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Ref.: AN 4/1.1.50-07/54

20 August 2007

Subject: Proposals for the amendment of Annex 14, Volumes I and II, and consequential amendments to Annexes 4 and 15, stemming from the recommendations of the first meeting of the Aerodromes Panel

Action required: Comments to reach Montreal by 5 December 2007

Sir/Madam,

1. I have the honour to inform you that the Air Navigation Commission, at the fourteenth meeting of its 175th Session held on 19 June 2007, considered proposals developed by the first meeting of the Aerodromes Panel (AP/1) and the Secretariat to amend the Standards and Recommended Practices (SARPs) in Annex 4 — *Aeronautical Charts*; Annex 14 — *Aerodromes*, Volume I — *Aerodrome Design and Operations*; Volume II — *Heliports* and Annex 15 — *Aeronautical Information Services* relating to aerodromes and heliports, and authorized their transmission to Contracting States and appropriate international organizations for comments.

2. The proposed amendments to Annex 14, Volumes I and II are shown in Attachments A and B, respectively, and those for Annex 4 and Annex 15 are in Attachments C and D.

3. The proposed amendment to Annex 14, Volume I covers a wide range of subjects, including revised code letter F provisions related to aerodrome physical characteristics, visual aids, rescue and fire fighting and aerodrome operations and services. The proposed amendment to Annex 14, Volume II relates mainly to physical characteristics for onshore heliports and offshore helidecks and shipboard heliports, as well as specifications on obstacle limitation surfaces and markings for offshore heliports.

4. The proposed amendment to Annex 4 introduces provisions for including a symbol for denoting wind turbines on aeronautical charts, in view of the proposed specifications on marking and lighting of wind turbines, and the proposed amendment to Annex 15 includes provisions for the promulgation of the status of aerodrome certification in the State's aeronautical information publication.

5. During its preliminary review of the proposal to amend Annex 14, Volume I, the Air Navigation Commission specifically requested that States' views be sought on the proposed withdrawal of the provision to lower the level of the aerodrome rescue and fire fighting (RFF) protection based on the frequency of movements of the largest aeroplane normally operating at the aerodrome, currently permitted in paragraph 9.2.3 of the Annex. Recent statistics on aircraft accidents involving fire, for the period from 1997 to 2007, supports the removal of this existing provision with a view to enhancing the safety of occupants of an aeroplane. To facilitate better understanding, Attachment E to this State letter contains the background information on this subject as well as the rationale behind the proposal. I would therefore appreciate receiving any data you may have on the adequacy of the existing levels of protection and the quantities of extinguishing agents used at any aircraft accidents involving fire.

6. AP/1 had developed an amendment proposal to introduce two new specifications related to aerodrome certification covering safety assessments to be conducted whenever any change in the aerodrome facilities and services was planned, coordination with all agencies working at an aerodrome, implementation of a safety reporting system, and having in place a safety training programme. The Commission agreed that this amendment proposal should not be part of the consultation process with States and international organizations as it would be in conflict with the overall objective of harmonizing safety management provisions as well as not adding anything new to existing provisions. The Commission also noted that sufficiently detailed guidance was available in the *Manual on Certification of Aerodromes* (Doc 9774).

7. AP/1 had not been in a position to finalize an amendment proposal on visual aids for denoting wind turbines. However, the Commission felt that it deserved consideration from a safety perspective. In light of the above, the Commission decided that the proposed amendments on visual aids for denoting wind turbines be sent to States and appropriate international organizations for comments.

8. The Commission recognized that, in addition to marking and lighting of wind turbines as was proposed by AP/1, aeronautical charting was also important in assisting pilots in identifying the locations of wind turbines. Therefore, the Secretariat developed a consequential amendment to Annex 4 — *Aeronautical Charts*, to include a symbol for denoting wind turbines on aeronautical charts. The Commission agreed that this amendment proposal also be sent to States and appropriate international organizations for comments.

9. May I request that any comments you wish to make on the amendment proposals be dispatched to reach me not later than 5 December 2007. The Air Navigation Commission has asked me to specifically indicate that comments received after the due date may not be considered by the Commission and the Council. In this connection, should you anticipate a delay in the receipt of your reply, please let me know in advance of the due date.

10. For your information, the proposed amendments to Annex 14, Volumes I and II are envisaged for applicability on 20 November 2008. The proposed amendments to Annex 4 and Annex 15 are envisaged for applicability on 18 November 2010. Any comments you may have thereon would be appreciated.

11. The subsequent work of the Air Navigation Commission and the Council would be greatly facilitated by specific statements on the acceptability or otherwise of the proposals. Please note that for the review of your comments by the Air Navigation Commission and the Council, replies are normally classified as "agreement with or without comments" "disagreement with or without comments" or "no indication of position". If in your reply the expressions "no objections" or "no comments" are used, they will be taken to mean "agreement without comment" and "no indication of position",

respectively. In order to facilitate proper classification of your response, a form has been included in Attachment F which may be completed and returned together with your comments, if any, on the proposals in Attachments A, B, C and D.

Accept, Sir/Madam, the assurances of my highest consideration.

Taïeb Chérif
Secretary General

Enclosures:

- A — Proposed amendment to Annex 14, Volume I
- B — Proposed amendment to Annex 14, Volume II
- C — Proposed amendment to Annex 4
- D — Proposed amendment to Annex 15
- E — Background information on the proposed amendment
concerning the level of protection for RFF
- F — Response form

ATTACHMENT A to State letter AN 4/1.1.50-07/54

**PROPOSED AMENDMENT TO
INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

AERODROMES

**ANNEX 14
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION**

**VOLUME I
(AERODROME DESIGN AND OPERATIONS)**

**NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT TO
ANNEX 14, VOLUME I**

The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

1. ~~Text to be deleted is shown with a line through it.~~ text to be deleted
2. New text to be inserted is highlighted with grey shading. new text to be inserted
3. ~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading. new text to replace existing text

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

CHAPTER 1. GENERAL

Introductory Note. — This Annex contains Standards and Recommended Practices (specifications) that prescribe the physical characteristics and obstacle limitation surfaces to be provided for at aerodromes, and certain facilities and technical services normally provided at an aerodrome. It also contains specifications dealing with obstacles outside those limitations surfaces. It is not intended that these specifications limit or regulate the operation of an aircraft.

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1.1 Definitions

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Intermediate holding position. A designated position intended for traffic control at which taxiing aircraft and vehicles shall stop and hold until further cleared to proceed, when so instructed by the aerodrome control tower.

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Obstacle. All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that:

a) are located on an area intended for the surface movement of aircraft; or ~~that~~

b) extend above a defined surface intended to protect aircraft in flight; or

c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.

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1.4 Certification of aerodromes

Note.— The intent of these specifications is to ensure the establishment of a regulatory regime so that compliance with the specifications in this Annex can be effectively enforced. It is recognized that the methods of ownership, operation and surveillance of aerodromes differ among States. The most effective and transparent means of ensuring compliance with applicable specifications is the availability of a separate safety oversight entity and a well-defined safety oversight mechanism with support of appropriate legislation to be able to carry out the function of safety regulation of aerodromes. When an aerodrome is granted a certificate, it signifies to aircraft operators and other organizations operating on the aerodrome that, at the time of certification, the aerodrome meets the specifications regarding the facility and its operation, and that it has, in the opinion of the certifying authority, the capability to maintain these specifications for the period of validity of the certificate. The certification process also establishes the baseline for continued monitoring of compliance with the specifications. Information on

the status of certification of aerodromes would need to be provided to the appropriate aeronautical information services for promulgation in the Aeronautical Information Publication (AIP). See 2.13.1 and Annex 15, Appendix 1, AD 1.5.

1.4.1 States shall certify aerodromes used for international operations in accordance with the specifications contained in this Annex as well as other relevant ICAO specifications through an appropriate regulatory framework.

1.4.2 **Recommendation.**— States should certify aerodromes open to public use in accordance with these specifications as well as other relevant ICAO specifications through an appropriate regulatory framework.

1.4.3 The regulatory framework shall include the establishment of criteria and procedures for the certification of aerodromes.

Note.— *Guidance on a regulatory framework is given in the Manual on Certification of Aerodromes.*

1.4.4 As part of the certification process, States shall ensure that an aerodrome manual which will include all pertinent information on the aerodrome site, facilities, services, equipment, operating procedures, organization and management including a safety management system, is submitted by the applicant for approval/acceptance prior to granting the aerodrome certificate.

Note.— *The intent of a safety management system is to have in place an organized and orderly approach in the management of aerodrome safety by the aerodrome operator. Guidance on an aerodrome safety management system is given in the Safety Management Manual (SMM) (Doc 9859) and in the Manual on Certification of Aerodromes (Doc 9774).*

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CHAPTER 2. AERODROME DATA

2.8 Declared distances

The following distances shall be calculated to the nearest metre or foot for a runway intended for use by international commercial air transport:

- a) take-off run available;
- b) take-off distance available;
- c) accelerate-stop distance available; and
- d) landing distance available.

Note — *Guidance on calculation of declared distances is given in Attachment A, Section 3*

2.9 Condition of the movement area and related facilities

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2.9.3 **Recommendation.**—To facilitate compliance with 2.9.1 and 2.9.2, inspections of the movement area ~~should~~ **shall** be carried out each day at least once where the code number is 1 or 2 and at least twice where the code number is 3 or 4.

Note.— *Guidance on carrying out daily inspections of the movement area is given in the Airport Services Manual, Part 8 and in the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476).*

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2.11 Rescue and fire fighting

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2.11.2 **Recommendation.**— *The level of protection normally available at an aerodrome should be expressed in terms of the category of the rescue and fire fighting services as described in 9.2 and in accordance with the types and amounts of extinguishing agents normally available at the aerodrome*

2.11.3 ~~Significant~~ **C** Changes in the level of protection normally available at an aerodrome for rescue and fire fighting shall be notified to the appropriate air traffic services units and aeronautical information units to enable those units to provide the necessary information to arriving and departing aircraft. When such a change has been corrected, the above units shall be advised accordingly.

Note.— ~~A significant change in the level of protection is considered to be~~ **Changes in the level of protection from that** ~~a change in the category of the rescue and fire fighting service from the category~~ normally available at the aerodrome **could** ~~resulting~~ from a change in **the** availability of extinguishing agents, equipment to deliver the agents or personnel to operate the equipment, etc.

2.11.4 **Recommendation.**— ~~A significant~~ change should be expressed in terms of the new category of the rescue and fire fighting service available at the aerodrome.

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2.13 Coordination between aeronautical information services and aerodrome authorities

2.13.1 To ensure that aeronautical information services units obtain information to enable them to provide up-to-date pre-flight information and to meet the need for in-flight information, arrangements shall be made between aeronautical information services and aerodrome authorities responsible for aerodrome services to report to the responsible aeronautical information services unit, with a minimum of delay:

- a) information on the status of certification of aerodromes and aerodrome conditions (ref. 1.4, 2.9, 2.10, 2.11 and 2.12);
- b) the operational status of associated facilities, services and navigation aids within their area of responsibility;
- c) any other information considered to be of operational significance.

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CHAPTER 3. PHYSICAL CHARACTERISTICS

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Taxiway minimum separation distances

3.9.8 Recommendation.— *The separation distance between the centre line of a taxiway and the centre line of a runway, the centre line of a parallel taxiway or an object should not be less than the appropriate dimension specified in Table 3-1, except that it may be permissible to operate with lower separation distances at an existing aerodrome if an aeronautical study indicates that such lower separation distances would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.*

Table 3-1. Taxiway minimum separation distances

Code Letter	Distance between taxiway centre line and runway centre line (metres)								Taxiway centre line to taxiway centre line (metres)	Taxiway, other than aircraft stand taxilane, centre line to object (metres)	Aircraft stand taxilane centre line to object (metres)
	Instrument runways				Non-instrument runways						
	Code number				Code number						
	1	2	3	4	1	2	3	4			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
A	82.5	82.5	-	-	37.5	47.5	-	-	23.75	16.25	12
B	87	87	-	-	42	52	-	-	33.5	21.5	16.5
C	-	-	168	-	-	-	93	-	44	26	24.5
D	-	-	176	176	-	-	101	101	66.5	40.5	36
E	-	-	-	182.5	-	-	-	107.5	80	47.5	42.5
F	-	-	-	190	-	-	-	115	95 97.5	55.0 57.5	50.5

Note 1.- The separation distances shown in columns (2) to (9) represent ordinary combinations of runways and taxiways. The basis for development of these distances is given in the Aerodrome Design Manual, Part 2.

Note 2. – The distances in columns (2) to (9) do not guarantee sufficient clearance behind a holding aeroplane to permit the passing of another aeroplane on a parallel taxiway. See the Aerodrome Design Manual, Part 2.

CHAPTER 5. VISUAL AIDS FOR NAVIGATION

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5.2.8 Taxiway centre line marking

Application

5.2.8.1 Taxiway centre line marking shall be provided on a paved taxiway, de-icing/anti-icing facility and apron where the code number is 3 or 4 in such a way as to provide continuous guidance between the runway centre line and aircraft stands.

5.2.8.2 **Recommendation.**— *Taxiway centre line marking should be provided on a paved taxiway, de-icing/anti-icing facility and apron where the code number is 1 or 2 in such a way as to provide continuous guidance between the runway centre line and aircraft stands.*

5.2.8.3 Taxiway centre line marking shall be provided on a paved runway when the runway is part of a standard taxi-route and:

- a) there is no runway centre line marking; or
- b) where the taxiway centre line is not coincident with the runway centre line.

5.2.8.3A **Recommendation.**— *Where it is necessary to denote the proximity of a runway-holding position, enhanced taxiway centre line marking should be provided.*

Note.— *The provision of enhanced taxiway centre line marking may form part of runway incursion prevention measures.*

5.2.8.3B Where provided, enhanced taxiway centre line marking shall be installed at each taxiway/runway intersection.

Location

5.2.8.4 **Recommendation.**— *On a straight section of a taxiway the taxiway centre line marking should be located along the taxiway centre line. On a taxiway curve the marking should continue from the straight portion of the taxiway at a constant distance from the outside edge of the curve.*

Note.— *See 3.9.6 and Figure 3-2.*

5.2.8.5 **Recommendation.**— *At an intersection of a taxiway with a runway where the taxiway serves as an exit from the runway, the taxiway centre line marking should be curved into the runway centre line*

marking as shown in Figures 5-6 and 5-25. The taxiway centre line marking should be extended parallel to the runway centre line marking for a distance of at least 60 m beyond the point of tangency where the code number is 3 or 4, and for a distance of at least 30 m where the code number is 1 or 2.

5.2.8.6 Recommendation.— Where taxiway centre line marking is provided on a runway in accordance with 5.2.8.3, the marking should be located on the centre line of the designated taxiway.

