of HKCAD.

1.5.3. 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.

1.6. Alternate landing sites must meet the landing requirements of the helicopter with a critical power unit inoperative.

1.7. Instructions on IFR alternate fuel requirements must provide for an approach to land at destination, a missed approach from DH/MDA, diversion to a suitable alternate using a suitable altitude (at least the MSA). Departure from this principle will be acceptable only in exceptional circumstances and subject to the provision of special instructions in the operations manual on fuel checks, calculations on Point of No Return (PNR) and weather minima at intended destination.

1.8. For flights departing from offshore installations and vessels connected with the exploitation of oil, gas and mineral resources to certain land aerodromes, the instructions pertaining to Final Reserve Fuel (for aeroplanes) may be waived, subject to the agreement of the CAD if, at the fuel planning stage, the

forecast and the latest information available to the commander indicates that the cloud ceiling and visibility at destination will:

1.8.1. By day, be at least 600 ft above the surface with 4 km visibility and no probability of temporary or intermittent deterioration.

1.8.2. By night, 1200 ft above the surface with 5 km visibility and no probability of temporary or intermittent deterioration.

2. In Flight Fuel Management

2.1. An operator shall establish policies and procedures, approved by CAD, to ensure that in-flight checks and fuel management are performed.

2.2. 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.

2.3. 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 changes 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.

2.4. 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 can be made is less than the required final reserve fuel in compliance with paragraph 1 of this Chapter.

Note 1. The planned final reserve fuel refers to the value calculated in paragraph 1 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 that 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.

Note 3. The words "MAYDAY FUEL" describe the nature of the distress conditions as required in ICAO Annex 10, Volume II, 5.3.2.1.b)3.

3. Safety Measures to be Adopted During Fuelling

3.1. Passengers

3.1.1. In helicopters, pressure and gravity fuel inlets and fuel tanks are generally very close to the cabin area. Passengers should not remain in the helicopter whilst fueling is in progress except during ambulance and life saving operations, or when prevailing weather conditions would create significant disembarkation and embarkation risks. If, due to exceptional circumstances, passengers remain on board during fuelling operations, all main exits should be available for immediate use, the external area adjacent to the exits kept clear and two-way communications should be maintained by helicopter inter-communications system or other suitable means between the ground crew supervising the fuelling and the pilot. Fuelling with passengers embarking and disembarking is prohibited. In case of helicopters where only normal exit is on the same side as the fuelling point filler caps, then 'rotors or engine running' fuelling with passengers on board is not permitted.

3.2. Onshore Sites

3.2.1. Fuelling at onshore sites whilst engines/rotors are running should be considered only to cover urgent circumstances, these may include:

3.2.1.1. Ambulance and other emergency missions where time is of the essence.

3.2.1.2. When severe weather conditions make it inadvisable to stop engines/rotors.

3.2.1.3. Adverse or unusual operational requirements at the aircraft commander's discretion, but by agreement with the fuelling undertaker.

3.2.1.4. Special operational requirements after a risk assessment has been carried out by the operator and approved by the HKCAD.

3.2.2. If because of the circumstances described above, it is necessary to keep the engines running extreme care should be exercised and the general guidance covering the Fuelling Zone should be followed.

3.3. **Offshore Sites**

3.3.1. In the severe weather and wind conditions such as experienced on offshore rigs/platforms it may be necessary to keep helicopter engines running after landing on the helideck to achieve a quick turn-round and operational reasons may also make it necessary to fuel the helicopter. In such circumstances the Commander of the helicopter should be responsible for the overall direction of the fuelling operation and the operator of the rig/platform should be made aware of the possible hazards, so that they may ensure their helicopter landing officer fully observes the necessary safety precautions.

3.3.2. Fuelling offshore must only be carried out from installations on an approved type. Helicopter operators should ensure good fire safety practices at all times fuelling takes place, including the provision of rescue and fire fighting personnel.

3.3.3. Further guidance on helicopter fuelling is included in the following documents:

3.3.3.1. Helicopter Landing Officer's Handbook (Offshore Petroleum Industry Board);

3.3.3.2. ICAO Annex 6 Part III, as amended; and

3.3.3.3. ICAO Heliport Manual – Doc -9261-AN/903/2, Chapter 6.

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Chapter 4 - Selection of Offshore Alternates – Helicopters

1. General

1.1. An operator shall establish procedures for the selection of destination and/or alternate heliports when planning a flight. An operator shall only authorise use of heliports that are adequate for the type(s) of helicopter and operation(s) concerned. Offshore alternate heliports may be specified subject to the following conditions;

1.1.1. An offshore alternate heliport shall be used only after a Point of No Return (PNR). Prior to PNR onshore alternate heliports shall be used.

1.1.2. One engine inoperative landing capability shall be attainable at the alternate heliport.

1.1.3. Deck availability shall be guaranteed. The dimensions, configuration and obstacle clearance of individual helidecks or other sites shall be assessed in order to establish operational suitability for use as an alternate by each helicopter type proposed to be used. The operator must establish procedures for guaranteeing the availability of the helideck. Where there is the possibility of the helideck being out of use due to another aircraft being scheduled to land on the helideck or for any other circumstance, another suitable alternate must be sought.

1.1.4. Weather minima shall be established taking accuracy and reliability of meteorological information into account.

1.1.5. The MEL shall reflect essential requirements for this type of operation. In addition, mechanical reliability of critical control systems and critical components shall be considered and taken into account when determining the suitability of the alternate heliport(s).

1.1.6. An offshore alternate shall not be selected unless the operator has published procedure in the operations manual, which has been approved by the HKCAD.

1.2. When operating offshore, any spare payload capacity should be used to carry additional fuel if it would facilitate the use of an onshore alternate.

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

2. Offshore Alternate Deck Landing Environment, Performance and Weather Considerations

2.1. The landing environment of a helideck that is proposed for use as an offshore alternate should be pre-surveyed and, in addition to the physical characteristics, the effect of the wind direction and strength and turbulence established. This information (including the orientation of the helideck), which should be available to the commander both at the planning stage of the flight and in the flight, should be published in an appropriate form in the operations manual, such that the suitability of the helideck for use as an offshore alternate can be assessed. The alternate helideck should meet the criteria for size and obstacle clearance appropriate to the performance requirements of the type of helicopter concerned.

2.2. The use of an offshore alternate is restricted to helicopters that can achieve one engine inoperative (OEI) in ground effect (IGE) hover at an appropriate power rating at the offshore alternate. Where the surface of the offshore alternate helideck, or prevailing conditions (especially wind velocity), precludes an OEI IGE hover, OEI out of ground effect (OGE) hover performance at an appropriate power rating should be used to compute the landing mass. The landing mass should be calculated from graphs provided in the relevant part of the operations manual. When arriving at this landing mass, due account should be taken of helicopter configuration, environmental conditions and the operation of systems which have an adverse effect on performance. The planned landing mass of the helicopter, including crew, passengers, baggage, cargo plus 30 minutes of Final Reserve fuel, should not exceed the OEI (whether IGE or OGE as appropriate) landing mass at the time of the approach to the offshore alternate.

2.3. When the use of an offshore alternate is planned, an operator should not select a helideck as a destination or offshore alternate unless the aerodrome forecast indicates that during a period commencing one hour before and ending one hour after the expected time of arrival at the destination and offshore alternate, the weather conditions will be at or above the following planning minima: cloud base 600 ft day/ 800 ft night and visibility 4 km day/5 km night. Where fog is forecast, or has been observed within the last two hours within 60 nm of the destination or alternate, offshore alternates should not be used.

3. Actions at PNR

3.1. Before passing the PNR – which should not be more than 30 minutes from the destination – the following actions should have been completed:

3.1.1. Confirmation that navigation to the destination and offshore alternate can be assured.

3.1.2. Radio contact with the destination and offshore alternate can be assured.

3.1.3. The landing forecast at the destination and offshore alternate has been obtained and confirmed to be above the required minima.

3.1.4. The requirements for OEI landing has been checked to ensure that they can be met.

3.1.5. The availability of the offshore alternate should be guaranteed by the duty holder (the rig operator in the case of fixed installations and the owner in the case of mobiles) to the extent possible, having regard to information on current and forecast use of the offshore alternate and on conditions prevailing, until landing at the destination, or the offshore alternate, has been achieved (or until offshore shuttling has been completed).

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Chapter 5 - Performance – Helicopters

1. Abbreviations Specific to Helicopter Operations

Abbreviations

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	Touch-down and lift-off area
TODAH	Take-off distance available (helicopter)
TODRH	Take-off distance required (helicopter)
V$_{TOSS}$	Take-off safety Speed

2. Definitions

Category A. With respect to helicopters, means a multi-engined helicopter designed with engines and system isolation features 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-engined 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.

Equivalent Terms: The equivalent ICAO terms used and the AN(HK)O terms are as shown below:

ICAO	AN(HK)O
Performance Class 1	Performance Group A
Performance Class 2	Performance Group A (Restricted)
Performance Class 3	Performance Group B

2.1. 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 a power-unit failure and rejection of the take-off to 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 VTOSS, a selected height and a positive climb gradient are achieved, following failure of the critical power-unit being recognized at TDP, the remaining power-units 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.

2.2 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 power-unit inoperative, from a specified point in the take-off to 300 m (1000 ft) above the surface.

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

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

Vy. Best rate of climb speed.

3. Applicability

3.1. An operator shall ensure that helicopters:

3.1.1. Operating to and from heliports located in a congested hostile environment;

3.1.2. Which have a maximum approved passenger seating of 15 or more; or

3.1.3. With a maximum total weight authorized of 5,700 kg or more.

are operated in Performance Class 1.

3.2. Helicopters which have a maximum approved passenger seating of less than 15 but more than 9, with a maximum total weight authorized of less than 5,700 kg are operated in Performance Class 1 or 2.

3.3. Helicopters which have a maximum approved passenger seating configuration of 9 or less, with a maximum total weight authorized of less than 2,730 kg are operated in Performance Class 1, 2 or 3.

4. General

4.1. An operator shall ensure that the mass of the helicopter:

4.1.1. At the start of the take-off;

or in the event of in-flight replanning

4.1.2. At the point from which the revised operational flight plan applies

is not greater than the mass at which the requirement of the Performance Class can be complied with.

4.2. An operator shall ensure that the approved performance data contained in the Helicopter Flight Manual is used to determine the requirements of the performance of the helicopter, supplemented as necessary with other data acceptable to the HKCAD.

4.3. When showing compliance with the requirements, due account shall be taken of the following parameters:

4.3.1. Mass of the helicopter;

4.3.2. Helicopter configuration;

4.3.3. Environmental conditions in particular:

4.3.3.1. Pressure-altitude, and temperature;
4.3.3.2. Wind:

4.3.3.2.1. For take-off, take-off flight path and landing requirements, accountability for wind shall be no more than 50 % of any reported steady head wind component of 5 knots or more;

4.3.3.2.2. Where take-off and landing with a tail wind component is permitted in the Helicopter Flight Manual, and in all cases for the take-off flight path, not less than 150% of any reported tail wind component shall be taken into account;

4.3.3.2.3. Where precise wind measuring equipment enables accurate measurement of wind velocity over the point of take-off and landing, alternate wind components specific to a site may be approved by the HKCAD;

4.3.4. Operating techniques; and

4.3.5. Operation of any system which have adverse effect on performance.

5. Operating Conditions

5.1. For helicopters operating in performance Class 2 or 3 in any flight phase where a power unit may cause the helicopter to force land:

5.1.1. A minimum visibility should be defined by the operator, taking into account the characteristics of the helicopter, but should not be less than 1000 m for helicopters operating in performance Class 2 and 3.

5.1.2. The operator shall verify that the surface below the intended flight path permits the pilot to execute a safe forced landing.

5.1.3. Operations in performance Class 2 should only be conducted with a safe forced landing capability during take-off and landing.

5.1.4. Operation in performance Class 3 should only be conducted in a non-hostile environment.

5.2. Performance Class 3 operations are not to be performed:

5.2.1. Out of sight of the surface;
5.2.2. At night; or
5.2.3. When the cloud ceiling is less than 180 m (600 ft).

5.3. In conditions where the safe continuation of flight is not ensured in the event of a critical engine failure, helicopter operations shall be conducted in conditions of weather and light, and over such routes and diversions that permit a safe forced landing to be executed.

5.4. Notwithstanding the provisions of 5.3, routes without a safe forced landing may be considered based on the result of a risk assessment to be carried out. The risk assessment shall take into consideration at least the following:

5.4.1. the type and circumstances of the operation;
5.4.2. the area/terrain over which the operation is being conducted;
5.4.3. the area/terrain over which the operation is being conducted;
5.4.4. the procedures and systems for monitoring and maintaining the reliability of the engine(s);
5.4.5. the training and operational procedures to mitigate the consequences of the critical engine failure; and
5.4.6. helicopter equipment.

5.5. In addition to the elements contained in 5.4, more details, or other factors, that could be considered include but not limited to:

5.5.1. the necessity for the types of operation envisaged;
5.5.2. the importance to the public interest and its impact on the local population;
5.5.3. alternative means of transportation that may be available to fulfil the objective and the level of risk associated with these alternative means;
5.5.4. topography and hostility of the surface likely to be tranversed;
5.5.5. environmental factors – daylight, weather, icing, lightning, seasonal conditions, sea state, etc.
5.5.6. distances to be covered and time to complete the operation; and
5.5.7. availability of alerting and search and rescue capabilities.

Note. Operations in performance Class 3 in IMC shall not be permitted in Hong Kong. This is due to the limited airspace and the congested hostile surface environment. As such the additional guidance and provisions intended for operations of performance Class 3 in IMC as promulgated in ICAO Annex 6 and 8 are not provided for.

6. Obstacle Accountability

6.1. For the purpose of obstacle clearance requirements, an obstacle, located beyond the FATO, in the take-off path or the missed approach 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:

6.1.1. For VFR operations:

6.1.1.1. half of the minimum FATO (or the equivalent term used 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:

6.1.1.1.1. 0.10 DR for VFR day operations

6.1.1.1.2. 0.15 DR for VFR night operations

6.1.2. For IFR operations:

6.1.2.1. 1.5 D (or 30 m, whichever is greater) plus:

6.1.2.1.1. 0.10 DR for IFR operations with accurate course guidance

6.1.2.1.2. 0.15 DR for IFR operations with standard course guidance

6.1.2.1.3. 0.30 DR for IFR operations without course guidance

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

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

6.1.3. For operations with initial take-off conducted visually and converted to IFR/IMC at a transition point, the criteria required in 6.1.1. apply up to the transition point then the criteria required in 6.1.2. apply after the transition point.

6.1.3.1. The transition point cannot 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.

6.2. For take-off using a backup (or a lateral transition) procedure; for the purpose of obstacle clearance requirements, an obstacle, located in the backup (or lateral transition) area, shall be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than:

6.2.1. Half the minimum FATO (or the equivalent term used in the Flight Manual) width 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 for VFR day, or 0.15 for VFR night, of the distance travelled from the back of the FATO.

6.3. Obstacles may be disregarded if they are situated beyond:

6.3.1. 7 R for day operations if it is assured that navigation accuracy can be achieved by reference to suitable visual cues during the climb;

6.3.2. 10 R for night operations if it is assured that navigation accuracy can be achieved by reference to suitable visual cues during the climb;

6.3.3. 300 m if navigational accuracy can be achieved by appropriate navigation aids; and

6.3.4. 900 m in other cases.

7. Operating area consideration. For operations in performance Class 1, the dimensions of the FATO should 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 and the conditions of 8 below are met.

8. Operations in performance Class 1

8.1. *Take-off and initial climb phase.* The helicopter shall be able, in the event of the failure of the critical power-unit being recognized at or before TDP, to discontinue the take-off and stop within the rejected take-off area available or, in the event of the failure of the critical power-unit being recognized at or after TDP, to continue the take-off, clearing all obstacles along the flight path by an adequate margin until it is in a position to comply with Para 8.4.

8.2. *Take-off.* The take-off mass of the helicopter should 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 per min at 60 m (200 ft) and 150 ft per min at 300 m (1000 ft) above the level of the heliport with the critical engine inoperative and the remaining power-units operating at an appropriate power rating, taking into consideration the parameters specified in 4.3. (Figure 1).

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

8.2.2. *Take-off distance*. The take-off mass should 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 power-unit 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, clearance from the elevated heliport edge is shown in Figure 3.

8.2.3. Backup procedures (or procedures with lateral transition)**.** An operator should ensure that, with the critical power-unit inoperative, all obstacles below the backup flight path (the lateral flight path) are cleared by an adequate margin. Only the obstacles in 6.2. should be considered.

8.3. *Take-off flight path***.** From the end of the take-off distance required with the critical power-unit inoperative:

8.3.1. The take-off mass should be such that the climb path provides a vertical clearance of not less than 10.7 m (35 ft) for VFR and 10.7 m (35 ft) plus 0.01 DR for IFR operations above all obstacles located in the climb path. Only obstacles specified in 6. should be considered.

8.3.2. When a change of direction of more than 15 degrees is made, obstacle clearance requirements should be increased by 5 m (15 ft) from the point at which the turn is initiated. The 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.

8.4. *En route***.** The take-off mass is such that it is possible, in case of the critical power-unit failure occurring at any point of the flight path, to continue the flight to an appropriate landing site at which the conditions of 8.5 can be met without flying below the appropriate minimum flight altitudes for the route to be flown.

8.5. *Approach, landing and balked landing (*Figure 4 and 5)**.** In the event of the failure of the critical power-unit being recognized at any point during the approach and landing phase, before LDP, the helicopter shall, at the destination and at any alternate, after clearing all obstacles in the flight path, be able to land and stop within the landing distance available or to perform a balked landing and clear all obstacles in the flight path by an adequate margin. In case of the failure occurring after the LDP, the helicopter shall be able to land and stop within the landing distance available. The estimated landing mass at the destination or alternate should be such that:

8.5.1. 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 per min at 60 m (200 ft) and 150 ft per min at 300 m (1000 ft) above the level of the heliport with the critical engine power-unit inoperative and the remaining power-units operating at an appropriate power rating, taking into account the parameters specified in 4.3.;

8.5.2. The landing distance required does not exceed the landing distance available unless the helicopter, with the critical power unit failure recognized at LDP can, when landing, clear all obstacles in the approach path;

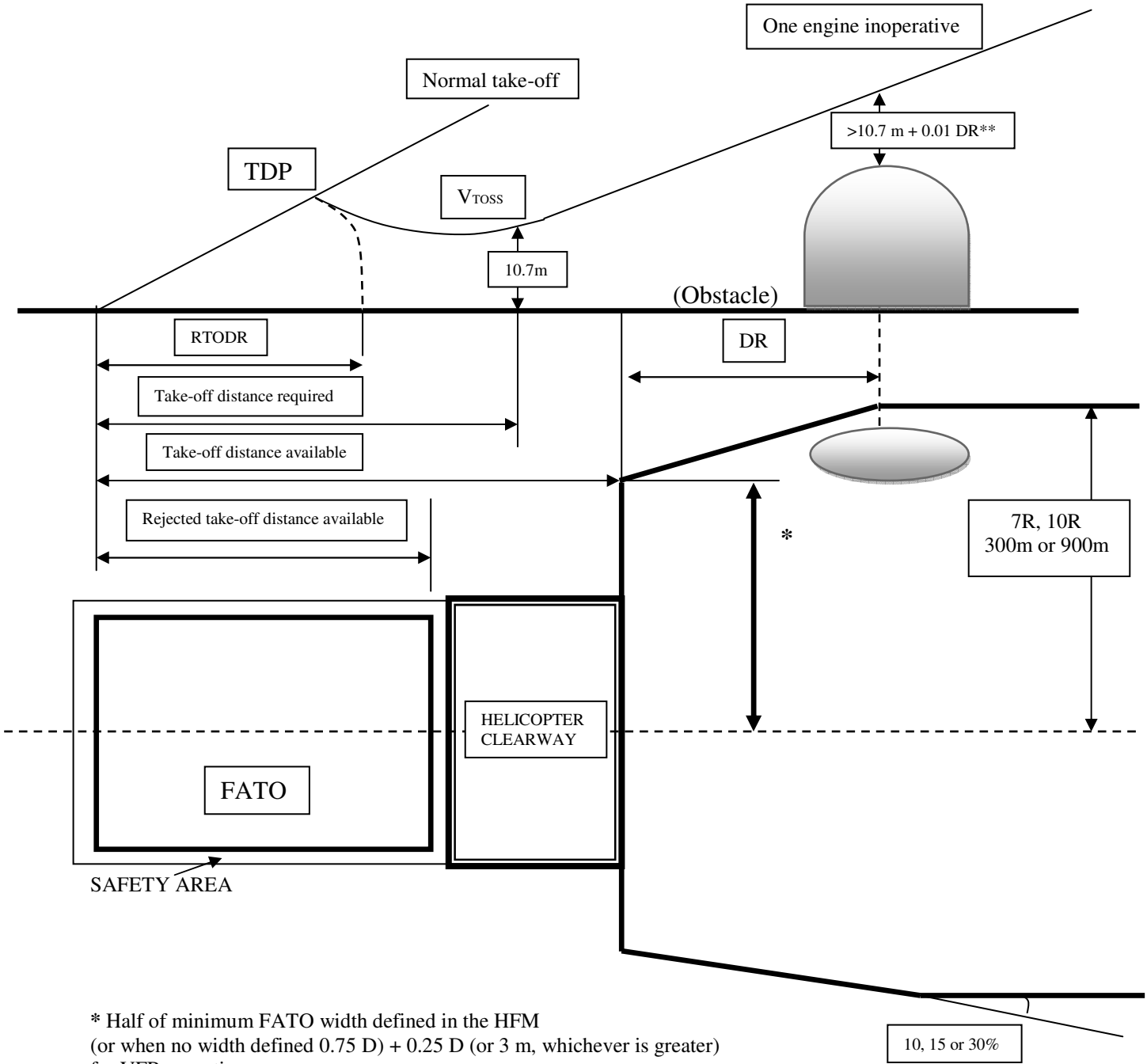
8.5.3. In the case of the critical power-unit failure occurring at any point after LDP, it is possible to land and stop within the FATO; and

8.5.4. In the event of the critical power-unit failure being recognized at the LDP or at any point before the LDP, it is possible to land and stop within the FATO or to overshoot, meeting the conditions of 8.3.1. and 8.3.2.

Note. For elevated heliports clearance from the heliport edge is shown in Figure 5.