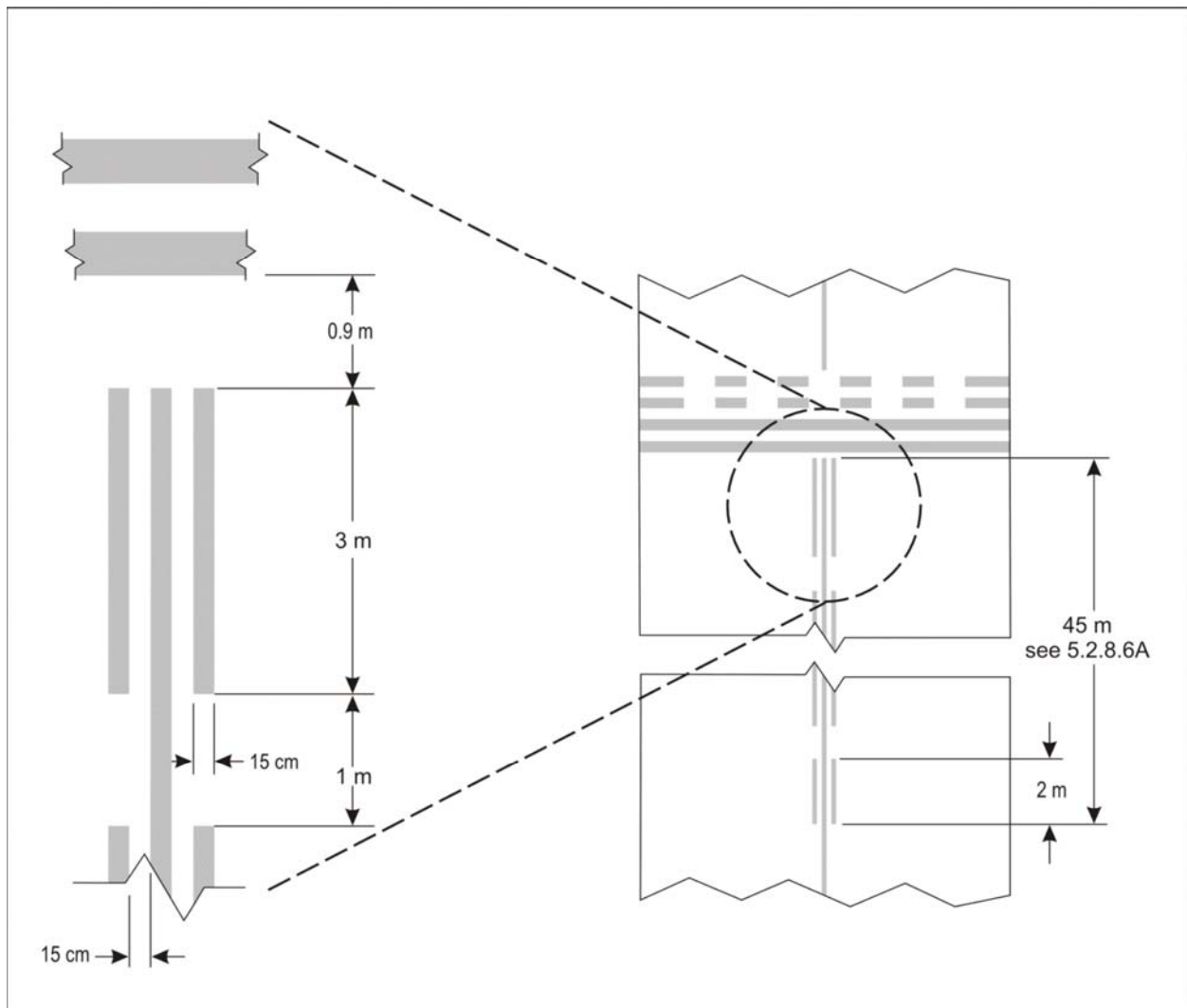
5.2.8.6A Where provided, an enhanced taxiway centre line marking shall extend from the runway holding position Pattern A (as defined in Figure 5-6, Taxiway markings) to a distance of up to 45 m in the direction of travel away from the runway or to the next runway holding position, if within 45m distance.

Characteristics

5.2.8.7 A taxiway centre line marking shall be at least 15 cm in width and continuous in length except where it intersects with a runway-holding position marking or an intermediate holding position marking as shown in Figure 5-6.

5.2.8.7A Enhanced taxiway centre line marking shall be as shown in Figure 5-6A.

Editorial Note.— Insert new Figure 5-6A as follows:



5-6A Enhanced taxiway centre line marking

5.2.16 Mandatory instruction marking

Note. — Guidance on mandatory instruction marking is given in the Aerodrome Design Manual, Part 4.

Application

5.2.16.1 Where it is impracticable to install a mandatory instruction sign in accordance with 5.4.2.1, a mandatory instruction marking shall be provided on the surface of the pavement.

5.2.16.2 **Recommendation.** — *Where operationally required, such as on taxiways exceeding 60 m in width, or to assist in the prevention of a runway incursion, a mandatory instruction sign should be supplemented by a mandatory instruction marking.*

Location

5.2.16.2A The mandatory instruction marking on taxiways, where the code letter is A, B, C, or D, shall be located across the taxiway equally placed about the taxiway centerline and on the holding side of the runway-holding position marking as shown in Figure 5-9 (a). The distance between the nearest edge of the marking and the runway holding position marking or the taxiway centre line marking shall be not less than 1 m.

5.2.16.3 The mandatory instruction marking on taxiways, where the code letter is E or F, shall be located on ~~the left-hand side~~ both sides of the taxiway centre line marking and on the holding side of the runway-holding position marking as shown in Figure 5-9 (b). The distance between the nearest edge of the marking and the runway holding position marking or the taxiway centre line marking shall be not less than 1 m.

5.2.16.4 **Recommendation.** — *Except where operationally required, a mandatory instruction marking should not be located on a runway.*

Characteristics

5.2.16.5 A mandatory instruction marking shall consist of an inscription in white on a red background. Except for a NO ENTRY marking, the inscription shall provide information identical to that of the associated mandatory instruction sign.

5.2.16.6 A NO ENTRY marking shall consist of an inscription in white reading NO ENTRY on a red background.

5.2.16.7 Where there is insufficient contrast between the marking and the pavement surface, the mandatory instruction marking shall include an appropriate border, preferably white or black.

5.2.16.8 **Recommendation.**— *The character height should be 4 m for inscriptions where the code letter is C, D, E or F, and 2 m where the code letter is A or B. The inscriptions should be in the form and proportions shown in Appendix 3.*

5.2.16.9 **Recommendation.**— *The background should be rectangular and extend a minimum of 0.5 m laterally and vertically beyond the extremities of the inscription.*

Editorial Note.— Replace Figure 5-9 with new Figure 5-9 as follows:

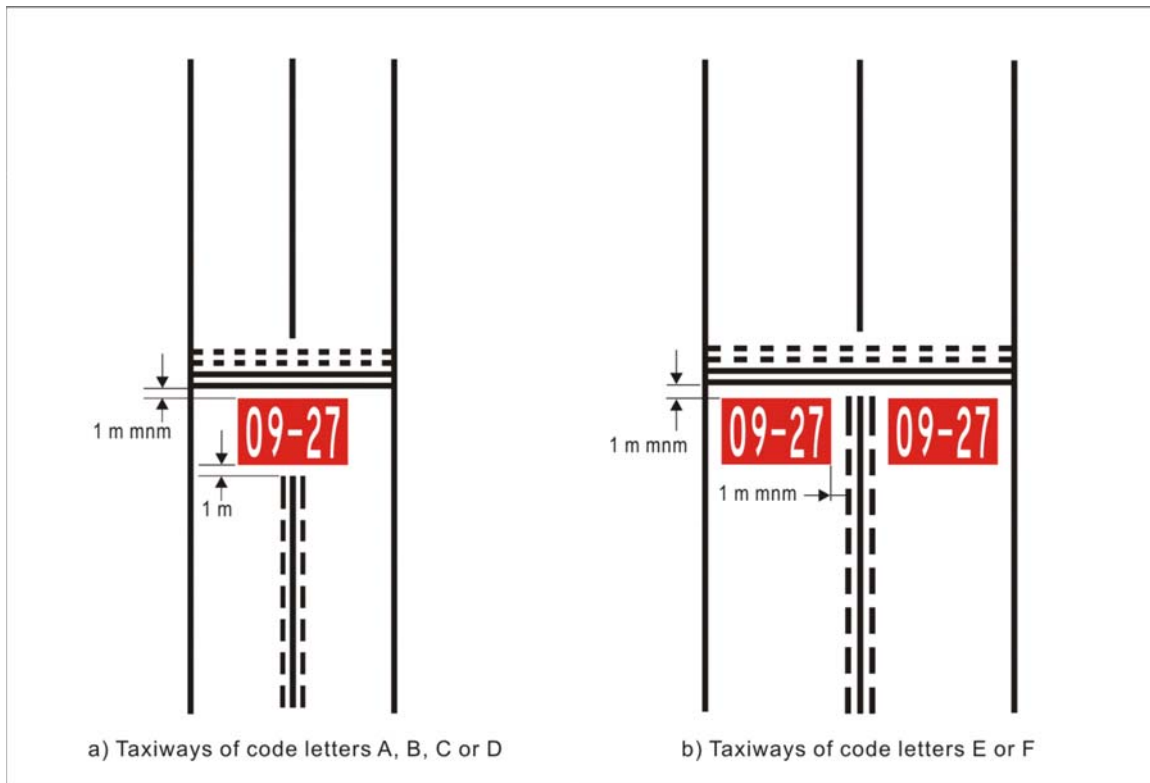


Figure 5-9. Mandatory instruction marking

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5.3.17 Taxiway edge lights

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Characteristics

5.3.17.7 Taxiway edge lights shall be fixed lights showing blue. The lights shall show up to at least 30 75° above the horizontal and at all angles in azimuth necessary to provide guidance to a pilot taxiing in either direction. At an intersection, exit or curve the lights shall be shielded as far as practicable so that they cannot be seen in angles of azimuth in which they may be confused with other lights.

5.3.17.8 The intensity of taxiway edge lights shall be at least 2 cd from 0° to 6° vertical, and 0.2 cd at any vertical angles between 6° and 75°.

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Editorial Note.— Insert new Section 5.3.25 as follows.

5.3.25 Advanced visual docking guidance system

Application

Note 1.— Advanced visual docking guidance systems (A-VDGS) include those systems that, in addition to basic and passive azimuth and stop position information, provide pilots with active (usually sensor-based) guidance information, such as aircraft type indication (in accordance with ICAO Document 8643), distance-to-go information and closing speed. Docking guidance information is usually provided on a single display unit.

Note 2.— An A-VDGS may provide docking guidance information in three stages: the acquisition of the aircraft by the system, the azimuth alignment of the aircraft, and the stopping position information.

5.3.25.1 **Recommendation.**— An A-VDGS should be provided where it is operationally desirable to confirm the correct aircraft type for which guidance is being provided, and/or to indicate the stand centre line in use, where more than one is provided for.

5.3.25.2 The A-VDGS shall be suitable for use by all types of aircraft for which the aircraft stand is intended.

5.3.25.3 The A-VDGS shall only be used in conditions in which its operational performance is specified.

Note 1.— The use of the A-VDGS in conditions such as weather, visibility, and background lighting both by day and night would need to be specified.

Note 2.— Care is required in both the design and on-site installation of the system to ensure that glare, reflection of sunlight, or other light in the vicinity, does not degrade the clarity and conspicuity of the visual cues provided by the system.

5.3.25.4 The docking guidance information provided by an A-VDGS shall not conflict with that provided by a conventional visual docking guidance system on an aircraft stand if both types are provided and are in operational use. A method of indicating that the A-VDGS is not in operational use or unserviceable, and should not be used, shall be provided.

Location

5.3.25.5 The A-VDGS shall be located such that unobstructed and unambiguous guidance is provided to the person responsible for, and persons assisting, the docking of the aircraft throughout the docking manoeuvre.

Note.— Usually the pilot-in-command is responsible for the docking of the aircraft. However, in some circumstances, another person could be responsible and this person may be the driver of a vehicle that is towing the aircraft.

Characteristics

5.3.25.6 The A-VDGS shall provide, at minimum, the following guidance information at the appropriate stage of the docking manoeuvre:

- a) an emergency stop indication;
- b) the aircraft type and model for which the guidance is provided;
- c) an indication of the lateral displacement of the aircraft relative to the stand centre line;
- d) the direction of azimuth correction needed to correct a displacement from the stand centre line;
- e) an indication of the distance to the stop position;
- f) an indication when the aircraft has reached the correct stopping position; and
- g) a warning indication if the aircraft goes beyond the appropriate stop position.

5.3.25.7 The A-VDGS shall be capable of providing docking guidance information for all aircraft taxi speeds encountered during the docking manoeuvre.

Note.— See the Aerodrome Design Manual, Part 4, for an indication of the maximum aircraft speeds relative to distance to the stopping position.

5.3.25.8 The time taken from the determination of the lateral displacement to its display shall not result in a deviation of the aircraft, when operated in normal conditions, from the stand centreline greater than 1 m.

5.3.25.9 **Recommendation.**— *The information on displacement of the aircraft relative to the stand centre line and distance to the stopping position, when displayed, should be provided with the accuracy specified in Table 5.X.*

Guidance information	max. deviation at stop position (stop area)	max. deviation at 9 m from stop position	max. deviation at 15 m from stop position	max. deviation at 25 m from stop position
Azimuth	±250 mm	±340 mm	±400 mm	±500 mm
Distance	±500 mm	±1000 mm	±1300 mm	Not specified

Table 5.X Recommended displacement accuracy

5.3.25.10 Symbols and graphics used to depict guidance information shall be intuitively representative of the type of information provided.

Note.— The use of colour would need to be appropriate and need to follow signal convention, i.e. red,

yellow and green mean hazard, caution and normal/correct conditions, respectively. The effects of colour contrasts would also need to be considered.

5.3.25.11 Information on the lateral displacement of the aircraft relative to the stand centre line shall be provided at least 25m prior to the stop position.

Note.— The indication of the distance of the aircraft from the stop position may be colour-coded and presented at a rate and distance proportional to the actual closure rate and distance of the aircraft approaching the stop point.

5.3.25.12 Continuous closure distance and closure rate shall be provided from at least 15 m prior to the stop position.

5.3.25.13 **Recommendation.**— *Where provided, closure distance displayed in numerals should be provided in metre integers to the stop position and displayed to 1 decimal place at least 3 m prior to the stop position.*

5.3.25.14 Throughout the docking manoeuvre, an appropriate means shall be provided on the A-VDGS to indicate the need to bring the aircraft to an immediate halt. In such an event, which includes a failure of the A-VDGS, no other information shall be displayed.

5.3.25.15 Provision to initiate an immediate halt to the docking procedure shall be made available to personnel responsible for the operational safety of the stand.

5.3.25.16 **Recommendation.**— *The word “STOP” in red characters should be displayed when an immediate cessation of the docking manoeuvre is required.*

End of new text

Editorial Note.— Renumber existing Sections accordingly.

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5.4 Signs

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Characteristics

5.4.2.12 A mandatory instruction sign shall consist of an inscription in white on a red background.

5.4.2.12A **Recommendation.**— *Where, owing to environmental or other factors, the conspicuity of the inscription on a mandatory instruction sign needs to be enhanced, the outside edge of the white inscription should be supplemented by a black outline. The black outline shall be 10 mm in width for runway code letters 1 and 2, and 20 mm in width for runway code letters 3 and 4.*

5.4.2.13 The inscription on a runway designation sign shall consist of the runway designations of the intersecting runway properly oriented with respect to the viewing position of the sign, except that a

runway designation sign installed in the vicinity of a runway extremity may show the runway designation of the concerned runway extremity only.