Performance Class 1

SURFACE LEVEL HELIPORT
TAKE-OFF

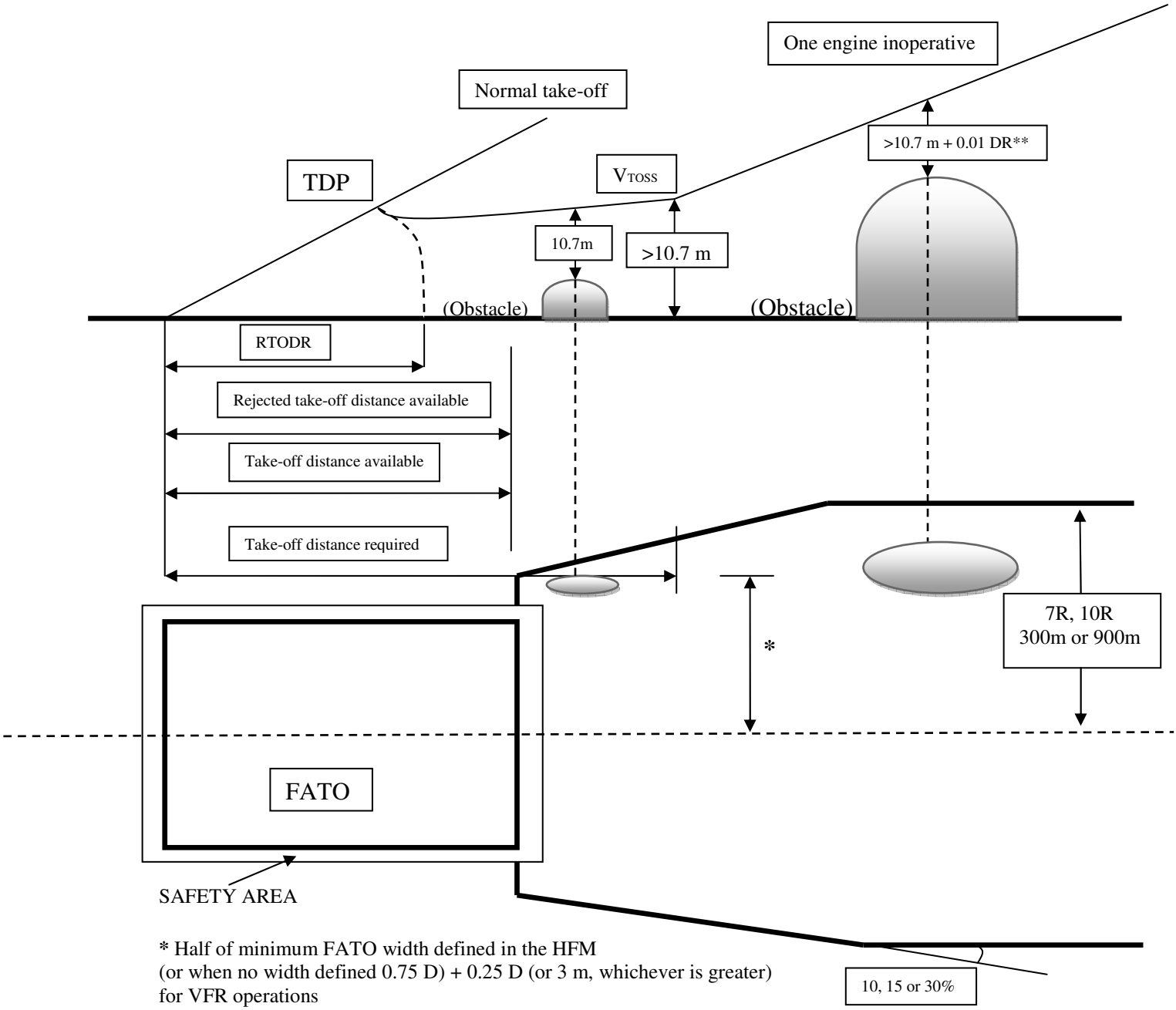


* Half of minimum FATO width defined in the HFM
(or when no width defined 0.75 D) + 0.25 D (or 3 m, whichever is greater) for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations

Figure 1

Performance Class 1

SURFACE LEVEL HELIPORT
(Alternative presented in Note 1 to 8.2.2.)
TAKE-OFF

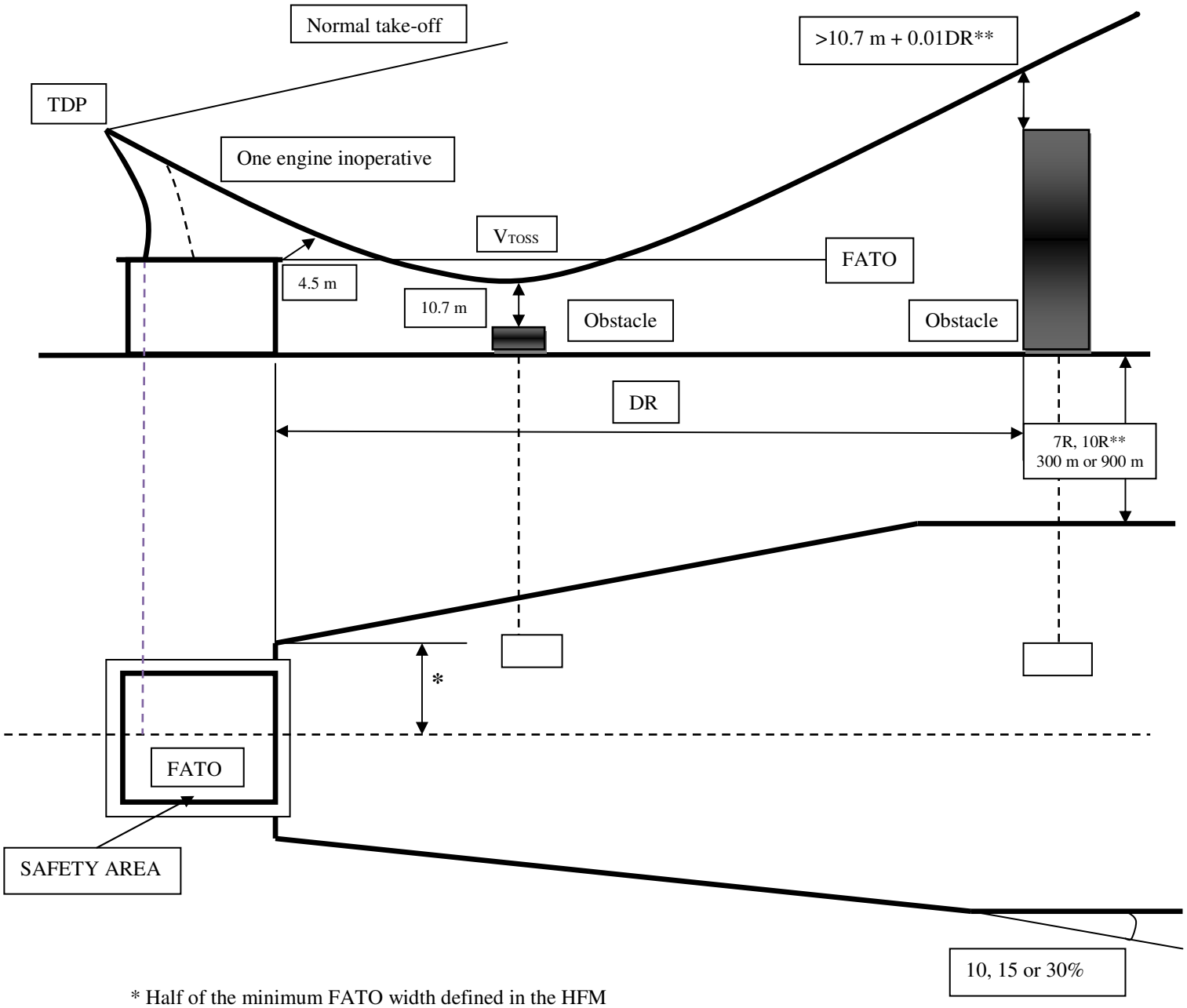


* Half of minimum FATO width defined in the HFM
(or when no width defined 0.75 D) + 0.25 D (or 3 m, whichever is greater)
for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations

Figure 2

PERFORMANCE CLASS I

ELEVATED HELIPORT/HELIDECK

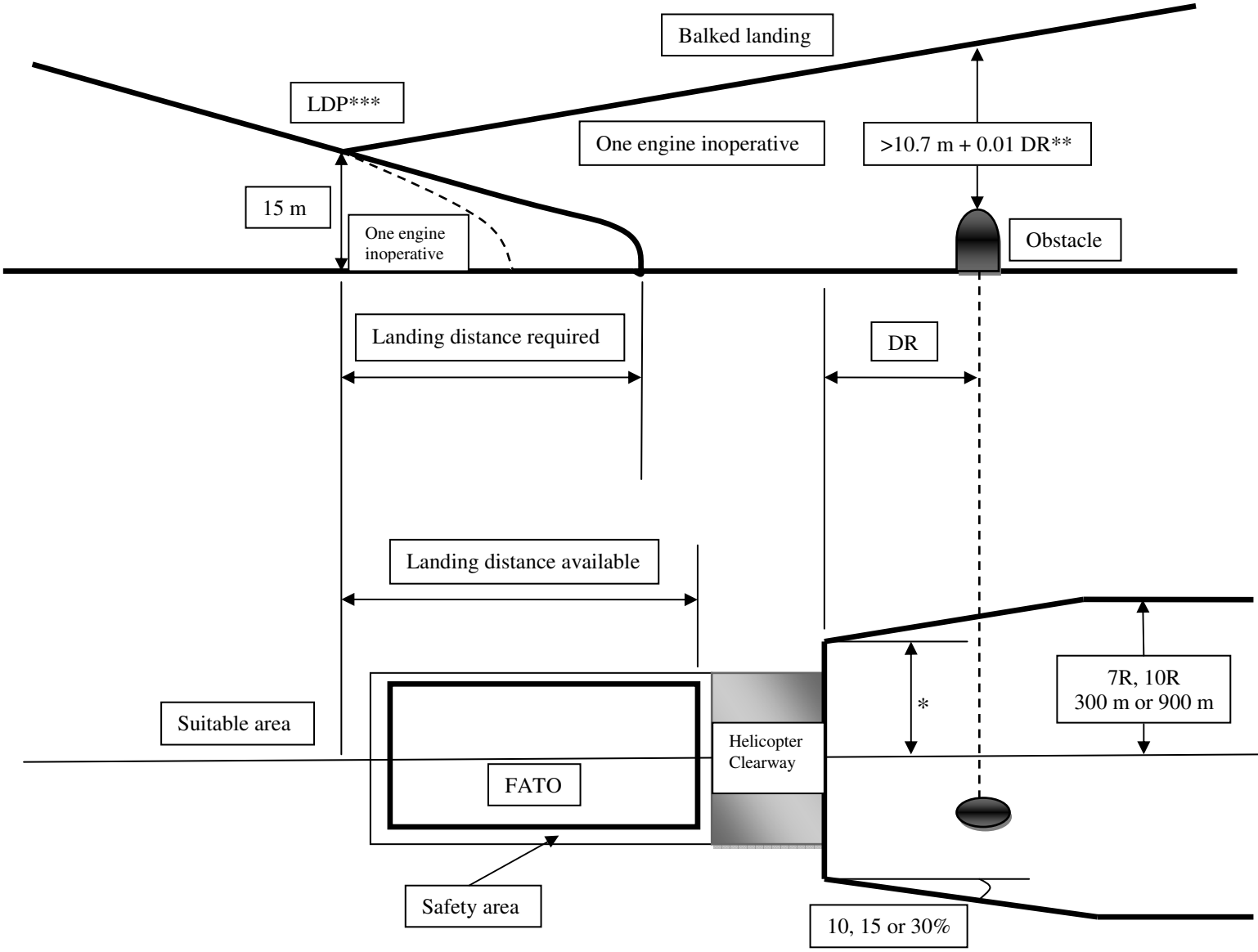


* Half of the minimum FATO width defined in the HFM
(or when no width defined, 0.75 D) + 0.25 D (or 3 m, whichever is greater)
for VFR Operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m + 0.01 DR for IFR operations