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CHAPTER 6. VISUAL AIDS FOR DENOTING OBSTACLES

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Editorial Note.— Insert new Section 6.4 as follows.

6.4 Wind turbines

6.4.1 A wind turbine shall be marked and/or lighted if it is determined to be an obstacle.

Note.— see 4.3.1 and 4.3.2.

Markings

6.4.2 **Recommendation.**— *The rotor blades, nacelle and upper 2/3 of the supporting mast of wind turbines should be painted white, unless otherwise indicated by an aeronautical study.*

Lighting

6.4.3 **Recommendation.**— *When lighting is deemed necessary, medium intensity obstacle lights should be used. In the case of a wind farm, i.e. a group of two or more wind turbines, it should be regarded as an extensive object and the lights should be installed:*

- a) to identify the perimeter of the wind farm;*
- b) respecting the maximum spacing, in accordance with 6.3.14, between the lights along the perimeter, unless a dedicated assessment shows that a greater spacing can be used;*
- c) so that, where flashing lights are used, they flash simultaneously; and*
- d) so that, within a wind farm, any wind turbines of significantly higher elevation are also identified wherever they are located.*

6.4.4 **Recommendation.**— *The obstacle lights should be installed on the nacelle in such a manner as to provide an unobstructed view for aircraft approaching from any direction.*

Editorial Note.— End of new text.

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CHAPTER 9

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9.2 Rescue and fire fighting

General

Introductory Note.— ~~The principal objective of a rescue and fire fighting service is to save lives. For this reason, the provision of means of dealing with an aircraft accident or incident occurring at, or in the immediate vicinity of, an aerodrome assumes primary importance because it is within this area that there are the greatest opportunities of saving lives. This must assume at all times the possibility of, and need for, extinguishing a fire which may occur either immediately following an aircraft accident or incident, or at any time during rescue operations.~~ The principal objective of a rescue and fire fighting service is to save lives in the event of an aircraft accident or incident occurring at, or in the immediate vicinity of, an aerodrome. The rescue and fire fighting service is provided to create and maintain survivable conditions, to provide egress routes for occupants and to initiate the rescue of those occupants unable to make their escape without direct aid. The rescue may require the use of equipment and personnel other than those assessed primarily for rescue and fire fighting purposes.

The most important factors bearing on effective rescue in a survivable aircraft accident are: the training received, the effectiveness of the equipment, the speed with which personnel and equipment designated for rescue and fire fighting purposes can be put into use.

Requirements to combat building and fuel farm fires, or to deal with foaming of runways, are not taken into account.

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Level of protection to be provided

9.2.3—The level of protection provided at an aerodrome for rescue and fire fighting shall be appropriate to the aerodrome category determined using the principles in 9.2.5 and 9.2.6, except that, where the number of movements of the aeroplanes in the highest category normally using the aerodrome is less than 700 in the busiest consecutive three months, the level of protection provided shall be not less than one category below the determined category.

Note.—Either a takeoff or a landing constitutes a movement.

~~9.2.4~~ **9.2.3 Recommendation.** ~~From 1 January 2005, t~~ The level of protection provided at an aerodrome for rescue and fire fighting ~~should~~ **shall** be equal to the aerodrome category determined using the principles in ~~9.2.5~~ **9.2.4** and ~~9.2.6~~ **9.2.5**.

~~9.2.5.4~~ The aerodrome category shall be determined from Table 9-1 and shall be based on the longest aeroplanes normally using the aerodrome and their fuselage width.

Note. — To categorize the aeroplanes using the aerodrome, first evaluate their overall length and second, their fuselage width.

~~9.2.6~~ **5** If, after selecting the category appropriate to the longest aeroplane's overall length, that aeroplane's fuselage width is greater than the maximum width in Table 9-1, column 3 for that category, then the category for that aeroplane shall actually be one category higher.

Note. — Guidance on categorizing aerodromes for rescue and fire fighting purposes and on providing rescue and fire fighting equipment and services is given in Attachment A, Section 17 and in the Airport Services Manual, Part 1

Note 1. — See guidance in the Airport Services Manual, Part 1 for categorizing aerodromes, including those for all-cargo aircraft operations, for rescue and fire fighting purposes.

Note 2. — Guidance on training of personnel, rescue equipment for difficult environment and other facilities and services for rescue and fire fighting is given in Attachment A, Section 17 and in the Airport Services Manual, Part 1.

...

Extinguishing Agents

...

9.2.11A Recommendation. *— At aerodromes where operation by aeroplanes larger than the average size in a given category are planned, the quantities of water should be recalculated and the amount of water for foam production and the discharge rates for foam solution should be increased accordingly.*

Note. — Additional guidance is available in Chapter 2 of the Airport Services Manual, Part 1.

9.2.12 The quantity of foam concentrates separately provided on vehicles for foam production shall be in proportion to the quantity of water provided and the foam concentrate selected.

...

9.2.16 The discharge rate of the foam solution shall not be less than the rates shown in Table 9-2.

Table 9-2. Minimum usable amounts of extinguishing agents

Aerodrome category	Foam meeting performance level A		Foam meeting performance level B		Complementary agents	
	Water (L)	Discharge rate foam solution/ minute (L)	Water (L)	Discharge rate foam solution/ minute (L)	Dry chemical powders (kg)	Discharge Rate kg/sec
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	350	350	230	230	45	2.25
2	1 000	800	670	550	90	2.25
3	1 800	1 300	1 200	900	135	2.25
4	3 600	2 600	2 400	1 800	135	2.25
5	8 100	4 500	5 400	3 000	180	2.25
6	11 800	6 000	7 900	4 000	225	2.25
7	18 200	7 900	12 100	5 300	225	2.25
8	27 300	10 800	18 200	7 200	450	4.5
9	36 400	13 500	24 300	9 000	450	4.5
10	48 200	16 600	32 300	11 200	450	4.5

Note 1. — The quantities of water shown in columns 2 and 4 are based on the average overall length of aeroplanes in a given category. ~~Where operations of an aeroplane larger than the average size are expected, the quantities of water would need to be recalculate. See the Airport Services Manual, Part 1 for additional guidance.~~

Note 2. Any other complementary agent having equivalent fire fighting capability may be used.

9.2.17 **Recommendation.**—The complementary agents ~~should~~ **shall** comply with the appropriate specifications of the International Organization for Standardization (ISO).*

Editorial Note.— To be put in footnote.

* See ISO Publication 5923 (Carbon Dioxide), 7201 (Halogenated Hydrocarbons) and 7202 (Powder).

9.2.18 **Recommendation.** — ~~The discharge rate of complementary agents should be selected for optimum effectiveness of the agent~~ **be no less than the rates shown in Table 9-2.**

9.2.18A Recommendation. — *Dry chemical powders should only be substituted with an agent that has equivalent or better fire fighting capabilities, for all types of fires where complementary agent is expected to be used.*

Note.— *Guidance on the use of complementary agents can be found in the Airport Services Manual – Part 1.*

...

Response time

...

9.2.23 **Recommendation.**— *The operational objective of the rescue and fire fighting service should*

be to achieve a response time not exceeding three minutes to any other part of the movement area in optimum visibility and surface conditions.

Note 1.— Response time is considered to be the time between the initial call to the rescue and fire fighting service, and the time when the first responding vehicle(s) is (are) in position to apply foam at a rate of at least 50 per cent of the discharge rate specified in Table 9-2.

Note 2.— ~~To meet the operational objective as nearly as possible in less than optimum conditions of visibility, it may be necessary to provide suitable guidance and/or procedures for rescue and fire fighting vehicles~~

Note 3.2.— Optimum visibility and surface conditions are defined as daytime, good visibility, no precipitation with normal response route free of surface contamination e.g. water, ice or snow.

9.2.23A Recommendation.— *To meet the operational objective as nearly as possible in less than optimum conditions of visibility, especially during low visibility operations, suitable guidance, equipment and/or procedures for rescue and fire fighting services should be provided.*

Note.— Additional guidance is available in the Airport Services Manual, Part 1.

9.2.24 Recommendation.—Any other vehicles required to deliver the amounts of extinguishing agents specified in Table 9-2 ~~should~~ **shall ensure continuous agent application and shall** arrive no more than ~~one~~ **four** minutes ~~s~~ after the first responding vehicle(s) so as to provide continuous agent application **from the initial call.**

...

Personnel

9.2.34 All rescue and fire fighting personnel shall be properly trained to perform their duties in an efficient manner and shall participate in live fire drills commensurate with the types of aircraft and type of rescue and fire fighting equipment in use at the aerodrome, including pressure-fed fuel fires.

Note 1.— Guidance to assist the appropriate authority in providing proper training is given in Attachment A, Section 17 ~~and~~ Airport Services Manual, Part 1, ~~and Training Manual, Part E-2.~~

Note 2.— Fires associated with fuel discharged under very high pressure from a ruptured fuel tank are known as “pressure-fed fuel fires”.

...

9.4 Bird ~~Wildlife strike~~ hazard reduction

Note. The presence of wildlife (birds and animals) on and in the airport vicinity poses a serious threat to aircraft operational safety.

9.4.1 The ~~bird~~ **wildlife** strike hazard on, or in the vicinity of, an aerodrome shall be assessed through:

- a) the establishment of a national procedure for recording and reporting ~~bird~~ **wildlife** strikes to aircraft; ~~and~~
- b) the collection of information from aircraft operators, airport personnel, etc. on the presence of ~~birds~~ **wildlife** on or around the aerodrome constituting a potential hazard to aircraft operations; ~~and~~
- c) **an ongoing evaluation of the wildlife hazard by competent personnel.**

Note.— See Annex 15, Chapter 8.

9.4.2 ~~Bird~~ **Wildlife** strike reports shall be collected and forwarded to ICAO for inclusion in the ICAO Bird Strike Information System (IBIS) database.

Note.— The IBIS is designed to collect and disseminate information on ~~bird~~ **wildlife** strikes to aircraft. Information on the system is included in the Manual on the ICAO Bird Strike Information System (IBIS).

9.4.3 ~~When a bird strike hazard is identified at an aerodrome, the appropriate authority shall take action~~ **shall be taken** to decrease ~~the risk~~ **the number of birds constituting a potential hazard to aircraft operations by adopting measures for discouraging their presence on, or in the vicinity of, an aerodrome to minimize the likelihood of collisions between wildlife and aircraft.**

Note.— Guidance on effective measures for establishing whether or not ~~birds~~ **wildlife**, on or near an aerodrome, constitute a potential hazard to aircraft operations, and on methods for discouraging their presence, is given in the Airport Services Manual, Part 3.

9.4.4 The appropriate authority shall take action to eliminate or to prevent the establishment of garbage disposal dumps or any ~~such other source attracting~~ **which attracts** ~~bird~~ **wildlife** activity on, or in the vicinity of, ~~an~~ **to the** aerodrome, ~~or its vicinity~~, unless an appropriate ~~aeronautical study~~ **wildlife assessment** indicates that they are unlikely to create conditions conducive to a ~~bird~~ **wildlife** hazard problem. **Where the elimination of existing sites is not possible, the appropriate authority shall ensure that any risk to aircraft posed by these sites is assessed and reduced to as low as reasonably practicable.**

Note.— **9.4.5 Recommended Practice – States should give** ~~Due consideration needs to be given to airport operators' to aviation safety~~ **concerns related to land developments close to the airport boundary in the vicinity of the aerodrome that may attract** ~~birds~~ **wildlife.**

...

CHAPTER 10. AERODROME MAINTENANCE

10.2 Pavements

10.2.1 The surfaces of **all movement areas including** pavements (runways, taxiways, ~~and~~ **aprons**) and adjacent areas ~~shall be kept clear of~~ **inspected and their conditions monitored regularly as part of an aerodrome preventive maintenance programme with the objective of eliminating** any loose stones or other

objects/debris that might cause damage to aircraft structures or engines an aeroplane, or impair the operation of aircraft systems.

Note 1.— See 2.9.3 for inspections of movement areas.

Note 2.— Guidance on carrying out daily inspections of the movement area is given in the Airport Services Manual, Part 8 and in the Manual of Surface Movement Guidance and Control Systems (SMGCS).

Note 3.— Additional guidance on sweeping/cleaning of surfaces is contained in the Airport Services Manual, Part 9.

Note 4.— Guidance on precautions to be taken in regard to the surface of shoulders is given in Attachment A, Section 8, and the Aerodrome Design Manual, Part 2.

APPENDIX 1. COLOURS FOR AERONAUTICAL GROUND LIGHTS, MARKINGS, SIGNS AND PANELS

...

3.2 Recommendation.— *The chromaticity and luminance factors of ordinary colours for markings and externally illuminated signs and panels should be within the following boundaries when determined under standard conditions.*

CIE Equations (see Figure A1-2):

...

g) Green

Yellow boundary : $x=0.313$

White boundary: $y=0.243+0.670x$

Blue boundary: $y=0.493-0.524x$

Luminance factor: $\beta=0.10$ (mn)

...

3.4 Recommendation.— *The chromaticity and luminance factors of colours for **luminescent or** transilluminated (internally illuminated) signs and panels should be within the following boundaries when determined under standard conditions.*

CIE Equations (see Figure A1-4):

...

e) Green

Yellow boundary : $x=0.313$

White boundary: $y=0.243+0.670x$

Blue boundary: $y=0.493-0.524x$

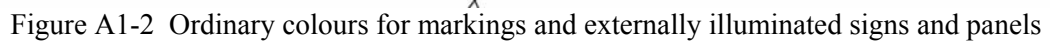
Luminance factor: $\beta=0.10$ minimum (day conditions)

Relative luminance: 5% (minimum)

to white (night conditions) 30% (maximum)

...

Editorial Note.— Replace Figure A1-2 with new Figure A1-2 as follows:



Editorial Note.— Replace Figure A1-4 with new Figure A1-4 as follows:

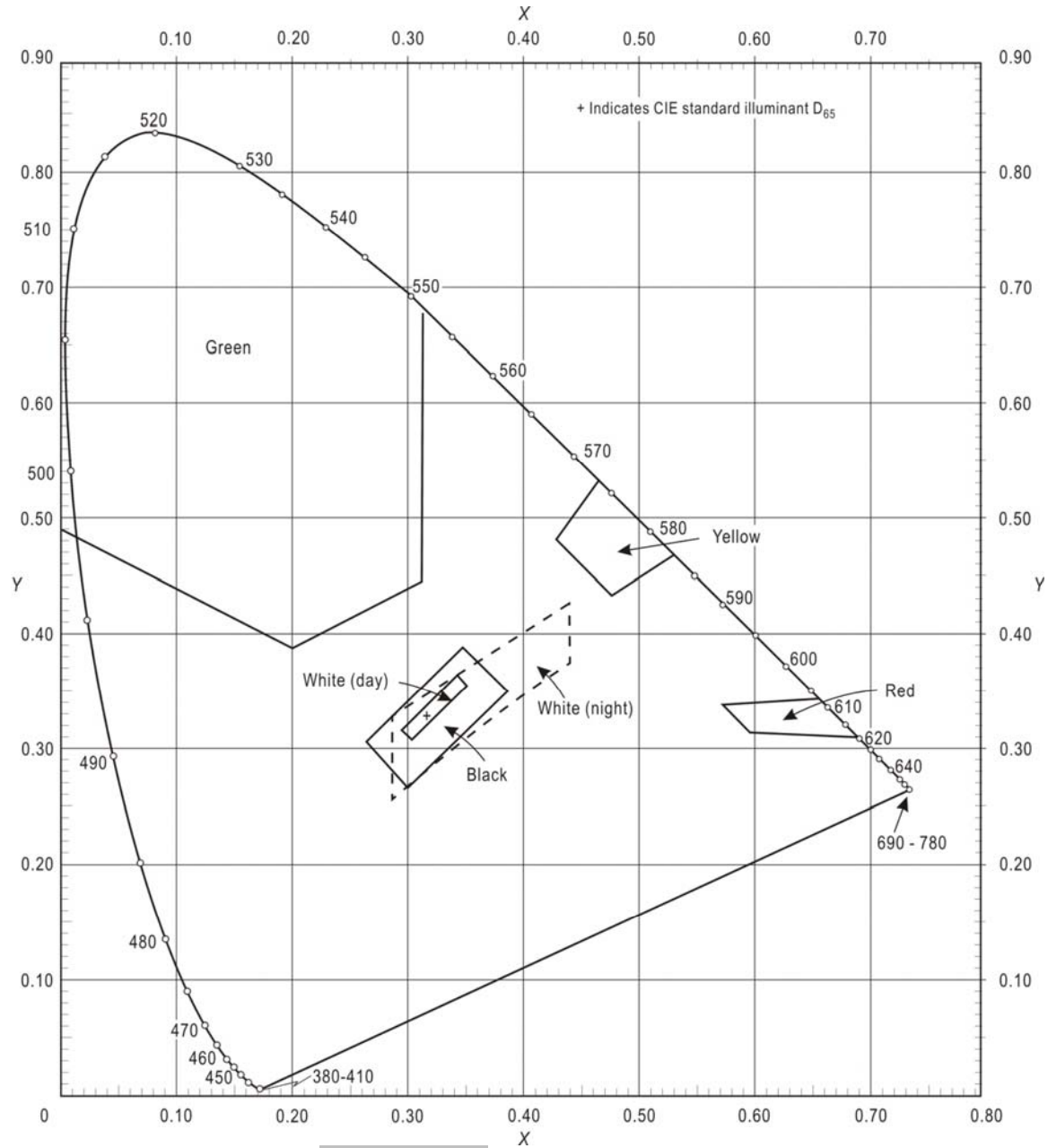


Figure A1-4. Colours of **luminescent or** transilluminated (internally illuminated) signs and panels

APPENDIX 2. AERONAUTICAL GROUND LIGHT CHARACTERISTICS

...

Add a new note to Figure A2-9

Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

2. Toe-in 3.5 degrees.

3. For red light, multiply values by 0.15.

3.4. For yellow light, multiply values by 0.40.

4.5. See collective notes for Figures A2-1 to A2-11.

Figure A2-9. Isocandela diagram for runway edge light where width of runway is 45 m (white light)

Add a new note to Figure A2-10

Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

2. Toe-in 4.5 degrees

3. For red light, multiply values by 0.15.

3.4. For yellow light, multiply values by 0.40.

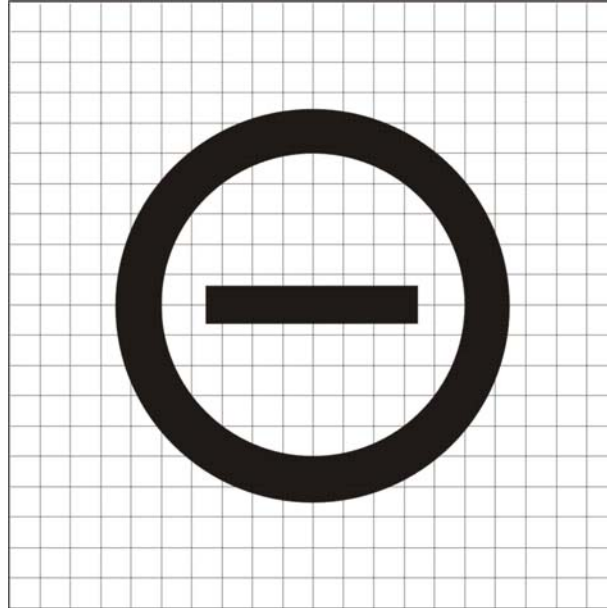
4.5. See collective notes for Figures A2-1 to A2-11.

Figure A2-10. Isocandela diagram for runway edge light where width of runway is 60 m (white light)

APPENDIX 4. REQUIREMENTS CONCERNING DESIGN OF TAXIING GUIDANCE SIGNS

...

Editorial Note.— Replace the NO ENTRY sign in Figure A4-2 as follows:



NO ENTRY sign

Note. — Existing NO ENTRY signs not conforming to the above dimensions are to be replaced not later than 1 January 2012

**ATTACHMENT A. GUIDANCE MATERIAL
SUPPLEMENTARY TO ANNEX 14, VOLUME I**

...

5. Runway surface evenness

5.1 In adopting tolerances for runway surface irregularities, the following standard of construction is achievable for short distances of 3 m and conforms to good engineering practice:

Except across the crown of a camber or across drainage channels, the finished surface of the wearing course is to be of such regularity that, when tested with a 3 m straight-edge placed anywhere in any direction on the surface, there is no deviation greater than 3 mm between the bottom of the straight-edge and the surface of the pavement anywhere along the straightedge.

5.2 Caution should also be exercised when inserting runway lights or drainage grilles in runway surfaces to ensure that adequate smoothness of the surface is maintained.

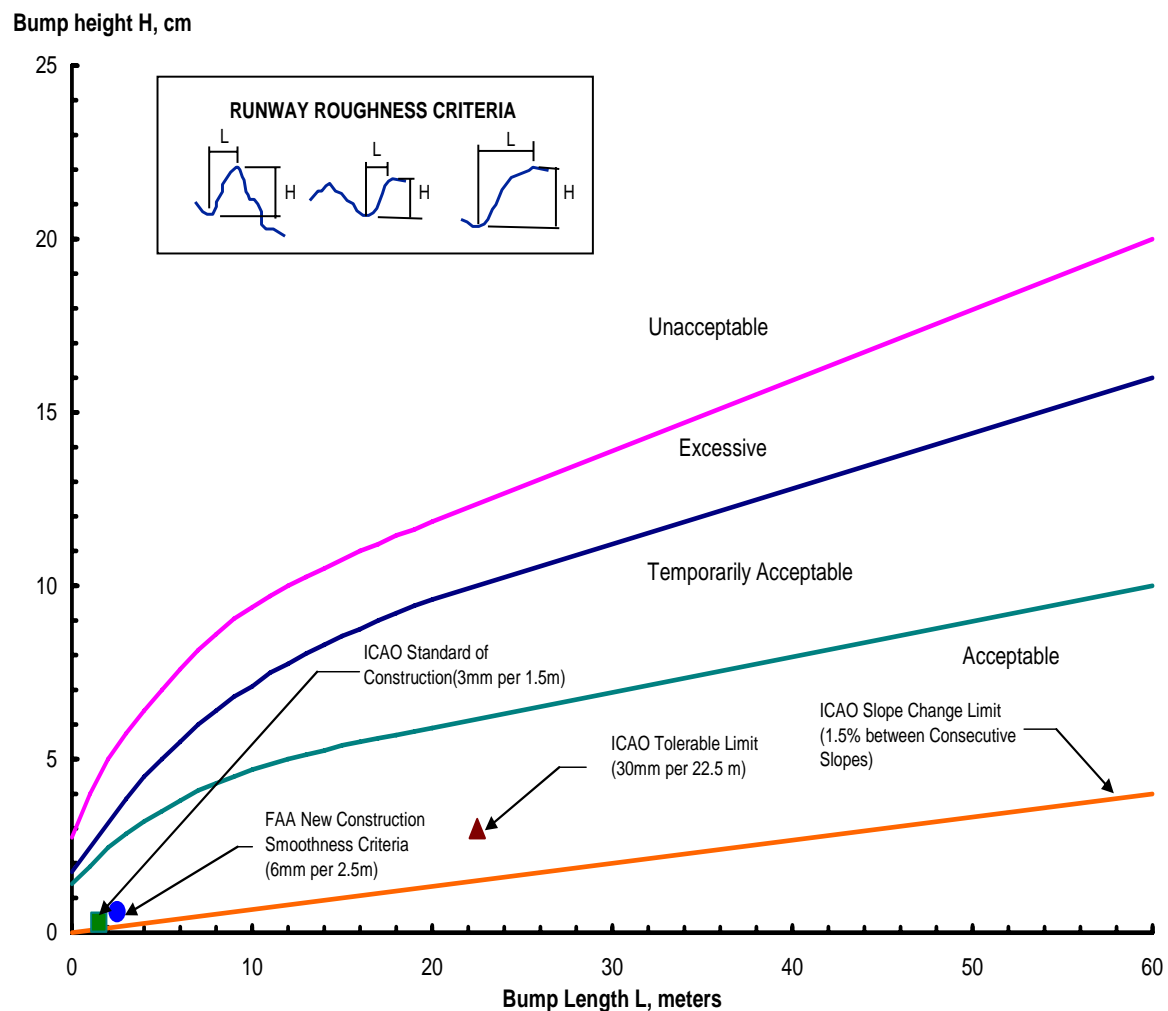
5.3 The operation of aircraft and differential settlement of surface foundations will eventually lead to increases in surface irregularities. Small deviations in the above tolerances will not seriously hamper aircraft operations. In general, isolated irregularities of the order of 2.5 cm to 3 cm over a 45 m distance are tolerable. ~~Exact information of the~~ **Even though** maximum acceptable deviations ~~cannot be given, as it varies~~ **with the type and speed of an aircraft, the limits of acceptable surface irregularities can be estimated to a reasonable extent. The following table describes temporarily acceptable and excessive limits. If the temporarily acceptable limits are exceeded, corrective action should be undertaken in a timely fashion to improve the ride quality. If the excessive limits are exceeded, the portions of the runway that exhibit such roughness should have corrective measures taken immediately if continued aircraft operations are to be maintained.**

1.1 Surface Irregularity	Minimum Acceptable Length of Irregularity (m)								
	3	6	9	12	15	20	30	45	60
Temporarily Acceptable Surface Irregularity Height (or Depth) (cm)	3	3.5	4	5	5.5	6	6.5	8	10
Maximum Surface Irregularity Height (or Depth) (cm)	3.5	5.5	6.5	7.5	8	9	11	13	15

Note that “Surface Irregularity” is defined herein to mean isolated surface elevation deviations that do not lie along a uniform slope through any given section of a runway. For the purposes of this concern, a section of a runway is understood to be from 30 to 60 meters in length (or longer) throughout which, a continuing general uphill, downhill or flat slope is prevalent.

Runway Surface Roughness Criteria

Note — that this criteria addresses single event roughness, not long wave length harmonic effects nor the effect of repetitive surface undulations.



...

10. Location of threshold

...

10.2 Displaced threshold

...

10.2.5 In the event of a threshold being located according to the criteria for obstacle-free surfaces in the preceding paragraph, the obstacle marking requirements of Chapter 6 should continue to be met in relation to the displaced threshold.

10.2.6 Depending on the length of the displacement, the RVR at the threshold could differ from that at the beginning of the runway for take-offs. The use of red runway edge lights with photometric intensities lower than the nominal value of 10 000 cd for white lights increases that phenomenon. The impact of a displaced threshold on take-off minima should be assessed by the appropriate authority.

10.2.7 Provisions in Annex 14, Volume I, regarding marking and lighting of displaced thresholds and some operational recommendations can be found in paragraphs 5.2.4.9 and 10, 5.3.5.5, 5.3.8.1, 5.3.9.7, 5.3.10.3 and 7, and 5.3.12.6.

...

17. Rescue and fire fighting services

...

17.2 Training

...

~~17.3 Level of protection to be provided~~

~~17.3.1 In accordance with Chapter 9, section 9.2 aerodromes should be categorized for rescue and fire fighting purposes and the level of protection provided should be appropriate to the aerodrome category.~~

~~17.3.2 However, Chapter 9, 9.2.3 permits a lower level of protection to be provided for a limited period where the number of movements of the aeroplanes in the highest category normally using the aerodrome is less than 700 in the busiest consecutive three months. It is important to note that the concession included in 9.2.3 is applicable only where there is a wide range of difference between the dimensions of the aeroplanes included in reaching 700 movements.~~

Editorial Note.— Renumber subsequent paragraphs accordingly.

...

17.5 Facilities

17.5.1 The provision of special telephone, two-way radio communication and general alarm systems for the rescue and fire fighting service is desirable to ensure the dependable transmission of essential emergency and routine information. Consistent with the individual requirements of each aerodrome, these facilities serve the following purposes:

- a) direct communication between the activating authority and the aerodrome fire station in order to ensure the prompt alerting and dispatch of rescue and fire fighting vehicles and personnel in the event of an aircraft accident or incident;
- b) direct communication between the rescue and fire fighting service and the flight crew of an aircraft in emergency;
- c) emergency signals to ensure the immediate summoning of designated personnel not on standby duty;
- d) as necessary, summoning essential related services on or off the aerodrome; and
- e) maintaining communication by means of two-way radio with the rescue and fire fighting vehicles in attendance at an aircraft accident or incident.

— — — — —

ATTACHMENT B to State letter AN 4/1.1.50-07/54

**PROPOSED AMENDMENT TO
INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

AERODROMES

**ANNEX 14
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION**

**VOLUME II
(HELIPORTS)**

**NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT TO
ANNEX 14, VOLUME II**

The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

- | | |
|---|-----------------------------------|
| 1. Text to be deleted is shown with a line through it. | text to be deleted |
| 2. New text to be inserted is highlighted with grey shading. | new text to be inserted |
| 3. Text to be deleted is shown with a line through it followed by the replacement text which is highlighted with grey shading. | new text to replace existing text |

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

CHAPTER 1. GENERAL

*Introductory Note.— **Annex 14**, Volume II of this Annex contains Standards and Recommended Practices (specifications) that prescribe the physical characteristics and obstacle limitation surfaces to be provided for at heliports, and certain facilities and technical services normally provided at a heliport. It is not intended that these specifications limit or regulate the operation of an aircraft.*

When designing a heliport, the critical design helicopter, having the largest set of dimensions and the greatest maximum take-off mass (MTOM) the heliport is intended to serve, would need to be considered.

The specifications in this volume modify or complement those in Volume I which, where appropriate, are also applicable to heliports. In other words, where a particular issue is a subject of a specification in this volume that specification will supersede any other specification on that particular issue in Volume I. Throughout this volume the term “heliport” is used; however, it is intended that these specifications also apply to areas for the exclusive use of helicopters at an aerodrome primarily meant for the use of aeroplanes.

It is to be noted that provisions for helicopter flight operations are contained in Annex 6, Part III..

1.1 Definitions

When the following terms are used in this volume, they have the meanings given below. Annex 14, Volume I, contains definitions for those terms which are used in both volumes.

Accuracy. A degree of conformance between the estimated or measured value and the true value.

Note.— For measured positional data, the accuracy is normally expressed in terms of a distance from a stated position within which there is a defined confidence of the true position falling.