Figure 3

Performance Class 1

SURFACE LEVEL HELIPAD
LANDING

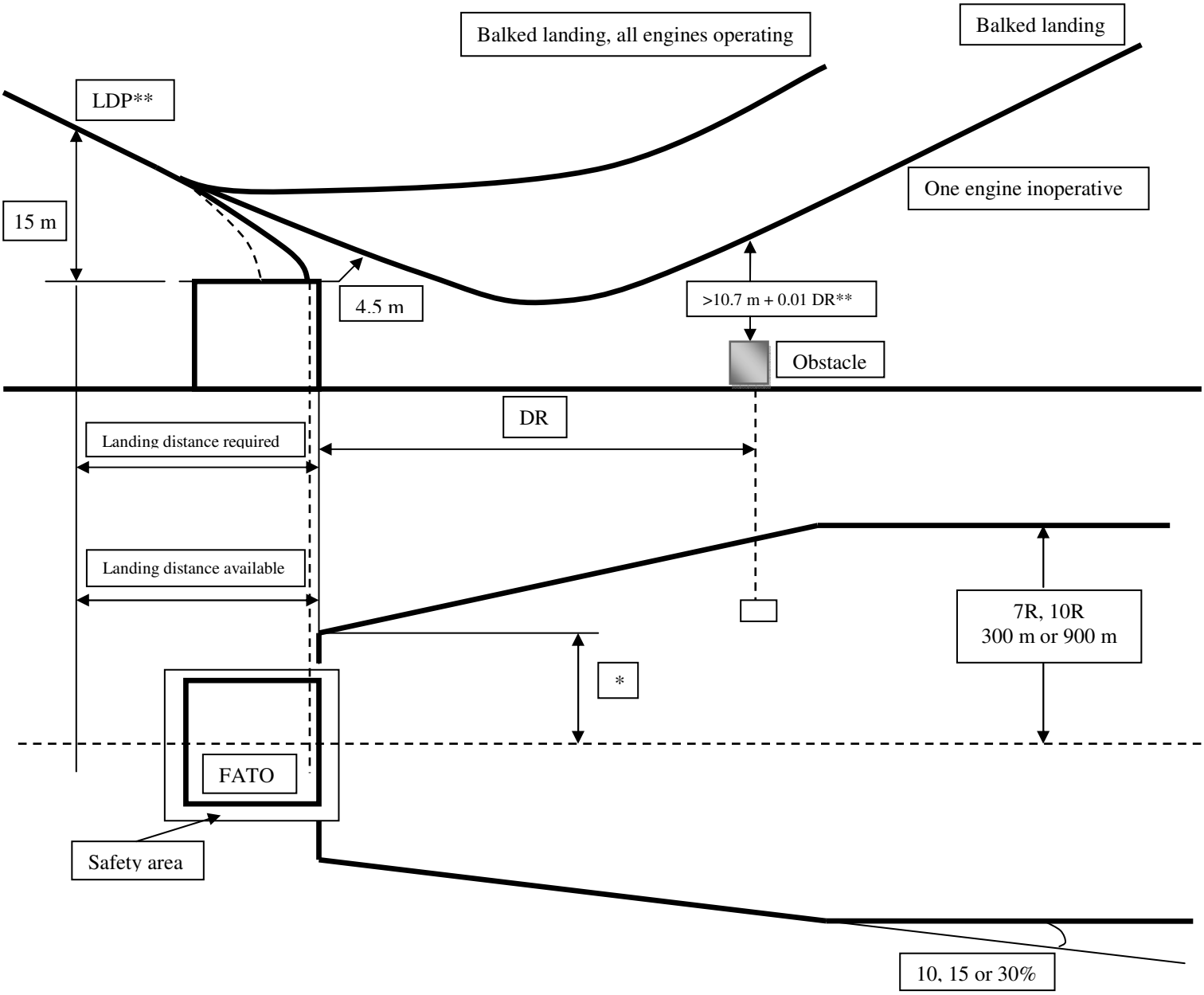


* Half of the minimum FATO as defined in the HFM (or when no width defined, 0.75 D) + 0.25 D (or 3 m, whichever is greater) for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
*** For the purposes of the diagram, all paths and distances emanate from 50 ft (15 m)
The actual height of this point and position of the LDP should be obtained from the HFM

Figure 4

PERFORMANCE CLASS 1

ELEVATED HELIPORT/HELIDECK
LANDING



* Half of minimum FATO width defined in the HFM (or when no width defined, 0.75 D) + 0.25 D (or 3 m, whichever is greater) for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
*** For the purpose of the diagram, all paths and distances emanates from 50 ft (15 m)
The actual height of this point and position of the LDP should be obtained from the HFM

Figure 5

9. Operations in performance Class 2

9.1. *Take-off and climb phase.* The helicopter shall be able, in the event of the failure of the critical power-unit at any time after reaching DPATO, to continue the take-off, clearing all the obstacles along the flight path by an adequate margin until the helicopter is in a position to comply with 9.4. Before the DPATO, failure of the critical power-unit may cause the helicopter to force-land. Therefore the condition that appropriate consideration be given to achieve a safe forced landing applies.

9.2. *Take-off.* (Figure 6 and 7)**.** The mass of the helicopter at take-off should 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 per min at 300 m (1000 ft) above the level of the heliport with the critical power-unit inoperative and the remaining power-units operating at an appropriate power rating, taking into account the parameters specified in 4.3.

9.3. *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 power-unit inoperative, the conditions of 8.3.1 and 8.3.2. should be met.

9.4. *En route***.** The requirement of 8.4. should be met.

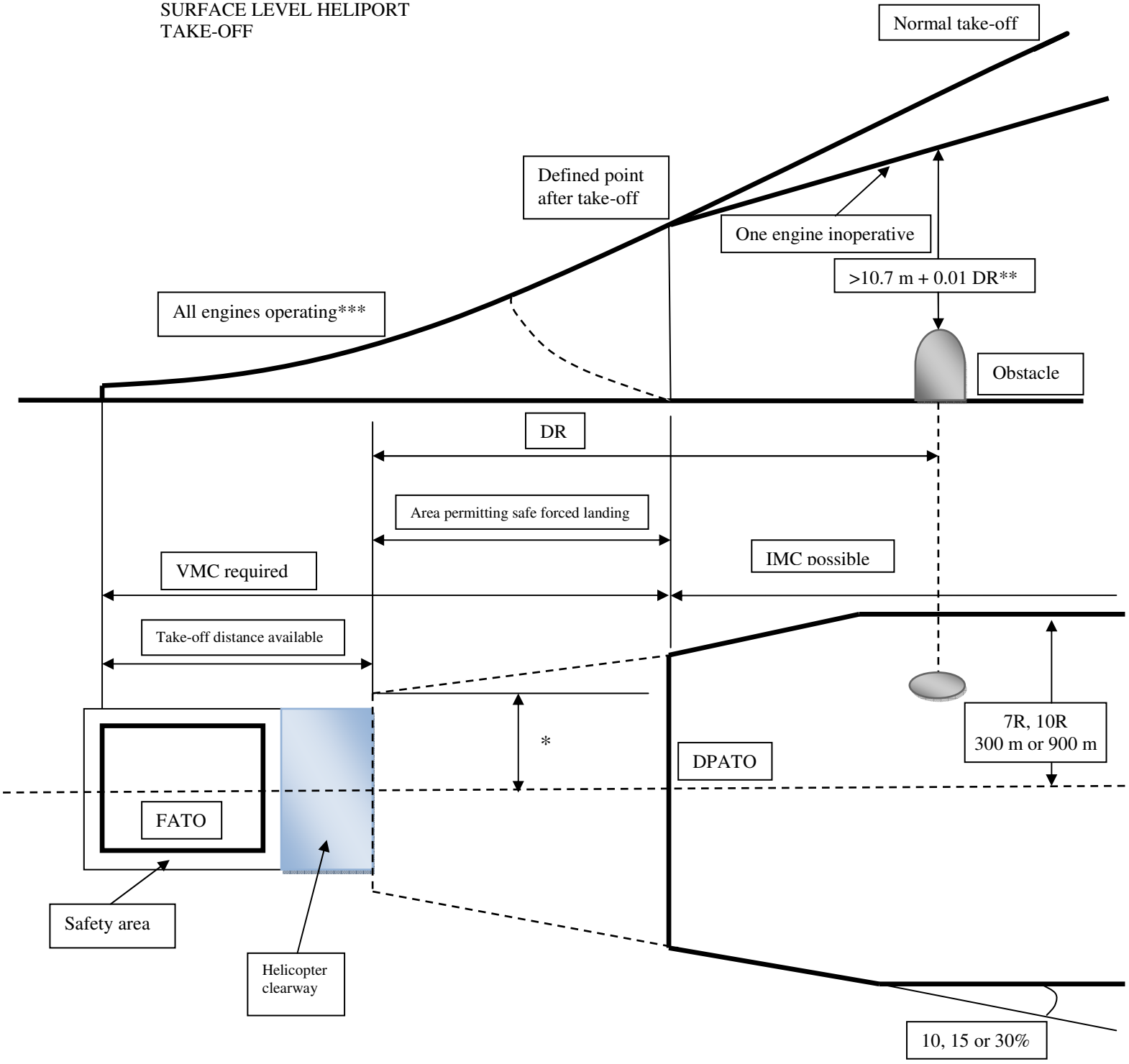
9.5. *Approach, landing and balked landing* (Figure 8 and 9)**.** In the event of the failure of the critical power-unit before the DPBL, the helicopter shall, at the destination or any alternate, after clearing all obstacles, in the approach path, be either able to land and stop within the landing distance available or to perform a balked landing and clear all obstacles in the approach path by an adequate margin. After the DPBL, failure of the power-unit may cause the helicopter to force-land. Therefore the condition that appropriate consideration be given to achieve a safe forced landing applies. The estimated landing mass at the destination or alternate should be such that:

9.5.1. It does not exceed the maximum landing mass specified in the flight manual for a rate of climb of 150 ft per min at 300 m (1000 ft) above the level of the heliport with the critical power-unit inoperative and the remaining power-units operating at an appropriate power rating, taking into account the parameters specified in 4.3.

9.5.2. It is possible, in case of a power-unit failure occurring at or before the DPBL, either to perform a safe forced landing or to overshoot, meeting the requirements of 8.3.1. and 8.3.2.

Only obstacles specified in 6. should be considered.

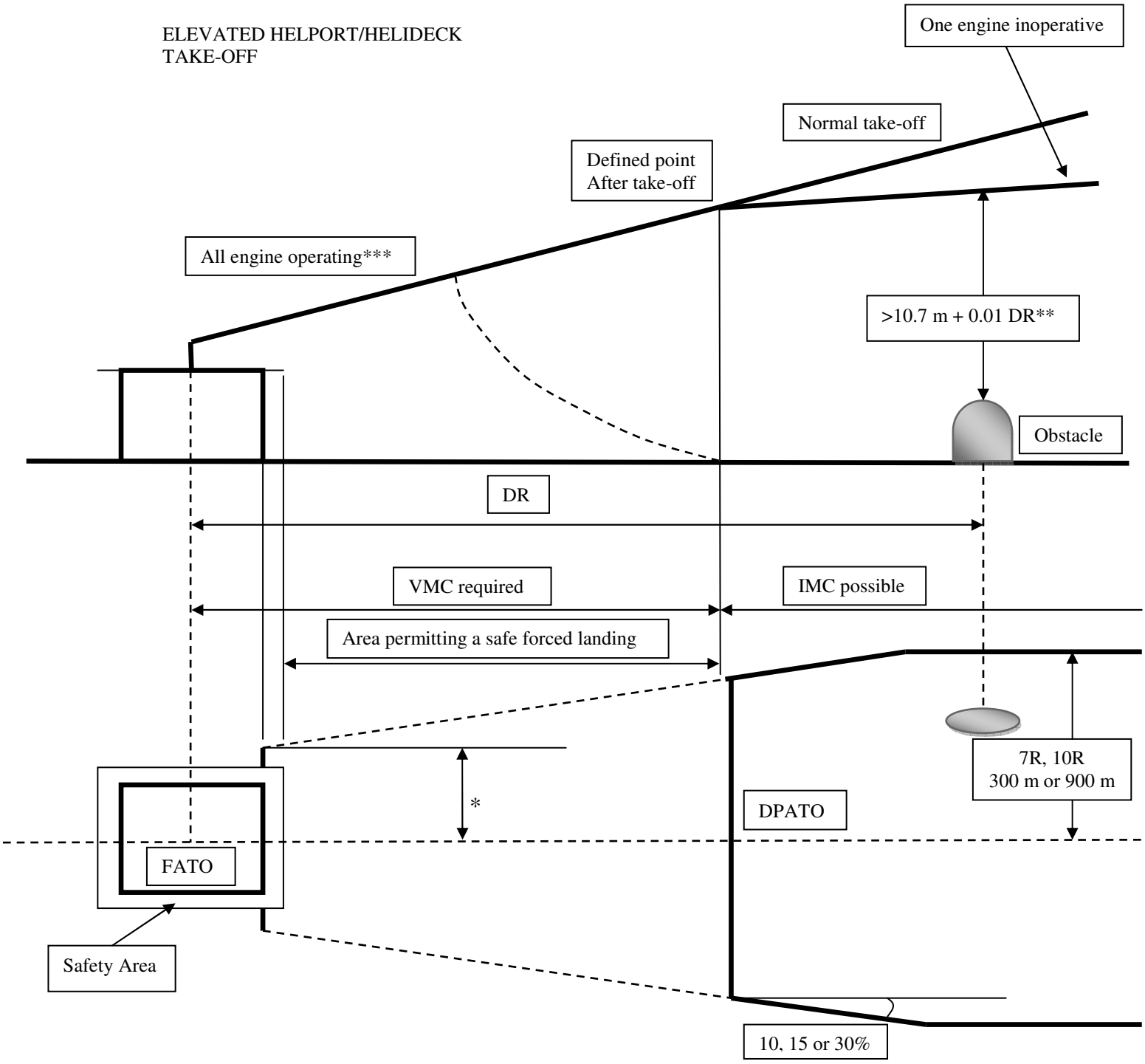
Performance Class 2



* 0.75 D +0.25 D (or 3 m, whichever is greater) for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
*** Only the all engines-operating flight path is shown

Figure 6

PERFORMANCE CLASS 2

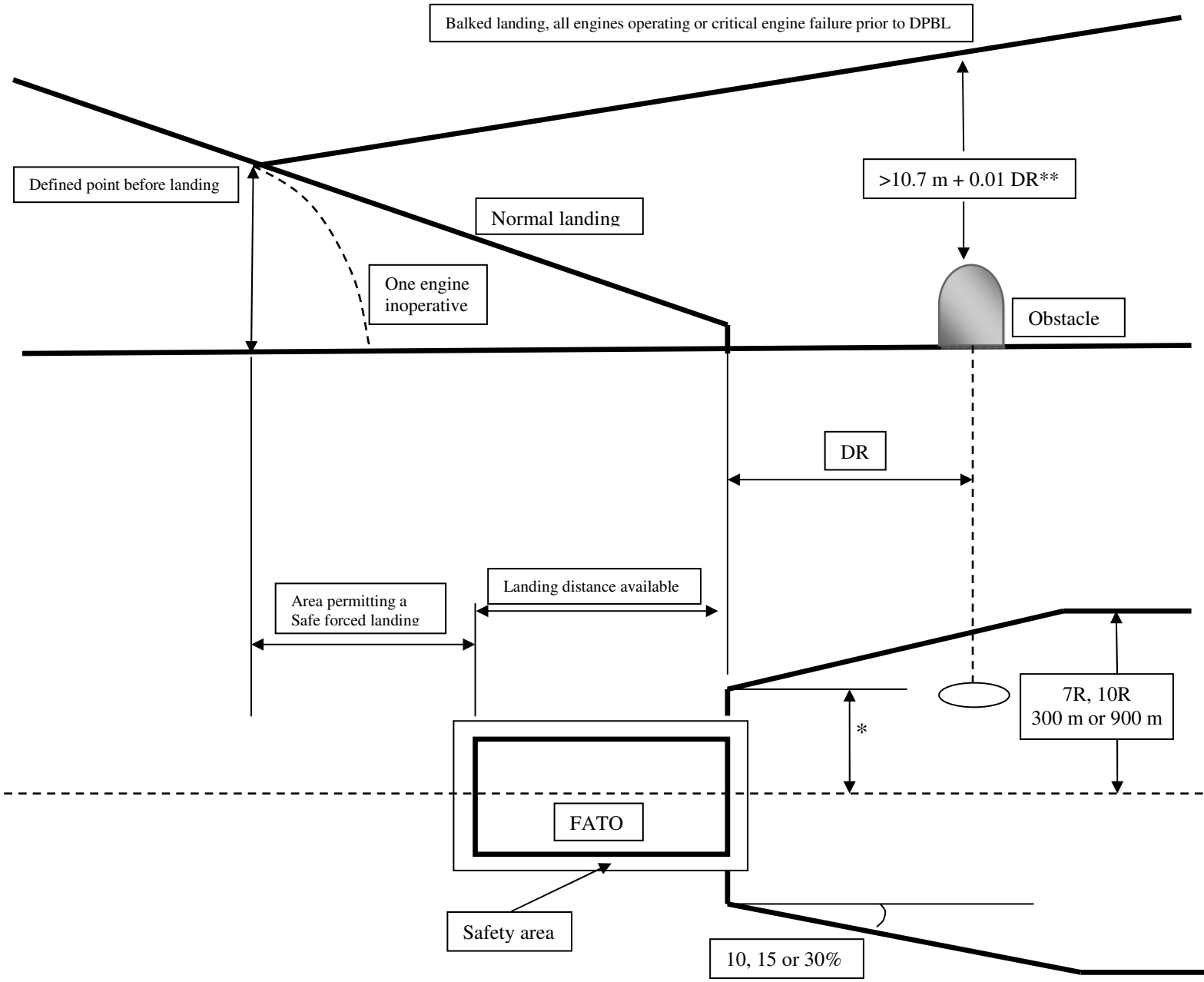


* 0.75 D +0.25 D (or 3 m, whichever is greater) for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
*** Only the all engines-operating flight path is shown

Figure 7

Performance Class 2

SURFACE LEVEL HELIPORT
LANDING

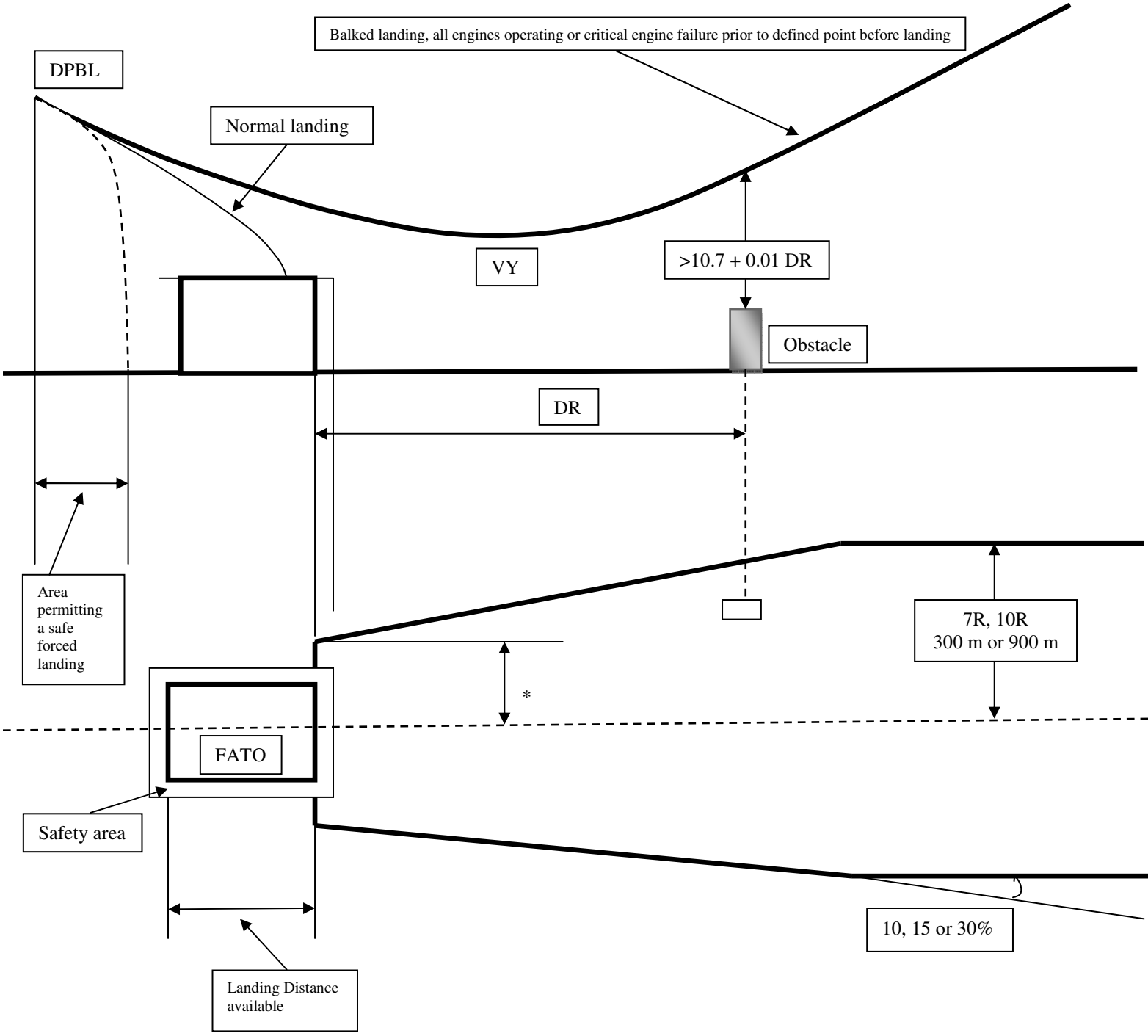


* 0.75 D +0.25 D (or 3 m, whichever is greater) for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations

Figure 8

Performance Class 2

ELEVATED HELIPORT/HELIDECK
LANDING



* 0.75 D +0.25 D (or 3 m, whichever is greater) for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations

Figure 9

10. Operations in performance Class 3

10.1. *Take-off and initial climb phase***.** At any point of the flight path, failure of a power-unit will cause the helicopter to force-land. Therefore the condition that appropriate consideration be given to achieve a safe forced landing applies.

10.2. *Take-off.* The mass of the helicopter at take-off should not exceed the maximum take-off mass specified in the flight manual for a hover in ground effect with all power-units operating at take-off power, taking into account parameters specified in 4.3. If the 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 power-units operating at take-off power, taking into account the parameters specified in 4.3.

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

10.4. *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. At any point of the flight path, failure of a power-unit will cause the helicopter to force-land. Therefore the condition that appropriate consideration be given to achieve a safe forced landing applies.

10.5. *Approach and landing*. At any point of the flight path, failure of a power-unit will cause the helicopter to force-land. Therefore the condition that appropriate consideration be given to achieve a safe forced landing applies. The estimated landing mass at the destination or alternate should be such that:

10.5.1.1. It does not exceed the landing mass specified in the flight manual for a hover in ground effect with all power-units operating at take-off power, taking into account the parameters specified in 4.3. If conditions are such that a hover in ground is not likely to be established, the take-off mass should not exceed the maximum mass specified in a hover out of ground effect with all power-units operating at take-off power, taking into account the parameters specified in 4.3.