~~**Air taxiway.** A defined path on the surface established for the air taxiing of helicopters.~~

Air transit route. A defined path on the surface established **route** for the air transiting of helicopters.

...

Declared distances — heliports. *The following distances shall be declared for helicopter operations in performance class 1 as required by Annex 6, Part III:*

- a) *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.
- b) *Rejected take-off distance available (RTODAH)*. The length of the final approach and take-off area declared available and suitable for **helicopters operated in** performance class 1 **helicopters** to complete a rejected take-off.
- c) *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.

...

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. Where the FATO is to be used by ~~performance class 1 helicopters~~ **operated in performance class 1**, the defined area includes the rejected take-off area available.

...

Helicopter air taxiway. A defined path on the surface established for the air taxiing of helicopters.

Helicopter clearway. A defined area on the ground or water ~~under the control of the appropriate authority, selected and/or prepared as a suitable area over which a performance class 1 helicopter~~ **operated in performance class 1** may accelerate and achieve a specific height.

Helicopter ground taxiway. A ground taxiway **intended for the ground movement of wheeled undercarriage helicopters** ~~for use by helicopters only~~.

Helicopter stand. An aircraft stand which provides for parking a helicopter and, where ~~air taxiing ground taxi~~ operations are **completed** ~~contemplated~~, **or where** the helicopter ~~touchdown~~ **touches down** and lifts off **for air taxi operations**.

Helideck. A heliport located on ~~a floating or fixed~~ **an** off-shore structure **such as an exploration or production platform used for the exploitation of oil or gas**.

...

Protection area. An area provided within a taxi-route and around a helicopter stand which ensures adequate separation from objects, the FATO, other taxi-routes and helicopter stands.

...

Rejected take-off area. A defined area on a heliport suitable for helicopters operating in performance class 1 to complete a rejected take-off.

...

Shipboard heliport. A heliport located on a ship that may be purpose or non-purpose built. A purpose built shipboard heliport is one designed specifically for the use of operating helicopters to it. A non-purpose built shipboard heliport is one that utilizes an area of the ship that is capable of supporting a helicopter but not designed specifically for that task.

...

Taxi-route. A defined corridor established for the movement of helicopters from one part of a heliport to another. A taxi-route includes a helicopter air or ground taxiway which is centred on the taxi-route.

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

Winching area. An area provided for the transfer by helicopter of personnel or stores to or from a ship.

1.2 Applicability

Note. — The dimensions discussed in this Annex are based on consideration of single main rotor helicopters. For tandem rotor helicopters the heliport design will be based on a case-by-case review of the specific models using the basic requirement for a safety area and protection areas specified in this Annex.

1.2.1 The interpretation of some of the specifications in the Annex expressly requires the exercising of discretion, the taking of a decision or the performance of a function by the appropriate authority. In other specifications, the expression appropriate authority does not actually appear although its inclusion is implied. In both cases, the responsibility for whatever determination or action is necessary shall rest with the State having jurisdiction over the heliport.

1.2.2 The specifications in Annex 14, Volume II, shall apply to all heliports intended to be used by helicopters in international civil aviation. They shall apply equally to areas for the exclusive use of helicopters at an aerodrome primarily meant for the use of aeroplanes. Where relevant, the provisions of Annex 14, Volume I shall apply to the helicopter operations being conducted at such an aerodrome. The specifications of Annex 14, Volume I, shall apply, where appropriate, to these heliports as well.

1.2.3 ~~Wherever a colour is referred to in this volume, the specifications for that colour given in Appendix 1 to Annex 14, Volume I, shall apply.~~ Unless otherwise specified, the specification for a colour referred to within this volume shall be that contained in Appendix 1 to Annex 14, Volume I.

CHAPTER 3. PHYSICAL CHARACTERISTICS

3.1 Surface-level heliports

Note 1. — The following specifications are for surface-level land based heliports only. (except where specified) Where a water heliport is being considered, the appropriate authority may establish suitable criteria.

Note 2. — The dimensions of the taxi-routes and helicopter stands include a protection area. The protection area provides separation from an object, the FATO and its safety area and, when abutted, from each other.

Final approach and take-off areas

...

3.1.2 A FATO shall be obstacle free.

3.1.2.3 The dimensions of a FATO shall be:

- a) ~~for a heliport intended to be used by performance class 1 helicopters, as prescribed in the helicopter flight manual except that, in the absence of width specifications, the width shall be not less than 1.5 times the over-all length/width, whichever is greater, of the longest/widest helicopter the heliport is intended to serve~~ where intended to be used by helicopters operated in performance class 1, as prescribed in the helicopter flight manual (HFM) except that, in the absence of width specifications, the width shall be not less than the greatest overall dimension (D) of the largest helicopter the FATO is intended to serve;
- b) where intended to be used by helicopters operated in performance class 2 or 3, of sufficient size and shape to contain an area within which can be drawn a circle of diameter not less than:
 - i) 1D of the largest helicopter when the maximum take-off mass (MTOM) of helicopters the FATO is intended to serve is more than 3175 kg,
 - ii) 0.83 D of the largest helicopter when the MTOM of helicopters the FATO is intended to serve is 3175 kg or less.
- ~~b) for a water heliport intended to be used by performance class 1 helicopters, as prescribed in a) above, plus 10 per cent;~~
- ~~e) for a heliport intended to be used by performance class 2 and 3 helicopters, of sufficient size and shape to contain an area within which can be drawn a circle of diameter not less than 1.5 times the~~

~~over all length/width, whichever is greater, of the longest/widest helicopter the heliport is intended to serve; and~~

- ~~d) for a water heliport intended to be used by performance class 2 and 3 helicopters, of sufficient size to contain an area within which can be drawn a circle of diameter not less than two times the over all length/width, whichever is greater, of the longest/widest helicopter the heliport is intended to serve.~~

Note . — Where the term FATO is not used in the helicopter flight manual (HFM), the minimum landing/takeoff area specified in the HFM for the appropriate flight profile is used.

3.1.4 Recommendation - *Where intended to be used by helicopters operated in performance class 2 or 3 with MTOM of 3175 kg or less, the FATO should be of sufficient size and shape to contain an area within which can be drawn a circle of diameter not less than 1 D.*

Note.— Local conditions, such as elevation and temperature, may need to be considered when determining the size of a FATO. Guidance is given in the Heliport Manual.

3.1.35 The ~~over all~~ **mean** slope in any direction on the FATO shall not exceed 3 per cent. No portion of a FATO shall have a local slope exceeding:

- a) 5 per cent where the heliport is intended to be used by ~~performance class 1~~ helicopters **operated in performance class 1**; and
- b) 7 per cent where the heliport is intended to be used by ~~performance class 2 and 3~~ helicopters **operated in performance class 2 or 3**.

3.1.46 The surface of the FATO shall:

- a) be resistant to the effects of rotor downwash;
- b) be free of irregularities that would adversely affect the take-off or landing of helicopters; and
- c) have bearing strength sufficient to accommodate a rejected take-off by ~~performance class 1~~ helicopters **operated in performance class 1**.

3.1.7 The surface of a FATO surrounding a TLOF intended for use by helicopters operated in performance classes 2 and 3, shall be static load bearing.

3.1.58 Recommendation.— *The FATO should provide ground effect.*

Helicopter clearways

3.1.69 When it is necessary to provide a helicopter clearway **is provided**, it shall be located beyond the ~~upwind~~ end of the rejected take-off area available.

3.1.710 Recommendation.— *The width of a helicopter clearway should not be less than that of the associated safety area.*

3.1.8¹¹ **Recommendation.**— *The ground in a helicopter clearway should not project above a plane having an upward slope of 3 per cent, the lower limit of this plane being a horizontal line which is located on the periphery of the FATO.*

3.1.9¹² **Recommendation.**— *An object situated on a helicopter clearway which may endanger helicopters in the air should be regarded as an obstacle and should be removed.*

Touchdown and lift-off areas

3.1.10¹³ At least one touchdown and lift-off area (TLOF) shall be provided at a heliport.

Note 1.— *The ~~touchdown and lift-off area~~ TLOF may or may not be located within the FATO.*

Note 2.— Additional TLOFs may be collocated with helicopter stands.

3.1.11¹⁴ The ~~touchdown and lift-off area~~ (TLOF) shall be of sufficient size to contain a circle of diameter of at least 0.83D 1.5 times the length or width of the undercarriage, whichever is the greater, of the largest helicopter the area is intended to serve.

Note.— *A ~~touchdown and lift-off area~~ TLOF may be any shape.*

3.1.12¹⁵ Slopes on a ~~touchdown and lift-off area~~ TLOF shall be sufficient to prevent accumulation of water on the surface of the area, but shall not exceed 2 per cent in any direction.

3.1.16 Where the TLOF is within the FATO, the TLOF shall be dynamic load bearing.

3.1.13¹⁷ Where a ~~A touchdown and lift-off area~~ TLOF is collocated with a helicopter stand, the TLOF shall be static load bearing and be capable of withstanding the traffic of helicopters that the area is intended to serve.

3.1.18 Where the TLOF is within the FATO, the centre of the TLOF shall be located not less than 0.5 D from the edge of the FATO.

Safety areas

3.1.14¹⁹ A FATO shall be surrounded by a safety area which need not be solid.

3.1.15²⁰ A safety area surrounding a FATO intended to be used by helicopters operated in performance class 1, in visual meteorological conditions (VMC) shall extend outwards from the periphery of the FATO for a distance of at least 3 m or 0.25 D times the over-all length/width, whichever is greater, of the longest/widest largest helicopter the FATO is intended to serve; and:

a) each external side of the safety area shall be at least 2 D where the FATO is quadrilateral; or

b) the outer diameter of the safety area shall be at least 2 D where the FATO is circular.

3.1.21 A safety area surrounding a FATO intended to be used by helicopters operated in performance class 2 or 3 in visual meteorological conditions (VMC) shall extend outwards from the periphery of the FATO for a distance of at least 3 m or 0.5 D, whichever is the greater, of the largest helicopter the FATO is intended to serve, and:

- a) each external side of the safety area shall be at least 2 D where the FATO is quadrilateral; or
- b) the outer diameter of the safety area shall be at least 2 D where the FATO is circular.

3.1.21A There shall be a protected side slope rising at 45° from the edge of the safety area to a distance of 10 meters, whose surface shall not be penetrated by obstacles; except that when obstacles are located to one side of the FATO only, they may be permitted to penetrate the side slope surface.

3.1.16~~22~~ A safety area surrounding a FATO intended to be used by helicopter operations in instrument meteorological conditions (IMC) shall extend:

- a) laterally to a distance of at least 45 m on each side of the centre line; and
- b) longitudinally to a distance of at least 60 m beyond the ends of the FATO.

Note.— See Figure 3-1.

3.1.17~~23~~ No fixed object shall be permitted on a safety area, except for frangible objects, which, because of their function, must be located on the area. No mobile object shall be permitted on a safety area during helicopter operations.

3.1.18~~24~~ Objects whose functions require them to be located on the safety area shall not exceed a height of 25 cm when located along the edge of the FATO nor penetrate a plane originating at a height of 25 cm above the edge of the FATO and sloping upwards and outwards from the edge of the FATO at a gradient of 5 per cent.

3.1.24A **Recommendation.**— *In the case of a FATO of diameter less than 1D, the maximum height of the objects whose functions require them to be located on the safety area should not exceed a height of 5 cm.*

3.1.19~~25~~ The surface of the safety area, **when a solid surface,** shall not exceed an upward slope of 4 per cent outwards from the edge of the FATO.

3.1.20~~26~~ **Where applicable,** The surface of the safety area shall be treated to prevent flying debris caused by rotor downwash.

3.1.21~~27~~ The surface of the safety area abutting the FATO shall be continuous with the FATO ~~and be capable of supporting, without structural damage, the helicopters that the heliport is intended to serve.~~

Helicopter ground taxiways and ground taxi-routes

Note 1.— A helicopter ground taxiway is intended to permit the surface movement of a wheeled helicopter under its own power. ~~The specifications for taxiways, taxiway shoulders and taxiway strips included in Annex 14, Volume I are equally applicable to heliports as modified below. When a taxiway is intended for use by aeroplanes and helicopters, the provisions for taxiways and helicopter ground taxiways will be examined and the more stringent requirements will be applied.~~

Note 2.—The following specifications are intended for the safety of simultaneous operations during the manoeuvring of helicopters. However, the wind velocity induced by the rotor downwash might have to be considered.

Note 3.— When a taxiway is intended for use by aeroplanes and helicopters, the provisions for taxiways for aeroplanes and helicopter ground taxiways will be taken into consideration and the more stringent requirements will be applied.

3.1.22~~28~~ The width of a helicopter ground taxiway shall not be less than: 1.5 times the largest width of the undercarriage (UCW) of helicopters the ground taxiway is intended to serve.

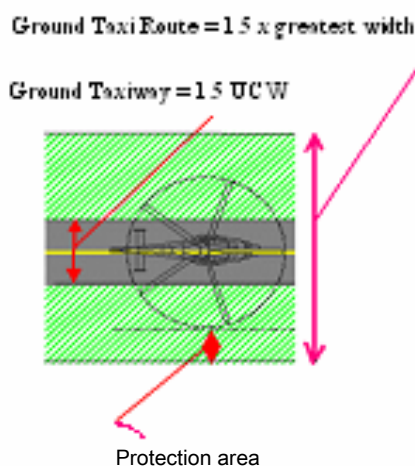


Figure 3-2. Ground taxi-route.

Helicopter main gear span	Helicopter ground taxiway width
Up to but not including 4.5 m	7.5 m
4.5 m up to but not including 6 m	10.5 m
6 m up to but not including 10 m	15 m
10 m and over	20 m

3.1.23— ~~The separation distance between a helicopter ground taxiway and another helicopter ground taxiway, an air taxiway, an object or helicopter stand shall not be less than the appropriate dimension specified in Table 3-1.~~

3.1.24²⁹ The longitudinal slope of a helicopter ground taxiway shall not exceed 3 per cent.

3.1.25³⁰ **Recommendation.**— A helicopter ground taxiway ~~should~~ **shall be static load bearing and** be capable of withstanding the traffic of helicopters that the helicopter ground taxiway is intended to serve.

3.1.30A A helicopter ground taxiway shall be centred in a ground taxi-route.

3.1.31 A helicopter ground taxi-route shall extend symmetrically on each side of the centreline for at least 0.75 times the largest overall width of the helicopters that it is intended to serve.

3.1.32 No objects shall be permitted on a helicopter ground taxi-route, except for frangible objects, which, because of their function, must be located there.

~~3.1.26 **Recommendation.**— A helicopter ground taxiway should be provided with shoulders which extend symmetrically on each side of the helicopter ground taxiway for at least one-half the greatest over-all width of the helicopters that the helicopter ground taxiway is intended to serve.~~

3.1.27³³ The helicopter ground taxiway and **the ground taxi-route** ~~its shoulder~~ shall provide rapid drainage but the helicopter ground taxiway transverse slope shall not exceed 2 per cent.

3.1.28³⁴ **Recommendation.**— The surface of a helicopter ground ~~taxiway shoulder should~~ **taxi-route** ~~shall~~ be resistant to the effect of rotor downwash.