10.5.1.2. It is possible to perform a balked landing, all engines operating, at the point of the flight path and clear all obstacles by an adequate vertical interval.

Chapter 6 - Helicopter – Public Transport Flights in VMC at Night

1. Minimum Weather and Associated Requirements for Public Transport Flights in VMC at Night

1.1. In Hong Kong, an aircraft flying at night shall be flown in accordance with the IFR unless it is within control zone on a Special VFR flight.

1.2. Commercial pilots shall not, unless their license includes an Instrument Rating validated by a IMC Proficiency Check, fly for the purpose of Public Transport other than in VMC, and shall not fly as pilot in command at night in VMC unless they have a minimum of 300 hours total flight time on helicopters which includes 100 hours as pilot-in-command and 10 hours at night as pilot flying.

1.3. Further requirements are:

1.3.1. Composition of crew: two pilots, or single pilot for helicopters equipped with an autopilot with at least altitude hold and heading mode which is serviceable on take-off and having a maximum total weight authorized of 5700 kg or less.

1.3.2. Recency: at least 3 take-offs, three circuits and three landings at night in the preceding 90 days.

1.3.3. Training and checking requirements for single pilot night VMC operations (which includes a night Proficiency Check, an instrument qualification, and a night line check) are detailed in Chapter 8.

1.4. Operations manuals must specify weather minima for VMC night flights. There are two standards of minima which are based on whether the crew/helicopter combination:

1.4.1. **Is not** equipped and capable of intentionally entering IMC flight; or

1.4.2. **Is** equipped and capable of entering IMC and subsequently making either an instrument approach to an airfield or regaining VMC.

1.5. For a crew/helicopter combination to be considered as IMC capable, the crew must be qualified for flight in IFR (instrument rating with appropriate training and checking), the AOC operations manual must include IFR operations, the aircraft must be equipped for IFR flight, and the weather and fuel state must be suitable for the flight or any required diversion. If any element is not valid, the crew/helicopter combination is not considered to be IMC capable.

1.6. For night flight in VMC with visual ground reference, the aircraft altitude must be capable of being assessed by reference to a clearly distinguishable external horizon that may be provided either by natural lighting or artificial lights spread deeply and widely across the track.

1.7. Night Weather Limits

1.7.1. **Non-IMC Capable:** For a non-IMC capable crew/helicopter combination flying in VMC at night by visual ground reference, the visibility shall not be less than 5 km and the forecast cloud base for the route shall not be less than 1500 ft above the highest terrain within 5 nm of the route. If the weather deteriorates en-route below the specified minima, the helicopter shall divert, return to the place of departure.

1.7.2. **IMC Capable:** For an IMC capable crew/helicopter combination flying in VMC at night by visual ground reference, the visibility shall not be less than 5 km and the forecast cloud base for the route shall not be less than 1200 ft above the highest terrain within 5 nm of the route. If the weather deteriorates en-route below the specified minima, the helicopter shall divert, return to the place of departure or continue the flight in IMC.

1.7.3. Reduce weather limits may be acceptable in some very specific areas of operation, such as flight over wholly within the confines of a well illuminated urban area or well illuminated line feature and also for some local areas, associated with the company operating base. Therefore, operators demonstrating an equivalent level of safety may be permitted some relaxation in the weather criteria stated, provided the case is acceptable to the HKCAD and the appropriate instructions are contained in the company operations manual.

Note. The weather limits of Para 1.7 applies to Public Transport operations only, and do not apply to Law Enforcement and Emergency Medical Services, where a risk analysis will have to be carried out taking into consideration the special equipment used, the training of the crew and the local environment. The weather limits determined by the risk analysis is to be acceptable to the HKCAD.

1.7.4. If public transport flights in VMC at night are to be conducted outside the requirements as set out in this chapter, the CAD is to be consulted at the earliest opportunity to determine whether equivalent safety measures can be applied that would allow the flights to be carried out under specified conditions.

Chapter 7 - Miscellaneous Provisions Affecting Helicopter Operations

1. Loading Instructions

1.1. Helicopter operators must provide loading instructions suited to the capabilities, limitations and operation of a helicopter. In preparing these instructions operators should remember that in many cases they will have to be read and implemented by personnel with little or no aviation experience, such as oil rig crews and contractors' staff. The instructions should be clear, concise and avoid the use of aviation jargon.

2. Radio Altimeter (Height Bug Setting Procedures)

2.1. Radio Altimeter (Radalt) and Audio Voice Alerting Devices (AVADs) for Public Transport over water operations are mandatory and the requirements were introduced with a warning of the proximity of the helicopter to the surface of the sea, sufficiently early so as to alert the crew and enable them to conduct corrective action.

2.2. It is essential that, for flights for which there is an equipment requirement for a radio altimeter to be fitted, the operations manual contains a procedure for setting the height bug or equivalent decision height indicator. The procedure should recognize the prime function of selecting the height indicator is to give the pilot early warning of possible impact with the sea and therefore when formulating the procedure, operators should ensure that the procedure gives their pilots "adequate" warning/reaction time. There are numerous instances of helicopter flights being conducted over-water where the fitment of a radio altimeter is not mandatory but where one is nonetheless installed. Operators of these flights should consider the safety benefits of providing advice to their crews on setting height warning bugs in such circumstances.

3. Provision of Two-Way Communications during Underslung Load Operations

3.1. The safety and efficiency of any load carrying operation depends to a large extent on the proficiency and team work of the ground personnel and this can be considerably enhanced by the use of portable VHF radios. This is particularly helpful when another crew member is not on board the helicopter to monitor the behavior of the external load. Operators should consider the use of two-way radio communications with the Ground Team when appropriate to the circumstances of the task, and should include a section in their operations manual detailing the procedures for the use of this two-way communication.

4. The Wearing of Protective Helmets by Crew Members Engaged in Underslung Load Operations

4.1. Operators are recommended to implement procedures requiring all crew members to wear protective flying helmets when conducting underslung load operations.

5. Special Protective Equipment: Power Line Inspections

5.1. Some AOC holders exercise the privileges of Exemptions against Schedule 14, Rules of the air Regulations, Rule 5(1)(e), on a regular and medium basis, for the purpose of inspecting, repairing and maintaining overhead transmission lines. The exemptions are subject to conditions designed to afford protection to vessels and vehicles unconnected with the task in hand and to persons and property on the surface. The standard Exemption does not directly address the risk to the helicopter and its occupants since it is assumed that the flight will not take place within the avoid section of the appropriate height/velocity graph.

5.2. It must be stressed that when non-company personnel are carried, these flights are classified as Public Transport, and as such, passengers are to be afforded proper protection. This means that planned flights in the avoid section of the height/velocity avoid area must be avoided. If prolonged penetration of the height /velocity avoid area are unavoidable as, for example, in live-line work, a twin-engined helicopter with the appropriate performance should be employed for the task. Where it is considered suitable to use a Group B helicopter it will often be the case that the terrain, onto which a forced landing may have to be carried out, will be unsuitable in terms of slope, for instance, to ensure full public transport protection standards to the passengers. In recognition of this unusual risk it is necessary for operators to afford the aircraft occupants added compensatory protection by requiring:

5.2.1. Aircraft engaged on the task to be equipped with full restraint harness for each occupant;

5.2.2. Each occupant to wear a protective helmet; and

5.2.3. Each occupant to wear flame proof overalls and clothing (and suitable footwear).

6. Additionally AOC holders should brief all personnel engaged on the task of any additional hazards associated with this type of flight, the material for such briefing to be included in the operations manuals. Initial grant and renewal of Exemptions will be conditional on meeting these requirements.

6. Loss of Tail Rotor Effectiveness

6.1. A critical low speed aerodynamic flight condition that results in an uncommanded rapid yaw rate that does not subside and which results in the loss of a helicopter if it remains unchecked is described as Loss of Tail Rotor Effectiveness (LTE). LTE results from a control margin deficiency and not a maintenance malfunction. LTE is an aerodynamic condition that can affect all single rotor helicopters that utilize a conventional tail rotor.

6.2. Whilst the design of the main and tail rotor blades and tail boom assembly can affect the characteristics and susceptibility of a helicopter to LTE, it will not nullify the phenomenon entirely. Tail Rotor capability is a factor and a helicopter type that is prone to reaching full pedal when, for example, hovering out of wind Inside Ground Effect (IGE) is more likely to suffer LTE due to high power (high, but in limits, gearbox torque or engine power) than a helicopter with good pedal margins in the same situation. Pilots should be aware of the characteristics of the helicopter they fly and be particularly aware of the amount of tail rotor pedal typically required for different flight conditions. LTE can occur on helicopters with either anti-clockwise or clockwise rotating main blades, but the direction of the relative wind that makes them susceptible to LTE will differ. Thus an American design will be susceptible with the relative wind from the left front arcs, and the French designs will be susceptible with relative winds from the front right arcs.

6.3. LTE is a condition that occurs when the flow of air through a conventional tail rotor, is altered in some way, by altering either the angle or the speed which the air passes through the rotating blades of the tail rotor system. An effective tail rotor relies on a stable and relatively undisturbed airflow in order to provide a steady and constant anti-torque reaction. The pitch, and inevitably the angle of attack of the individual blades, will determine the thrust output of the tail rotor. A change to any of these criteria, will inevitably alter the amount of thrust generated. When a pilot, makes a yaw pedal input he will effect a thrust reaction from the tail rotor. Altering the thrust delivered from the same yaw input will create an in-balance. Taking this in-balance to the extreme will result in the loss of effective control in the yawing plane and LTE will occur. The alteration of the tail rotor thrust can be effected by numerous external influences. The main influence and hence the main contributing factors of LTE are:

6.3.1. Airflow and downdraft generated by the main rotor blades interfering with the airflow entering the tail rotor assembly;

6.3.2. Main rotor vortices developed in the main rotor tips entering the tail rotor; and

6.3.3. Turbulence and other natural phenomena affecting the airflow surrounding the tail rotor.

6.4. Wind tunnel tests have shown that the aerodynamic turbulence induced with all three of the above phenomena are both complex and interrelated; however, three conditions appear to be contributory factors of LTE:

6.4.1. A high power setting, hence large main rotor pitch angle, induces considerable main rotor blade downwash and hence more turbulence than when the helicopter is in a low power setting;

6.4.2. A slow forward speed, typically at speeds where translational lift is in the process of change, where airflow around the tail rotor will vary in direction and speed; and

6.4.3. The airflow relative to the helicopter, the worst case being when the relative wind is within + or – 15 degrees of the 10 or 2 o'clock position (American/French types respectively) when the generated vortices can be blown directly into the tail rotor.

6.5. Certain flight activities are more at high risk to LTE than others and can find themselves in low and slow situations over the geographical areas where the exact wind speed and direction are hard to determine; power-line and pipeline patrol sectors, low speed aerial filming, and in Police and Air Ambulance service environments.

6.6. The exact parameters described below will vary from type to type depending on rotor orientation (clockwise or anti), the size of the machine and the geometric and aerodynamic relationship between the main and tail rotors. However there are certain flight phases where LTE is more likely to occur regardless of the type. The following is a general 'how to avoid LTE' list and whenever possible, avoid combinations of:

6.6.1. Low and slow flight outside of ground effect;
6.6.2. Winds from + or – 15 degrees or the 10 o'clock (American) or 2 o'clock (French) position;
6.6.3. Tailwinds that may alter the onset of translational lift hence induce high power demands;
6.6.4. Low speed downwind turns;
6.6.5. Large changes of power at low airspeeds; and
6.6.6. Low speed flight in the proximity of physical obstructions that may alter a smooth airflow.

6.7. Pilots should be aware that if they enter a flight regime where combinations of the above occurred, then they are entering a potential LTE situation. In this case they should realize the possibility of experiencing LTE, recognize their onset and be prepared to react quickly before it builds up.

6.8. The exact actions to be taken, having encountered the phenomenon, will vary according to the circumstances, but gaining forward airspeed will remove the problem. Awareness of LTE to assist in early detection of it, followed by firm corrective action to counter the effect, will always pay dividends. Early identification followed by the immediate application of corrective action by

getting the nose forward to regain airspeed is the key to a safe recovery – hence the need for the pilot to ensure that he has the height and space available to recover.

6.9. Vortex ring state can also occur on the tail rotor if the tail rotor thrust is opposed by a sufficiently strong airflow. In helicopters with counter-clockwise rotating main rotors, tail rotor thrust is produced by air being drawn from the right and accelerated to the left. Thus, if an airflow is present from left to right onto the tail rotor, vortex ring state can develop. Such an opposite airflow may occur when the aircraft is subject to a high rate hover turn to the right, wind from the left, or sideways flight to the left. The problem shows up when the rate of turn suddenly increases. If the pilot uses full left anti-torque pedal to stop the turn it may place substantial stresses on the drive system because the angles of attack on the tail rotor blades rapidly becomes exceedingly large. This together with the reduction of the induced flow due to the opposing airflow from the turn to the right will result in an extremely large angle of attack, that may approach the stalling angle of attack.

6.10. There was a case where a counter-clockwise rotating main rotors helicopter, hovering downwind, in ground effect, made a rapid yaw turn to the right. When the pilot applied full left pedal to stop the turn when he was into wind, the rate of turn to the right increased. The pilot could not arrest the rate of turn, in fact the full application of left pedal accelerated the turn to the right. According to the helicopter's Pilot's Handbook, this indicates a Loss of Tail Rotor Thrust and the action to be taken is to roll off the throttle to remove the helicopter's anti-torque effect and cushion the landing by the application of collective. To prevent this occurring, all hover manoeuvres should be carried out at a slow controlled pace.

7. One-Engine-Inoperative Ferry Flights – Helicopters

7.1. General

7.1.1. A one-engine-inoperative ferry flight in a multi-engined helicopter should only be considered under the most exceptional circumstances. The same general criteria and limitations that apply to aeroplane one-engine-inoperative ferry flights should be followed where appropriate. (see Appendix D, Chapter 4 of CAD 360)

7.1.2. A one-engine-inoperative ferry flight is not permitted unless the limitations, performance and operational procedures are specified in the helicopter's Flight Manual and the instructions pertaining to such a flight are included in the company's Operational Manual.

8. Turning of Helicopter Rotor under Power

8.1. A helicopter rotor shall not be turned under power without a qualified pilot at the controls.

9. Offshore Operations

9.1. Helicopters operating in Performance Class 1 or 2 shall be equipped with:

9.1.1. One life jacket, for each person. The life jacket shall be worn constantly unless the occupant is wearing an integrated survival suit that includes the functionality of the life jacket.

9.1.2. A survival suit, for each person. The survival suit should be worn by all occupants when the sea temperature is less than 10 degrees centigrade or when the estimated rescue time exceeds the calculated survival time. When the elevation and strength of the sun results in a high temperature hazard on the flight deck, consideration should be given to alleviating the flight crew from this recommendation.

Chapter 8 - Additional Factors for Helicopter Pilots' Training and Periodic Test

1. Introduction

1.1. The periodic test for helicopter pilots should be based, as far as it is practicable to do so for aeroplane pilots in Chapter 5 of CAD 360.

1.2. Commanders and co-pilots should normally be checked in their respective seats.

1.3. Commanders whose duties also require them to carry out the duties of the co-pilot, or commanders required to conduct training or examining duties, shall complete their proficiency checks respectively from left and right hand seats, on alternate proficiency checks.

2. Line Checks

2.1. Operator's, training staff should recognize the wide variety of roles in which pilots may be engaged and the content of the line check should reflect this. In any event the duration of the line check should not be less than 40 minutes.

2.2. Conduct of the line check must closely follow the requirements of CAD 360, Part 1, Chapter 5, paragraph 9.5. For pilots who are required to operate at night or under IMC the check must include an appropriate section and certification. The airways section of the instrument rating renewal may be counted as satisfying the IMC requirement.

3. Proficiency Checks

3.1. The proficiency check provides an opportunity for the practice of emergency drills and procedures which rarely arise in normal operations, and can generally be regarded as continuation training. The statutory Schedule 9 requirements, however, is that pilots shall be tested. And their continued competence must be verified and certified. It includes renewal of the Aircraft Rating (i.e. > boxed items = of form DCA 528) and, where applicable, Instrument Rating. Some manoeuvres can only be conducted in VMC whilst others must be carried out in simulated IMC (either by use of approved blind-flying screens or a simulator approved for this purpose). Those pilots conducting only VMC operations normally need only carry out a VMC section. Those required to carry out both VMC and IMC operations will require both VMC check and an IMC check. It is therefore acceptable to treat these sections as separate checks each having the same validity as prescribed at CAD 360, Part One, Appendix A to Chapter 5.

3.2. Those items of the VMC check which are appropriate at night operations and those which should only be attempted in daylight should be checked at least annually. Therefore the VMC check should be conducted alternately by day and night.

3.3. The content of the VMC proficiency check must include the following items where applicable to the type of helicopter:

3.3.1. Engine failure before and after the decision point for each take-off profile and each landing profile that is in use by the operator and is published in the Operations Manual;

3.3.2. Flight and engine control systems malfunctions for which accepted procedures are included in the Rotorcraft Flight Manual;

3.3.3. Auto-rotation to a designated area with powered recovery to forward or hovering flight; and

3.3.4. Pilot incapacitation.

3.4. The content of the IMC proficiency check must include the following items where applicable to the type of helicopter:

3.4.1. Precision instrument approach to minima with, in the case of multi-engined helicopters, a simulated failure of one engine;

3.4.2. Non-precision approach to minima;

3.4.3. Where appropriate to the helicopter type, approach with flight control system/flight director system malfunction, flight instrument and navigation equipment failures;

3.4.4. At least one instrument approach should be flown with a degradation of the flight control system/auto-pilot; and

3.4.5. Recovery from unusual attitudes and techniques for auto-rotation in IMC.

3.5. Emergencies such as tail rotor failure, double engine failure, and icing problems which it would be impossible or only possible with acceptable risk factor to practise in flight, should be covered in a simulator or by discussion on the ground.

4. Conduct of Specialist Task Checks

4.1. Contract work will often require specialist techniques, and operators should ensure that role checks can be conducted to cover particular circumstances. Examples of these are:

4.1.1. Manoeuvres in confined areas or over rough or uneven ground
4.1.2. Over water operations, including winching
4.1.3. Underslung loads
4.1.4. Power line “stringing”

5. Instrument Approach Proficiency

To satisfy the requirements for Commander's and co-pilot's instrument approach proficiency, at least one instrument approach must be flown in IMC (actual or simulated). This approach must be carried to a position from which a successful landing could have been made and this will normally form part of the proficiency check.

6. Instrument Rating (Helicopters)

The helicopter Instrument rating is valid only in respect of the helicopter type on which the test was conducted with the exception of the airways section which need only be conducted on one type in the case of a multi-type rated pilot.

7. Proficiency Checks – Pilots to Operate at Night in VMC

7.1. **Two Pilot Operation.** For helicopters that are operated by two pilots, each holding a valid Instrument Rating (IR) and IMC Proficiency Check, there are no specific requirements for Proficiency Checks to be carried out at night. However, companies must examine their night operating procedures, and if night performance profiles, e.g. helipad and deck operations, require procedures or techniques that are unique to the night environment, then appropriate training and alternating day/night Proficiency Checks must be incorporated into the recurrent training and checking programme. For pilots without a valid Instrument Rating and VMC Proficiency Check an Instrument Night Qualification (INQ) previously referred to as Night Qualification Check (NQC) and night Proficiency Check requirement are the same as detailed in paragraphs 7.2. and 7.3. for single pilot operation.

7.2. **Single-Pilot Operation.** To operate single pilot night in VMC, the pilot must hold either a valid IR and IMC Proficiency Check or an INQ. Pilots who do not hold an IR and IMC Proficiency Check are required to demonstrate their competence while executing specified manoeuvres and procedures in flight in simulated instrument flight conditions, prior to commencing night operations in VMC, and thereafter at six monthly intervals. The training and checking syllabus for the INQ is detailed in Appendix 1 to this Chapter. The INQ must not be confused with, and in addition to, the requirement for a Proficiency Check to be carried out at night, detailed in paragraph 7.3. below.

7.3. Prior to commencing night operations in VMC, Pilots shall carry out a Proficiency Check at night. Thereafter, each alternate Proficiency Check shall be conducted at night. A Proficiency Check conducted at night shall qualify a pilot for both day and night operations.

8. Operations to Oil and Gas Installations and Vessels at Night

8.1. Operators who intend to work in the offshore environment to oil and gas installations shall ensure that all pilots are initially qualified in night deck landings and thereafter remain recent.

8.2. An initial night deck landing qualification will qualify a pilot to land on and depart from an installation at night. The qualification shall be valid for 12 months and may be revalidated by operating to a deck at night within the 12 month period. A pilot whose night deck recency has expired may operate to a deck at night provided he is in date for day deck landings and is accompanied by a suitably qualified Line Training Captain.

Appendix 1 to Chapter 8

Training and Checking Required for a Public Transport Helicopter Night Qualification for Flight Crew who do not hold an IR or IMC Proficiency Check

1. Introduction

1.1. The training and checking requirements and skill levels necessary of a helicopter Instrument Night Qualification (INQ) are listed below. The INQ is only required by flight crew whose license does not include an instrument rating which has been validated by an Instrument Proficiency Check and who carries out Public Transport or Commercial Air Transport at night in VMC.

1.2. The pilot conducting the training and/or checking (the Training Captain) shall be a Type Rating Examiner for the aircraft type to be used. The pilot under test shall pass all section of the INQ. Failure in more than one section will require the pilot to take the entire check again. A pilot failing only one section shall take the failed section again. Further training may be required following any failed INQ. Failure to achieve a pass in all sections of the check in two attempts shall require further training as determined by the examiner.

1.3. The INQ is type-specific, and shall be carried out in the helicopter type in flight.

2. Conduct of Check

2.1. The check is intended to simulate a practical flight and should be carried out in Day VFR under simulated instrument flight conditions. The route to be flown shall be chosen by the Training Captain. An essential element is the ability of the pilot to plan and conduct the flight from routine briefing material. The pilot shall undertake the flight planning and shall ensure that all equipment and documentation for the execution of the flight are on board. The duration of the flight shall be at least 30 minutes.

2.2. The pilot shall normally be required to fly the helicopter from a position where pilot-in-command functions can be performed and to carry out the check as if there is no other crew-member. The Training Captain shall take no part in the operation of the helicopter, except when intervention is necessary in the interests of safety or to avoid unacceptable delay to other traffic. The pilot shall indicate to the Training Captain the checks and duties carried out, including the identification of radio facilities. Checks shall be completed in accordance with the authorized checklist for the helicopter on which the check is being taken. Power settings and speeds should be agreed with the Training Captain before the start of the check and should normally conform to those given in the operations or flight manual of the helicopter concerned.

3. Flight Check Tolerances

3.1. The pilot shall demonstrate the ability to:

3.1.1. Operate the helicopter within its limitations;
3.1.2. Complete all manoeuvres with smoothness and accuracy;
3.1.3. Exercise good judgement and airmanship;
3.1.4. Apply aeronautical knowledge; and
3.1.5. Maintain control of the helicopter at all times in such a manner that the successful outcome of a procedure is never in doubt.