Helicopter ~~Air taxiways~~ **and air taxi-routes**

Note.— An air taxiway is intended to permit the movement of a helicopter above the surface at a height normally associated with ground effect and at groundspeed less than 37km/h (20 kt).

3.1.29³⁵ The width of an **a helicopter** air taxiway shall be at least two times the ~~greatest over-all width~~ **largest width of the undercarriage (UCW)** of the helicopters that the air taxiway is intended to serve.

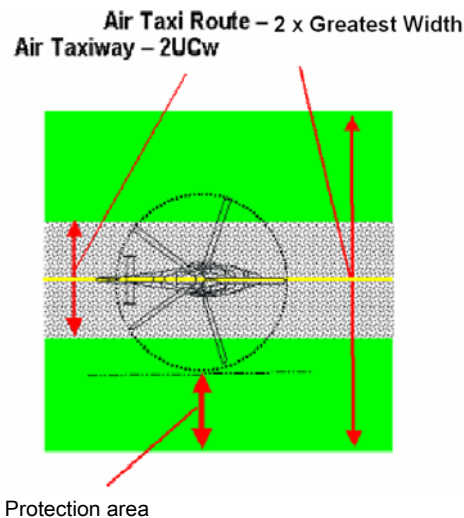


Figure 3-3. Air taxi-route

3.1.30~~36~~ The surface of ~~an~~ **a helicopter** air taxiway shall **be suitable for an emergency landing.**

- a) ~~be resistant to the effects of rotor downwash; and~~
- b) ~~be suitable for emergency landings.~~

3.1.37 **Recommendation.**— *The surface of a helicopter air taxiway should be static load bearing.*

3.1.31 **Recommendation.**— *The surface of an air taxiway should provide ground effect.*

3.1.32~~38~~ **Recommendation.**— *The transverse slope of the surface of **a helicopter** ~~an~~ air taxiway should not exceed 10 per cent and the longitudinal slope should not exceed 7 per cent. In any event, the slopes should not exceed the slope landing limitations of the helicopters the air taxiway is intended to serve.*

3.1.38A A helicopter air taxiway shall be centred in an air taxi-route.

3.1.39 A helicopter air taxi-route shall extend symmetrically on each side of the centreline for a distance at least equal to the largest overall width of the helicopters that it is intended to serve.

3.1.40 No objects shall be permitted on an air taxi-route, except for frangible objects, which, because of their function, must be located thereon.

3.1.41 The surface of an air taxi-route shall be resistant to the effect of rotor downwash.

3.1.42 The surface of an air taxi-route shall provide ground effect.

~~3.1.33 The separation distance between an air taxiway and another air taxiway, a helicopter ground taxiway, an object or a helicopter stand shall not be less than the appropriate dimension in Table 3-1.~~

~~Table 3-1. Helicopter ground taxiway and air taxiway separation distances
(expressed in multiples of greatest over all width of helicopter with rotor turning)~~

Facility	Helicopter ground taxiway	Air taxiway	Object	Helicopter stand
Helicopter ground taxiway	2 (between edges)	4 (between centre lines)	1 (edge to object)	2 (between edges)
Air taxiway	4 (between centre lines)	4 (between centre lines)	1 1/2 (centre line to object)	4 (centre line to edge)

Air transit route

Note.— An air transit route is intended to permit the movement of a helicopter above the surface, normally at heights not above 30 m (100 ft) above ground level and at ground speeds exceeding 37 km/h (20 kt).

~~3.1.34~~⁴³ The width of an air transit route shall not be less than:

- a) 7.0 times ~~the largest overall width of the helicopters the air transit route is intended to serve~~ RD when the air transit route is intended for use by day only; and
- b) 10.0 times ~~the largest overall width of the helicopters the air transit route is intended to serve~~ RD when the air transit route is intended for use at night;

~~when RD is the diameter of the largest rotor of the helicopters that the air transit route is intended to serve.~~

~~3.1.35~~⁴⁴ Any variation in the direction of the centre line of an air transit route shall not exceed 120° and be designed so as not to necessitate a turn of radius less than 270 m.

Note.— It is intended that air transit routes be selected so as to permit autorotative or one-engine-inoperative landings such that, as a minimum requirement, injury to persons on the ground or water, or damage to property are minimized.

Aprons

Note.—The specifications for aprons included in Chapter 3 of Annex 14, Volume I are equally applicable to heliports as modified below.

3.1.36⁴⁵ The slope in any direction on a helicopter stand shall not exceed 2 per cent.

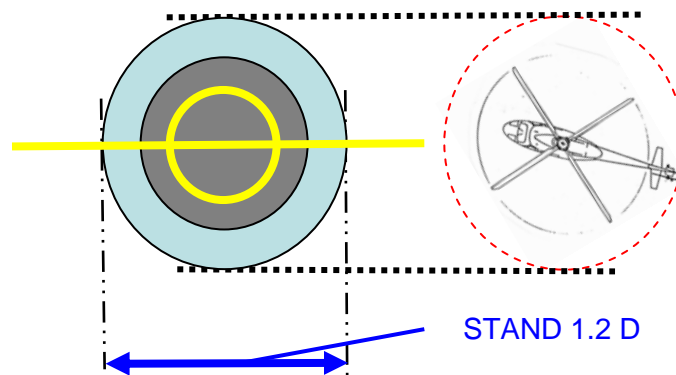
3.1.37 The minimum clearance between a helicopter using a helicopter stand and an object or any aircraft on another stand shall not be less than half the greatest over-all width of the helicopters that the stand is intended to serve.

Note.—Where simultaneous hover operations are to be provided for, the separation distances specified in Table 3-1 between two air taxiways are to be applied.

3.1.38⁴⁶ A helicopter stand shall be of sufficient size to contain a circle of diameter of at least **1.2 D** the largest over-all dimension of the largest helicopter the stand is ~~expected~~ **intended** to serve.

3.1.47 If a helicopter stand is used for taxi through, the minimum width of the stand and associated protection area shall be that of the taxi-route.

Figure 3.4. Helicopter stand



3.1.48 When a helicopter stand is used for turning, the minimum dimension of the stand and protection area shall be not less than 2 D.

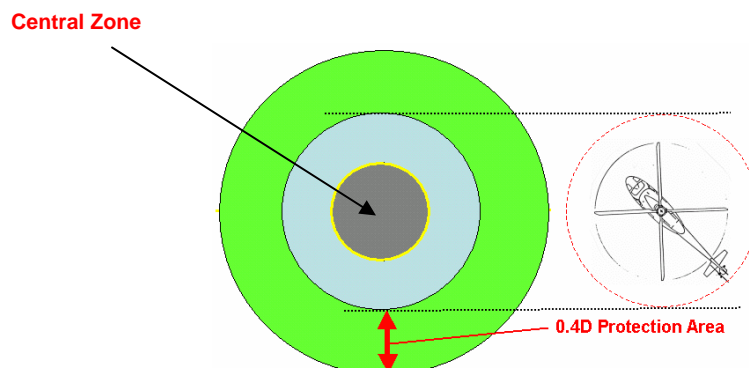


Figure 3-5. Helicopter stand protection area.

3.1.48A For simultaneous operations, the protection area of helicopter stands and their associated taxi-routes shall not overlap.

3.1.48B When a helicopter stand is used for turning, it shall be surrounded by a protection area which extends for a distance of $0.4 D$ from the edge of the helicopter stand.

Note.— Where non-simultaneous operations are envisaged, the protection area of helicopter stands and their associated taxi-routes may overlap.

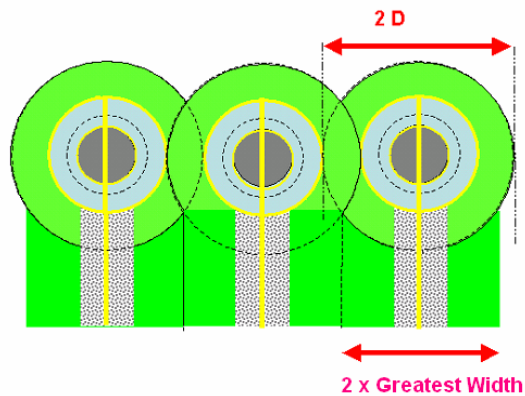


Figure 3-6. Stand separation distance – non simultaneous operations

3.1.48C When intended to be used for ground taxi operations by wheeled helicopters, the dimensions of a helicopter stand shall take into account the minimum turning-circle of wheeled helicopters the stand is intended to serve.

3.1.49 A helicopter stand and associated protection area intended to be used for air taxiing shall provide ground effect.

3.1.50 No fixed objects shall be permitted on a helicopter stand and the associated protection area.

3.1.51 The central zone of the stand shall be capable of withstanding the traffic of helicopters that it is intended to serve and have a static load-bearing area:

a) of diameter not less than $0.83 D$ of the largest helicopter it is intended to serve; or

b) for a helicopter stand intended to be used for ground taxi-through, the same width as the ground taxiway.

Note.— For a helicopter stand intended to be used for turning on the ground, the dimension of the central zone may need to be increased.

***Location of a final approach and take-off area
in relation to a runway or taxiway***

3.1.39~~52~~ Where a FATO is located near a runway or taxiway, and simultaneous VMC operations are planned, the separation distance between the edge of a runway or taxiway and the edge of a FATO shall not be less than the appropriate dimension in Table 3-2.

3.1.40~~53~~ **Recommendation.**— *A FATO should not be located:*

- a) *near taxiway intersections or holding points where jet engine efflux is likely to cause high turbulence; or*
- b) *near areas where aeroplane vortex wake generation is likely to exist.*

Table 3-2. FATO minimum separation distance

If aeroplane mass and/or helicopter mass are	Distance between FATO edge and runway edge or taxiway edge
up to but not including 2 720 3175 kg	60 m
2 720 3175 kg up to but not including 5 760 kg	120 m
5 760 kg up to but not including 100 000 kg	180 m
100 000 kg and over	250 m

3.2 Elevated heliports

Note 1. — The dimensions of the taxi-routes and stands include a protection area. The protection area provides separation from an object, the FATO and its safety area and, when abutted, from each other.

Note 2. — Guidance on structural design for elevated heliports is given in the Heliport Manual.

3.2.1 In the case of elevated heliports, design considerations of the different elements of the heliport shall take into account additional loading resulting from the presence of personnel, snow, freight, refuelling, fire fighting equipment, etc.

Final approach and take-off area and touchdown and lift-off area

Note.— *On elevated heliports it is presumed that the FATO and the ~~one~~ touchdown and lift-off area will be coincidental.*

...

3.2.2 A FATO shall be obstacle free.

3.2.2.3 The dimensions of the FATO shall be:

- a) for a heliport intended to be used by performance class 1 helicopters, as prescribed in the helicopter flight manual except that, in the absence of width specifications, the width shall be not less than 1.5 times the over-all length/width, whichever is greater, of the longest/widest helicopter the heliport is intended to serve; and where intended to be used by helicopters operated in performance class 1, as prescribed in the helicopter flight manual (HFM) except that, in the absence of width specifications, the width shall be not less than 1 D of the largest helicopter the FATO is intended to serve;
- b) for a heliport intended to be used by performance class 2 helicopters, of sufficient size and shape to contain an area within which can be drawn a circle of diameter not less than 1.5 times the over-all length/ width, whichever is greater, of the longest/widest helicopter the heliport is intended to serve. where intended to be used by helicopters operated in performance class 2 or 3, of sufficient size and shape to contain an area within which can be drawn a circle of diameter not less than:
 - i) 1 D of the largest helicopter when the MTOM of helicopters the FATO is intended to serve is more than 3175 kg,
 - ii) 0.83 D of the largest helicopter when the MTOM of helicopters the FATO is intended to serve is 3175 kg or less.

3.2.4 Recommendation - Where intended to be used by helicopters operated in performance class 2 or 3 with MTOM of 3175 kg or less, the FATO should be of sufficient size and shape to contain an area within which can be drawn a circle of diameter not less than 1 D

Note.— Local conditions, such as elevation and temperature, may need to be considered when determining the size of a FATO. Guidance is given in the Heliport Manual.

3.2.3 Recommendation. ~~The slope requirements for elevated heliports should conform to the requirements for surface level heliports specified in 3.1.3.~~

3.2.5 The mean slope in any direction on the FATO shall not exceed 3 per cent. No portion of a FATO shall have a slope exceeding:

- a) 5 per cent where the heliport is intended to be used by helicopters operated in performance class 1; and
- b) 7 per cent where the heliport is intended to be used by helicopters operated in performance class 2 or 3.

3.2.6 The FATO shall be dynamic load bearing.

3.2.7 The surface of the FATO shall:

a) be resistant to the effects of rotor downwash; and

b) be free of irregularities that would adversely affect the take-off or landing of helicopters.

3.2.4 ~~The FATO shall be capable of withstanding the traffic of helicopters the heliport is intended to serve. Design considerations shall take into account additional loading resulting from the presence of personnel, snow, freight, refuelling, fire fighting equipment, etc.~~

Note. ~~Guidance on structural design for elevated heliports is given in the Heliport Manual.~~

3.2.8 Recommendation.- *The FATO should provide ground effect.*

Helicopter clearways

3.2.9 When a helicopter clearway is provided, it shall be located beyond the end of the rejected take-off area available.

3.2.10 Recommendation.- *The width of a helicopter clearway should not be less than that of the associated safety area.*

3.2.11 Recommendation.- *When solid, the surface of the helicopter clearway should not project above a plane having an upward slope of 3 per cent, the lower limit of this plane being a horizontal line which is located on the periphery of the FATO.*

3.2.12 Recommendation.- *An object situated on a helicopter clearway which may endanger helicopters in the air should be regarded as an obstacle and should be removed.*

Touchdown and lift-off areas

3.2.13 One TLOF shall be coincidental with the FATO.

Note. ~~Additional TLOFs may be collocated with helicopter stands.~~

3.2.14 For a TLOF coincidental with the FATO, the dimensions and the characteristics of the TLOF shall be the same as those of the FATO.

3.2.15 When the TLOF is collocated with a helicopter stand, the TLOF shall be of sufficient size to contain a circle of diameter 0.83 D of the largest helicopter the area is intended to serve.

3.2.16 Slopes on a TLOF shall be sufficient to prevent accumulation of water on the surface of the area, but shall not exceed 2 per cent in any direction.

3.2.17 When the TLOF is collocated with a helicopter stand and intended to be used by ground taxiing helicopters only, the TLOF shall at least be static load bearing and be capable of withstanding the traffic of helicopters that the area is intended to serve.

3.2.18 When the TLOF is collocated with a helicopter stand and intended to be used by air taxiing helicopters, the TLOF shall have a dynamic load-bearing area.

Safety area

3.2.5¹⁹ The FATO shall be surrounded by a safety area **which need not be solid**.

3.2.20 A safety area surrounding a FATO intended to be used by helicopters operated in performance class 1, in visual meteorological conditions (VMC) shall extend outwards from the periphery of the FATO for a distance of at least 3 m or 0.25 D, whichever is greater, of the largest helicopter the FATO is intended to serve and :

- a) each external side of the safety area shall be at least 2 D where the FATO is quadrilateral; or
- b) the outer diameter of the safety area shall be at least 2 D where the FATO is circular.