3.2. The following limits are for general guidance. The Training Captain shall make allowance for turbulent conditions and the handling qualities and performance of the helicopter used.

Height: +/- 150 ft
Heading: +/- 10 degrees
Speed: +/- 10 knots

4. Contents of INQ

Section 1

Pre-Departure

(a) Aircraft performance calculation, mass and balance

(b) Pre-flight inspection

(c) Knowledge of OM weather minima requirements

(d) Pre-take-off instrument serviceability checks

Section 2

General Handling

*(coupled autopilot modes may **not** be used in this section)*

Control of the helicopter by reference solely to instruments, including:

(a) Transition to instrument flight during climb out;

(b) Climbing and descending turns with sustained Rate 1 bank angle;

(c) Speed changes in level flight maintaining a constant heading and altitude;

(d) Rate 1 turns to specific headings maintaining a constant altitude;

(e) Autorotation and recovery to level flight;

(f) Limited panel (main Attitude Indicator failure); and

(g) Recovery from unusual attitudes, to include: Low IAS and High rate of descent; High IAS; High bank angles.

Section 3

Emergency Homing and Let Down Procedure

(coupled autopilot mode, if fitted, may be used for this section)

Control of the helicopter by reference solely to instruments, including:

(a) Setting and checking of navigational aids, identification of facilities if applicable;

(b) Homing to a nominated point, as briefed by the Training Captain, using pilot interpreted aids or simulated ground instructions;

(c) Level flight, control of heading, altitude and airspeed, power setting;

(d) Altimeter settings;

(e) ATC liaison and compliance, (simulated if appropriate) RTF procedures; and

(f) Instrument let down to an airfield as briefed by the Training Captain (can be by use of pilot interpreted aids or ground instructions which may be simulated).

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Appendix 2 to Chapter 8

Low Visibility Operations – Training and Qualifications

1. **General.** An operator must ensure that the flight crew member training programmes for Low Visibility Operations include structured courses of ground, flight simulator and/or flight training. The operator may abbreviate the course content as prescribed in sub-paragraph 1.2. and 1.3. below provided the content of the abbreviated course is acceptable to the HKCAD.

1.1. Flight crew members with no Category II or III experience must complete the full training programme prescribed in sub-paragraph 2., 3., and 4. below.

1.2. Flight crew members with Category II and III experience may undertake an abbreviated ground training course.

1.3. Flight crew members with Category II or III experience with the operator may undertake an abbreviated ground, flight simulator and/or flight training course. The abbreviated course is to include at least the requirements of sub-paragraphs 4.1., 4.2.1., or 4.2.2., as appropriate and 4.3.1.

2. **Ground Training.** An operator must ensure that the initial ground training course for Low Visibility Operations covers at least:

2.1. The characteristics and limitations of the ILS and/or MLS
2.2. The characteristics of the visual aids
2.3. The characteristics of fog
2.4. The operational capabilities and limitations of the particular airborne system
2.5. The effects of precipitation, ice accretion, low level wind shear and turbulence
2.6. The effects of specific helicopter malfunctions
2.7. The use and limitations of RVR assessment systems
2.8. The principles of obstacle clearance requirements
2.9. Recognition and action to be taken in the event of failure of ground equipment
2.10. The procedures and precautions to be followed with regard to surface movement during operations when the RVR is 400 m or less and any additional procedures required for take-off in condition below 150 m
2.11. The significance of Decision Heights based upon radio altimeters and the effect of terrain profile in the approach area on radio altimeter readings and on the automatic approach/landing systems
2.12. The importance and significance of Alert Height if applicable and the action in the event of any failure above and below the alert height
2.13. The qualification requirements for pilots to obtain and retain approval to conduct Low Visibility Take-offs and Category II and III operations
2.14. The importance of correct seating and eye position

3. Flight simulator training and/or flight training

3.1. An operator must ensure that flight simulator and/or flight training for Low Visibility Operations includes:

3.1.1. Checks of satisfactory functioning of equipment, both on the ground and in flight.

3.1.2. Effect of minima caused by changes in the status of ground installations.

3.1.3. Monitoring of automatic flight control systems and auto-land status annunciators with emphasis on the action to be taken in the event of failures of such systems.

3.1.4. Action to be taken in the event of failures such as engines, electrical systems, hydraulics or flight control system.

3.1.5. The effect of known unserviceability and use of minimum equipment lists.

3.1.6. Operating limitations resulting from airworthiness certification.

3.1.7. Guidance on the visual cues required at decision height together with information on maximum deviation allowed from glidepath or localizer.

3.1.8. The importance and significance of Alert Height if applicable and the action in the event of any failure above and below the Alert Height.

3.2. An operator must ensure that each flight crew-member is trained to carry out his duties and instructed on the coordination required with other crew members. Maximum use should be made of suitably equipped flight simulators for this purpose.

3.3. Training must be divided into phases covering normal operations with no helicopter or equipment failures but including all weather conditions which may be encountered and detailed scenarios of helicopter and equipment failure which could affect Category II or III operations. If the helicopter system involves the use of hybrid or other special systems (such as head up displays or enhanced vision equipment) then flight crew-members must practice the use of these systems during the flight simulator phase of training.

3.4. Incapacitation procedures appropriate to Low Visibility Take-offs and Category II or III operations shall be practiced.

3.5. For helicopters with no type specific flight simulator, operators must ensure that the flight training phase specific to the visual scenarios of Category II operations is conducted in a flight simulator approved for the purpose by the

HKCAD. Such training must include a minimum of 4 approaches. The training that is type specific shall be practiced in the helicopter.

3.6. Category II and III training shall include at least the following exercise:

3.6.1. Approach using the appropriate flight guidance, autopilots and control systems installed in the helicopter, to the appropriate decision height and to include transition to visual flight and landing;

3.6.2. Approach with all engines operating using the appropriate flight guidance systems, autopilots and control systems installed in the helicopter down to the appropriate decision height followed by missed approach, all without external visual reference;

3.6.3. Where appropriate, approaches using automatic flight systems to provide automatic flare, hover, landing and roll-out; and

3.6.4. Normal operations of the applicable system both with and without acquisition of visual cues at decision height.

3.7. Subsequent phases of training must include at least:

3.7.1. Approaches with engine failure at various stages of the approach;

3.7.2. Approaches with critical equipment failure (e.g. electrical systems, autoflight systems, ground and /or airborne ILS/MLS systems and status monitor);

3.7.3. Approaches where failure of autoflight equipment at low level require either:

3.7.3.1. Reversion to manual flight to control flare, hover, landing and roll out or missed approach; or

3.7.3.2. Reversion to manual flight on a degraded automatic mode to control missed approaches from, at or below decision height including those which may result in a touchdown on the runway;

3.7.4. Failure of the systems which will result in excessive localizer and/or glide-slope deviation, both above and below decision height, in the minimum visual conditions authorized for the operation. In addition a continuation to a manual landing must be practiced if a head-up display forms the only flare mode; and

3.7.5. Failures and procedures specific to helicopter type or variant.

3.8. The training programme must provide practice in handling faults which require a reversion to higher minima.

3.9. The training programme must include, the handling of the helicopter when, during a fail passive Category III approach, the fault causes the autopilot to disconnect at or below decision height when the last reported RVR is 300 m or less.

3.10. When take-offs are conducted in RVRs of 400 m or below, training must be established to cover systems failure and engine failures resulting in continued as well as rejected take-offs.

4. Conversion training Requirements to conduct Low Visibility Take-off and Category II and III operations. An operator shall ensure that each flight crew member completes the following Low Visibility Procedure training if converting to a new type or variant of helicopter in which Low Visibility Take-off and Category II and III Operations will be conducted. The flight crew member experience requirements to undertake an abbreviated course are prescribed in sub-paragraphs 1.2 and 1.3. above.

4.1. *Ground Training*. The appropriate requirement prescribes in sub-paragraph 2. above, taking into account the flight crew member's Category II and III training and experience.

4.2. *Simulator Training and/or Flight Training*

4.2.1. A minimum of 8 approaches and/or landings in a flight simulator approved for the purpose.

4.2.2. When no type specific flight simulator is available, a minimum of 3 approaches including at least one go-around is required on the helicopter.

4.2.3. Appropriate additional training if any special equipment is required such as head-up displays or enhanced vision equipment.

4.3. *Flight Crew Qualification.* The flight crew qualification requirements are specific to the operator and the type of helicopter operated.

4.3.1. The operator must ensure that each flight crew member completes a check before conducting Category II or III operations.

4.3.2. The check provided in sub-paragraph 4.3.1. above may be replaced by successful completion of the flight simulator and/or flight training prescribed in sub-paragraph 4.2. above

4.4. *Line Flying under Supervision.* An operator must ensure that each flight crew member undergoes the following under supervision:

4.4.1. For Category II when a manual landing is required, a minimum of 3 landings from autopilot disconnect.

4.4.2. For Category III, a minimum of 3 autolands except that only 1 autoland is required when the training required in sub-paragraph 4.2. above has been carried out in a full flight simulator usable for zero flight time training.

5. Type and command experience. The following additional requirements are applicable to commanders who are new to the helicopter type:

5.1. 50 hours or 20 sectors as pilot-in-command on the type before performing any Category II or III operations.

5.2. 100 hours or 40 sectors as pilot-in-command on the type. 100 m must be added to the applicable Category II or III RVR minima unless he has been previously qualified for Category II or III operations with another operator.

5.3. The HKCAD may authorize a reduction in the above command experience requirement for flight crew members who have Category II or III command experience.

6. Low Visibility Take-off with RVR less than 150 m

6.1. An operator must ensure that prior to authorization to conduct take-offs in RVRs below 150 m the following training is carried out:

6.1.1. Normal take-off in minimum authorized RVR conditions;

6.1.2. Take-off in minimum authorized RVR conditions with an engine failure at or after TDP; and

6.1.3. Take-off in minimum authorized RVR conditions with an engine failure before the TDP.

6.2. An operator must ensure that the training required by sub-paragraph 6.1. above is carried out in an approved flight simulator. This training must include the use of any special procedures and equipment. Where no approved simulator exists, the HKCAD may approve such training in a helicopter without the requirement for minimum RVR conditions.

6.3. An operator must ensure that a flight crew member has completed a check before conducting low visibility take-offs in RVRs of less than 150 m if applicable. The check may only be replaced by successful completion of the flight simulator and/or flight training prescribed in sub-paragraph 6.1. on initial conversion to a helicopter type.

7. Recurrent Training and Checking – Low Visibility Operations

7.1. An operator must ensure that, in conjunction with the normal recurrent training and operator proficiency checks, a pilot's knowledge and ability to perform the tasks associated with the particular category of operation, including LVTO, for which he is authorized is checked. The required number

of approaches to be conducted during such recurrent training is to be a minimum of two, one of which is to be a missed approach and at least one low visibility take-off to the lowest applicable minima. The period of validity for this check is 6 months including the remainder of the month of issue.

7.2. For Category III operations an operator must use a flight simulator approved for Category III training.

7.3. An operator must ensure that, for Category III operations on helicopter with a fail passive flight control system, a missed approach is completed at least once every 18 months as a result of an autopilot failure at or below decision height when the last reported RVR is 300 m or less.

7.4. The HKCAD may authorize recurrent training for Category II operations in a helicopter type where no approved flight simulator is available.

8. LVTO and Category II and III Recency Requirements

8.1. An operator must ensure that, in order for pilots to maintain a Category II and III qualification, they have conducted a minimum of 3 approaches and landings using approved Category II/III procedures during the previous 6 months period, at least one of which must be conducted in the helicopter.

8.2. Recency for LVTO is maintained by retaining the Category II or III qualification prescribes in sub-paragraph 8.1. above.

8.3. An operator may not substitute this recency requirement for recurrent training.

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