3.2.21 A safety area surrounding a FATO intended to be used by helicopters operated in performance class 2 or 3 in visual meteorological conditions (VMC), shall extend outwards from the periphery of the FATO for a distance of at least 3 m or 0.5 D, whichever is the greater, of the largest helicopter the FATO is intended to serve:

- a) each external side of the safety area shall be at least 2 D where the FATO is quadrilateral; or
- b) the outer diameter of the safety area shall be at least 2 D where the FATO is circular.

3.2.22 There shall be a protected side slope rising at 45° from the edge of the safety area to a distance of 10 meters, whose surface shall not be penetrated by obstacles; except that when obstacles are located to one side of the FATO only, they may be permitted to penetrate the side slope surface.

~~3.2.6 The safety area shall extend outwards from the periphery of the FATO for a distance of at least 3 m or 0.25 times the over all length/width, whichever is greater, of the longest/widest helicopter intended to use the elevated heliport.~~

3.2.7²³ No fixed object shall be permitted on a safety area, except for frangible objects, which, because of their function, must be located on the area. No mobile object shall be permitted on a safety area during helicopter operations.

3.2.8²⁴ Objects whose function require them to be located on the safety area shall not exceed a height of 25 cm when located along the edge of the FATO nor penetrate a plane originating at a height of 25 cm above the edge of the FATO and sloping upwards and outwards from the edge of the FATO at a gradient of 5 per cent.

3.2.24A **Recommendation.** - *In the case of a FATO of diameter less than 1D, the maximum height of the objects whose functions require them to be located on the safety area should not exceed a height of 5 cm.*

3.2.25 The surface of the safety area, **when a solid surface**, shall not exceed an upward slope of 4 per cent outwards from the edge of the FATO.

3.2.26 Where applicable, the surface of the safety area shall be prepared in a manner to prevent flying debris caused by rotor downwash.

3.2.27 The surface of the safety area abutting the FATO shall be continuous with the FATO, and be capable of supporting, without structural damage, the helicopters that the heliport is intended to serve.

Helicopter ground taxiways and ground taxi-routes

Note. — The following specifications are intended for the safety of simultaneous operations during the manoeuvring of the helicopters. However, the wind velocity induced by the rotor downwash might have to be considered.

3.2.28 The width of a helicopter ground taxiway shall not be less than 2 times the largest width of the undercarriage (UCW) of helicopters the ground taxiway is intended to serve.

3.2.29 The longitudinal slope of a helicopter ground taxiway shall not exceed 3 per cent.

3.2.30 A helicopter ground taxiway shall be static load bearing and be capable of withstanding the traffic of helicopters that the helicopter ground taxiway is intended to serve.

3.2.30A A helicopter ground taxiway shall be centred in a ground taxi-route.

3.2.31 A helicopter ground taxi-route shall extend symmetrically on each side of the centreline to a distance not less than the largest overall width of the helicopters that it is intended to serve.

3.2.32 No objects shall be permitted on a helicopter ground taxi-route, except for frangible objects, which, because of their function, must be located there.

3.2.33 The helicopter ground taxiway and the ground taxi-route shall provide rapid drainage but the helicopter ground taxiway transverse slope shall not exceed 2 per cent.

3.2.34 The surface of a helicopter ground taxi-route shall be resistant to the effect of rotor downwash.

Helicopter air taxiways and taxi-routes

Note. — An air taxiway is intended to permit the movement of a helicopter above the surface at a height normally associated with ground effect and at groundspeed less than 37 km/h (20 kt).

3.2.35 The width of a helicopter air taxiway shall be at least three times the largest undercarriage (UCW) of the helicopters that the air taxiway is intended to serve.

3.2.36 The surface of a helicopter air taxiway shall be dynamic load bearing.

3.2.37 The transverse slope of the surface of a helicopter air taxiway shall not exceed 2 per cent and the longitudinal slope shall not exceed 7 per cent. In any event, the slopes shall not exceed the slope landing limitations of the helicopters the air taxiway is intended to serve.

3.2.37A A helicopter air taxiway shall be centred in an air taxi-route.

3.2.38 A helicopter air taxi-route shall extend symmetrically on each side of the centreline to a distance not less than the largest overall width of the helicopters that it is intended to serve.

3.2.39 No objects shall be permitted on an air taxi-route, except for frangible objects, which, because of their function, must be located thereon.

3.2.40 The surface of an air taxi-route shall be resistant to the effect of rotor downwash.

3.2.41 The surface of an air taxi-route shall provide ground effect.

Aprons

3.2.42 The slope in any direction on a helicopter stand shall not exceed 2 per cent.

3.2.43 A helicopter stand shall be of sufficient size to contain a circle of diameter of at least 1.2 D of the largest helicopters the stand is intended to serve.

3.2.44 If a helicopter stand is used for taxi-through, the minimum width of the stand and associated protection area shall be that of the taxi-route.

3.2.45 When a helicopter stand is used for turning, the minimum dimension of the stand and protection area shall be not less than 2 D.

Note.— If a helicopter stand is used for turning, it is surrounded by a protection area which extends for a distance of 0.4 D from the edge of the helicopter stand.

3.2.45A For simultaneous operations, the protection area of helicopter stands and their associated taxi-routes shall not overlap.

Note.— Where non-simultaneous operations are envisaged, the protection area of helicopter stands and their associated taxi-routes may overlap;

3.2.45B When intended to be used for ground taxi operations by wheeled helicopters, the dimensions of a helicopter stand shall take into account the minimum turning-circle of wheeled helicopters the stand is intended to serve.

3.2.46 A helicopter stand and associated protection area intended to be used for air taxiing shall provide ground effect.

3.2.47 No fixed objects shall be permitted on a helicopter stand and the associated protection area.

3.2.48 The central zone of the helicopter stand shall be capable of withstanding the traffic of helicopters that it is intended to serve and have a load bearing area:

a) of diameter not less than 0.83 D of the largest helicopter it is intended to serve; or

b) for a helicopter stand intended to be used for ground taxi through the same width as ground taxiway.

3.2.49 The central zone of a helicopter stand intended to be used for ground taxiing only shall be static load-bearing.

3.2.50 The central zone of a helicopter stand intended to be used for air taxiing shall be dynamic load-bearing.

Note.— For a helicopter stand intended to be used for turning on the ground, the dimension of the central zone might have to be increased.

3.3 Helidecks

Note.— The following specifications are for helidecks located on structures engaged in such activities as mineral exploitation, research or construction. See 3.4 for shipboard heliport provisions.

Final approach and take-off area and touchdown and lift-off area TLOF

Note.— On helidecks it is presumed that the FATO and the touchdown and lift-off area will be coincidental. Reference to FATO within the helideck section of this Annex is assumed to include the TLOF. Guidance on the effects of airflow direction and turbulence, prevailing wind velocity and high temperatures from gas turbine exhausts or flare radiated heat on the location of the FATO is given in the Heliport Manual.

3.3.1 The specifications in paragraphs 3.3.4 to 3.3.7, 3.3.10 to 3.3.12 and 3.3.14 shall be applicable for helidecks completed on or after 1 January 2012.

3.3.2¹ A helideck shall be provided with at least one FATO.

3.3.2³ A FATO may be any shape but shall, ~~for a single main rotor helicopter or side-by-side twin main rotor helicopter,~~ be of sufficient size to contain an area within which can be drawn a circle of diameter not less than 1.0 times D of the largest helicopter the helideck is intended to serve, where D is the largest dimension of the helicopter when the rotors are turning.

3.3.2⁴ A FATO may be any shape but shall, ~~for a single main rotor helicopter or side-by-side twin main rotor helicopter,~~ be of sufficient size to **contain:** ~~contain an area within which can be drawn a circle~~

of diameter not less than 1.0 times D of the largest helicopter the helideck is intended to serve, where D is the largest dimension of the helicopter when the rotors are turning.

a) for helicopters with a MTOM of more than 3175 kg, an area within which can be accommodated a circle of diameter of not less than 1.0 D of the largest helicopter the helideck is intended to serve.

b) for helicopters with a MTOM of 3175 kg or less, an area within which can be accommodated a circle of diameter of not less than 0.83 D of the largest helicopter the helideck is intended to serve.

~~3.3.3 Where omnidirectional landings by helicopters having tandem main rotors are intended, the FATO shall be of sufficient size to contain an area within which can be drawn a circle of diameter not less than 0.9 times the distance across the rotors in a fore and aft line. Where these provisions cannot be met, the FATO may be in the form of a rectangle with a small side not less than 0.75 D and a long side not less than 0.9 D but within this rectangle, bi-directional landings only will be permitted in the direction of the 0.9 D dimension.~~

3.3.5 Recommendation.— *For helicopters with a MTOM of 3175 kg or less, the FATO should be of sufficient size to contain an area within which can be accommodated a circle of diameter of not less than 1.0 D of the largest helicopter the helideck is intended to serve.*

3.3.6 A FATO shall be dynamic load bearing.

3.3.7 A FATO shall provide ground effect.

3.3.8 No fixed object shall be permitted around the edge of the FATO except for frangible objects, which, because of their function, must be located thereon.

3.3.9 Objects whose function require them to be located on the edge of the FATO shall not exceed a height of 25 cm.

3.3.10 Objects whose function require them to be located on the edge of the FATO shall not exceed a height of 25 cm; *except that in the case of a FATO of diameter less than 1D the maximum height of such objects shall not exceed a height of 5 cm.*

3.3.11 Objects whose function requires them to be located within the FATO (such as lighting or nets) shall not exceed a height of 2.5 cm.. Such objects may only be present if they do not represent a hazard to helicopters.

Note.— Examples of potential hazards include nets or raised fittings on the deck that might induce dynamic rollover for helicopters equipped with skids.

3.3.12 Safety net or safety shelves shall be located around the edge of a helideck but shall not exceed the helideck height.

3.3.13 The surface of the FATO shall be skid-resistant to both helicopters and persons and be sloped to prevent pooling of liquids. Where the helideck is constructed in the form of a grating, the underdeck design shall be such that ground effect is not reduced.

3.3.6~~14~~ The surface of the FATO shall be skid-resistant to both helicopters and persons and be sloped to prevent pooling of liquids ~~water~~. ~~Where the helideck is constructed in the form of a grating, the underdeck design shall be such that ground effect is not reduced.~~

Note.— *Guidance on rendering the surface of the FATO skid-resistant is contained in the Heliport Manual.*

3.4 Shipboard heliports

3.4.1 The specifications in paragraphs, 3.4.3, 3.4.5, 3.4.6 and 3.4.8 to 3.4.13 shall be applicable to shipboard heliports completed on or after 1 January 2012.

3.4.4~~2~~ When helicopter operating areas are provided in the bow or stern of a ship or are purpose-built above the ship's structure, they shall be regarded as helidecks and the criteria given in 3.3 shall apply.

3.4.4~~3~~ When helicopter operating areas are provided in the bow or stern of a ship or are purpose-built above the ship's structure, they shall be regarded as helidecks ~~purpose-built shipboard heliports~~, and the criteria given in 3.3 shall apply.

Final approach and take-off area and touchdown and lift-off area

Note.— On ~~shipboard~~ heliports, ~~located in other areas of ships it is presumed that the FATO and the touchdown and lift-off area~~ TLOF will be coincidental. ~~Reference to FATO within the shipboard heliport section of this Annex is assumed to include the TLOF.~~ Guidance on the effects of airflow direction and turbulence, prevailing wind velocity and high temperature from gas turbine exhausts or flare radiated heat on the location of the FATO is given in the Heliport Manual.

3.4.2~~4~~ Shipboard heliports shall be provided with at least one FATO.

3.4.5 The FATO of a shipboard heliport shall be dynamic load bearing.

3.4.6 The FATO of a shipboard heliport shall provide ground effect.

3.4.7 A FATO on a shipboard heliport shall be circular and shall be of sufficient size to contain a diameter not less than 1.0 times D of the largest helicopter the heliport is intended to serve where D is the largest dimension of the helicopter when the rotors are turning.

3.4.8~~8~~ A FATO on a shipboard heliport shall be circular and shall be of sufficient size to contain a diameter not less than 1.0 times D of the largest helicopter the heliport is intended to serve where D is the largest dimension of the helicopter when the rotors are turning. ~~For purpose-built shipboard heliports provided in a location other than the bow or stern the FATO shall be of sufficient size to contain a circle with a diameter not less than 1.0 D of the largest helicopter the heliport is intended to serve.~~

3.4.9 For purpose-built shipboard heliports provided in the bow or stern of a ship, the FATO shall be of sufficient size to:

- a) contain a circle with a diameter not less than 1 D of the largest helicopter the heliport is intended to serve; or
- b) for operations with limited touchdown directions, contain an area within which can be accommodated two opposing arcs of a circle with a diameter of not less than 1D in the helicopters longitudinal direction. The minimum width of the heliport shall be not less than 0.83D. (See Figure 3.7).

Note 1 — The ship will need to be manoeuvred to ensure that the relative wind is appropriate to the direction of the helicopter touchdown heading.

Note 2 — The touchdown heading of the helicopter is limited to the angular distance subtended by the 1 D arcs headings, minus 15 degrees at each end of the arc.

3.4.10 For non-purpose built shipboard heliports, the FATO shall be of sufficient size to contain a circle with a diameter not less than 1D of the largest helicopter the helideck is intended to serve.

3.4.11 No fixed object shall be permitted around the edge of the FATO except for frangible objects, which, because of their function, must be located thereon.

3.4.12 Objects whose function require them to be located on the edge of the FATO shall not exceed a height of 25 cm

3.4.13 Objects whose function requires them to be located within the FATO (such as lighting or nets) shall not exceed a height of 2.5 cm. Such objects may only be present if they do not represent a hazard to helicopters.

3.4.14 The surface of the FATO shall be skid-resistant to both helicopters and persons.

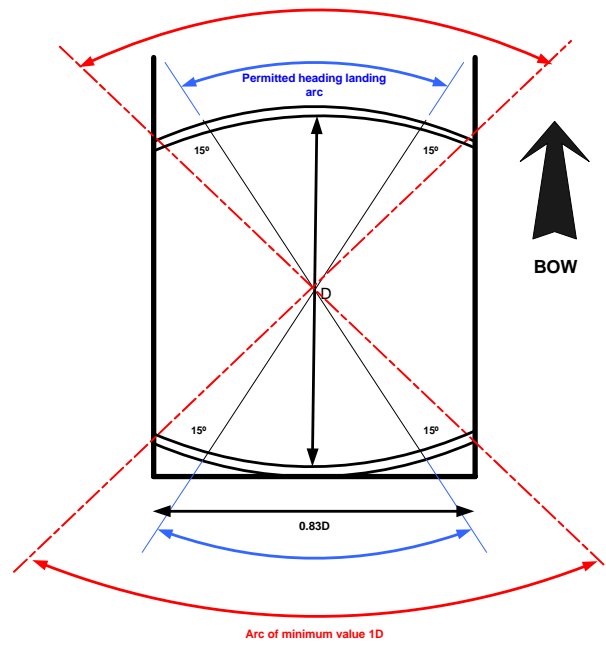


Figure 3-7. Shipboard permitted landing headings for limited heading operations

CHAPTER 4. OBSTACLE RESTRICTION AND REMOVAL

4.1 Obstacle limitation surfaces and sectors

Obstacle-free sector/surface — helidecks

4.1.21 The specifications in paragraphs 4.1.23, 4.1.26 and 4.1.29 and Figure 4-2B shall be applicable for helidecks completed on or after 1 January 2012.

4.1.21—22 *Description.* A complex surface originating at a reference point on the edge of the FATO of a helideck and extending to a specified distance.

4.1.2123 *Description.* A complex surface originating at and extending from, a reference point on the edge of the FATO of a helideck and extending to a specified distance. In the case of a FATO of less than 1 D, the reference point shall be located not less than 0.5D from the centre of the FATO.

4.1.2224 *Characteristics.* An obstacle-free sector/surface shall subtend an arc of specified angle.

4.1.2325 For helidecks the obstacle-free sector shall subtend an arc of 210° and extend outwards to a distance compatible with the one-engine inoperative capability of the most critical helicopter the helideck is intended to serve. The surface shall be a horizontal plane level with the elevation of the helideck except that, over an arc of 180° passing through the centre of the FATO, the surface shall be at water level, extending outwards for a distance compatible with the take-off space required for the most critical helicopter the helideck is intended to serve (see Figure 4-2A).

4.1.26 A helideck obstacle-free sector shall comprise of two components, one above and one below helideck level (see Figure 4-2B.):

a) Above helideck level: The surface shall be a horizontal plane level with the elevation of the helideck surface that subtends an arc of at least 210° with the apex located on the periphery of the D reference circle extending outwards to a distance that will allow for an unobstructed departure path appropriate to the helicopter the helideck is intended to serve.

b) Below helideck level: Within the (minimum) 210° arc, the surface shall additionally extend downward from the edge of the FATO below the elevation of the helideck to water level for an arc of not less than 180° that passes through the centre of the FATO and outwards to a distance that will allow for safe clearance from the obstacles below the helideck in the event of an engine failure for the type of helicopter the helideck is intended to serve.

Note.— For both the above obstacle free sectors for helicopters operated in Performance class 1 or 2 the horizontal extent of these distances from the helideck will be compatible with the one-engine inoperative capability of the helicopter type to be used.

Limited obstacle surface — helidecks

Note.— Where obstacles are necessarily located on the structure, a helideck may have a limited obstacle sector.

4.1.24²⁷ *Description.* A complex surface originating at the reference point for the obstacle-free sector and extending over the arc not covered by the obstacle-free sector as shown in Figures 4-3, 4-4 and 4-5 and within which the height of obstacles above the level of the FATO will be prescribed.

4.1.25²⁸ *Characteristics.* The limited obstacle surface shall not subtend an arc greater than a specified angle and shall be sufficient to include that area not covered by the obstacle-free sector.

4.1.29 *Characteristics.* A limited obstacle sector shall not subtend an arc greater than 150 degrees. Its dimensions and location shall be as indicated in Figure 4-3.

4.2 Obstacle limitation requirements

...

Helidecks

Note.— The following specifications are for helidecks located on a structure and engaged in such activities as mineral exploitation, research, or construction, but excluding heliports on ships .

4.2.12 The specifications in paragraphs, 4.2.14, 4.2.16, and 4.2.18 shall be applicable for helidecks completed on or after 1 January 2012.

4.2.12¹³ A helideck shall have an obstacle-free sector and, where necessary, a limited obstacle sector.

4.2.12¹⁴ A helideck shall have an obstacle-free sector, and, where necessary, a limited obstacle sector.

Note.— A helideck may have a limited obstacle sector (see paragraph 4.1.29).

4.2.13¹⁵ There shall be no fixed obstacles within the obstacle-free sector above the obstacle-free surface.

4.2.16 Recommendation.— *If a permitted obstacle is located within the first segment of the limited obstacle sector at a height greater than 5 cm but less than 0.05D, a prohibited landing sector should be established to provide the helicopter with further protection from obstacles not readily visible to the flight crew because the obstacles are positioned behind a landing helicopter*

4.2.1417 In the immediate vicinity of the helideck, obstacle protection for helicopters shall be provided below the heliport level. This protection shall extend over an arc of at least 180° with the origin at the centre of the FATO, with a descending gradient having a ratio of one unit horizontally to five units vertically from the edges of the FATO within the 180° sector.

4.2.1418 In the immediate vicinity of the helideck, obstacle protection for helicopters shall be provided below the heliport level. This protection shall extend over an arc of at least 180° with the origin at the centre of the FATO, with a descending gradient having a ratio of one unit horizontally to five units vertically from the edges of the FATO within the 180° sector. *This descending gradient may be reduced to a ratio of one unit horizontally to three within the 180° sector for multi-engine helicopters operated in performance class 1 or 2 (see Figure 4.2B).*

4.2.1519 Where a mobile obstacle or combination of obstacles within the obstacle-free sector is essential for the operation of the installation *(e.g. crane)*, the obstacle(s) shall not subtend an arc exceeding 30°, as measured from the centre of the FATO.

4.2.1620 ~~For single main rotor and side-by-side twin rotor helicopters, w~~ Within the 150° limited obstacle surface/sector out to a distance of 0.62 D, measured from the centre of the FATO, objects shall not exceed a height of 0.05 D above the FATO. Beyond that arc, out to an over-all distance of 0.83 D the limited obstacle surface rises at a rate of one unit vertically for each two units horizontally (see Figure 4-3).

~~4.2.17 For omnidirectional operations by tandem main rotor helicopters within the 150° limited obstacle surface/sector out to a distance of 0.62 D, measured from the centre of the FATO, there shall be no fixed obstacles. Beyond that arc, out to an over-all distance of 0.83 D, objects shall not penetrate a level surface which has a height equivalent to 0.05D above the FATO (see Figure 4-4).~~

~~4.2.18 For bi-directional operations by tandem main rotor helicopters, within the 0.62 D arc in the 150° limited obstacle surface/sector, objects shall not penetrate a level surface which has a height equivalent to 1.1 m above the FATO (see Figure 4-5).~~

Shipboard heliports

Purpose-built heliports located forward or aft

4.2.21 The specifications in paragraphs, 4.2.22, 4.2.25 to 4.2.28, 4.2.30, 4.2.32 to 4.2.37 and Figures 4-11B and 4-12B shall be applicable for shipboard heliports completed on or after 1 January 2012. Figure 4-13 shall be applicable for winching areas completed on or after 1 January 2012.

4.2.22 When helicopter operating areas are provided in the bow or stern of a ship they shall apply the obstacle criteria given in 4.2.14, 4.2.16, 4.2.18 and 4.2.20 above.

*Amidships location**Landing facing athwartships*

4.2.19~~23~~ Forward and aft of the FATO shall be two symmetrically located sectors, each covering an arc of 150°, with their apexes on the periphery of the FATO D reference circle. Within the area enclosed by these two sectors, there shall be no objects rising above the level of the FATO, except those aids essential for the safe operation of a helicopter (such as nets or lighting) and then only up to a maximum height of 25 cm. Such objects shall only be present if they do not represent a hazard to helicopters.

Note.— Examples of potential hazards include nets for helicopters equipped with skids or raised fittings on the deck that might induce dynamic rollover.

4.2.20~~24~~ To provide further protection from obstacles fore and aft of the FATO, rising surfaces with gradients of one unit vertically to five units horizontally shall extend from the entire length of the edges of the two 150° sectors. These surfaces shall extend for a horizontal distance equal to at least the diameter of the FATO and shall not be penetrated by any obstacle (see Figure 4-11A).

4.2.20~~25~~ To provide further protection from obstacles fore and aft of the FATO, rising surfaces with gradients of one unit vertically to five units horizontally shall extend from the entire length of the edges of the two 150° sectors. These surfaces shall extend for a horizontal distance equal to at least 1 D of the largest helicopter the FATO is intended to serve the diameter of the FATO and shall not be penetrated by any obstacle (see Figure 4-11B).

*Ship's side location**Landing facing Fore and/or Aft*

4.2.26 In addition to paragraphs 4.2.23, 4.2.24 and 4.2.25 and to provide further protection from obstacles not readily visible to the flight crew, obstacles within the area referred to in 4.2.25 located to the rear of a landing helicopter, shall not exceed a height of 5 cm for a distance of 0.5 D from the edge of the FATO. (see Figure 4-11B(b)).

*Non-purpose built heliports**Ship's side location (see Figure 4-12B)*

4.2.27 No objects shall be located within the FATO except those aids essential for the safe operation of a helicopter (such as nets or lighting) and then only up to a maximum height of 2.5cm. Such objects shall only be present if they do not represent a hazard to helicopters.

4.2.28 Outside the FATO and within a 1.5D circle centred on the D circle there shall be no obstacle rising above the FATO except those essential for the safe operation of the helicopter to a maximum height

of 25cm. Allowable objects within this area shall only be present if they do not represent a hazard to helicopters

4.2.21²⁹ From the fore and aft mid-points of the D reference circle, an area shall extend to the ship's rail to a fore and aft distance of 1.5 times the diameter of the FATO, located symmetrically about the athwartships bisector of the reference circle. Within this sector there shall be no objects rising above the level of the FATO, except those aids essential to the safe operation of the helicopter and then only up to a maximum height of 25 cm (see Figure 4-12A).

4.2.21³⁰ From the fore and aft mid-points of the D-reference 1.5 D circle, an area shall extend to the ship's rail to a fore and aft distance of 1.5 times the diameter of the FATO, located symmetrically about the athwartships bisector of the reference circle. Within this sector there shall be no objects rising above the level of the FATO, except those aids essential to the safe operation of the helicopter and then only up to a maximum height of 25 cm are permitted to a maximum height of 25 cm (see Figure 4-12B). Such objects shall only be present if they do not represent a hazard to helicopters.

4.2.22³¹ A horizontal surface shall be provided, at least 0.25 times the diameter of the D reference circle, which shall surround the FATO and the obstacle-free sector, at a height of 0.05 times the diameter of the reference circle, which no object shall penetrate.

4.2.32 To provide further protection from obstacles not readily visible to the flight crew, obstacles within the 1.5D circle referred to in 4.2.28 located to the rear of a helicopter on the FATO, shall not exceed a height of 5 cm from the edge of the FATO for a distance 0.5D.

Winching areas

4.2.33 An area designated for winching onboard ships shall comprise of a circular clear zone of diameter 5m and extending from the perimeter of the clear zone, a concentric manoeuvring zone of diameter 2D. (see Figure 4-13)

4.2.34 The manoeuvring zone shall comprise of 2 areas:

- a) The inner manoeuvring zone extending from the perimeter of the clear zone and of a circle of diameter not less than 1.5D; and
- b) The outer manoeuvring zone extending from the perimeter of the inner manoeuvring zone and of a circle of diameter of not less than 2D.

4.2.35 Within the clear zone of a designated winching area, no objects shall be located above the level of its surface.

4.2.36 Objects located within the inner manoeuvring zone of a designated winching area shall not exceed a height of 3m.

4.2.37 Objects located within the outer manoeuvring zone of a designated winching area shall not exceed a height of 6m.

Editorial Note.— Renumber existing Figure 4-2 as Figure 4-2A and insert new Figure 4-2B as follows.

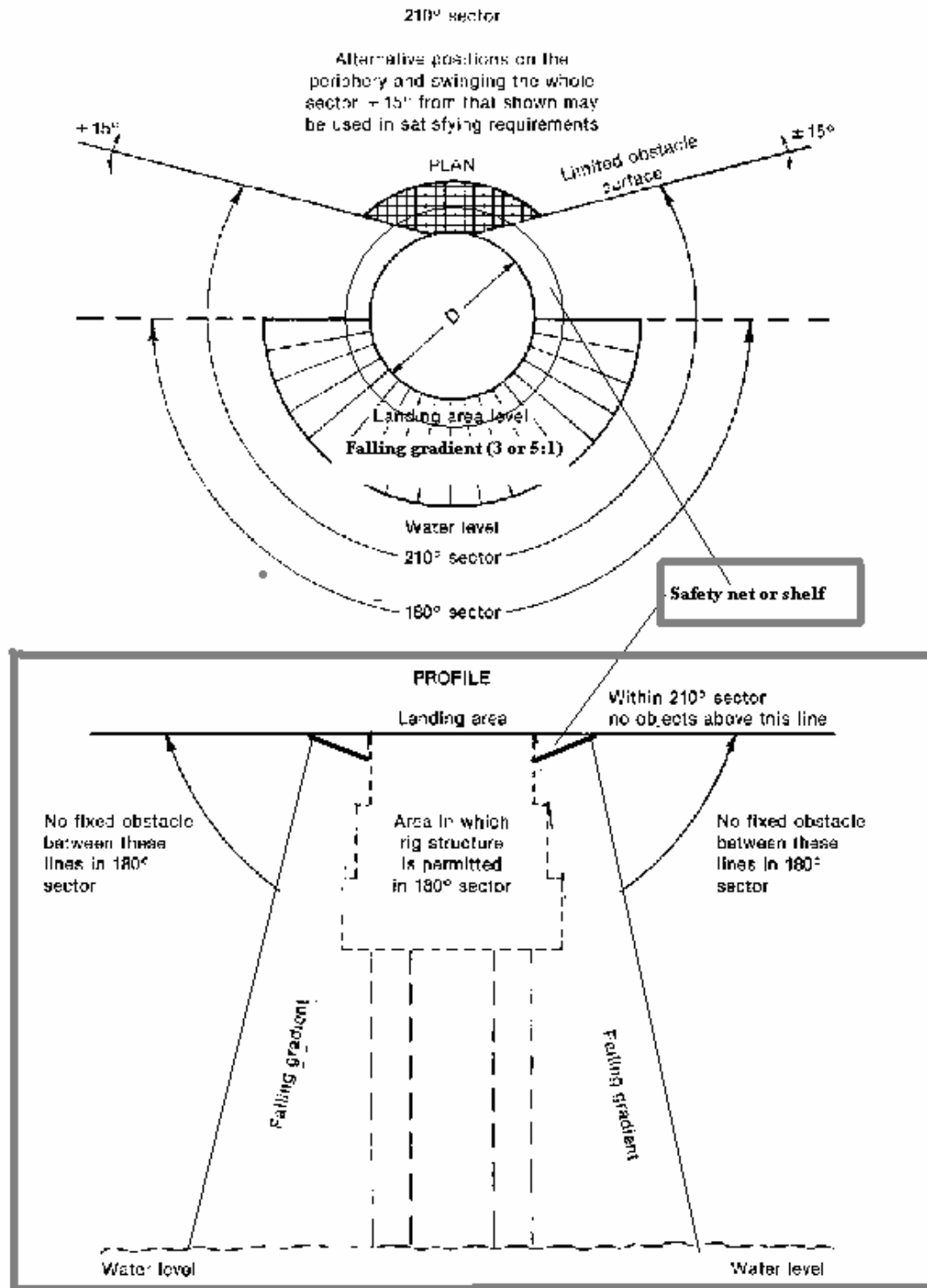


Figure 4-2B. Helideck obstacle-free sector

Editorial Note.—Revise title of Figure 4-3 as follows: Figure 4-3. Helideck obstacle limitation sectors.

Editorial Note.— Delete existing Figures 4-4 and 4-5 and renumber remaining figures accordingly.

Editorial Note.— Renumber existing Figure 4-11 as 4-11A and insert new Figure 4-11B as follows.

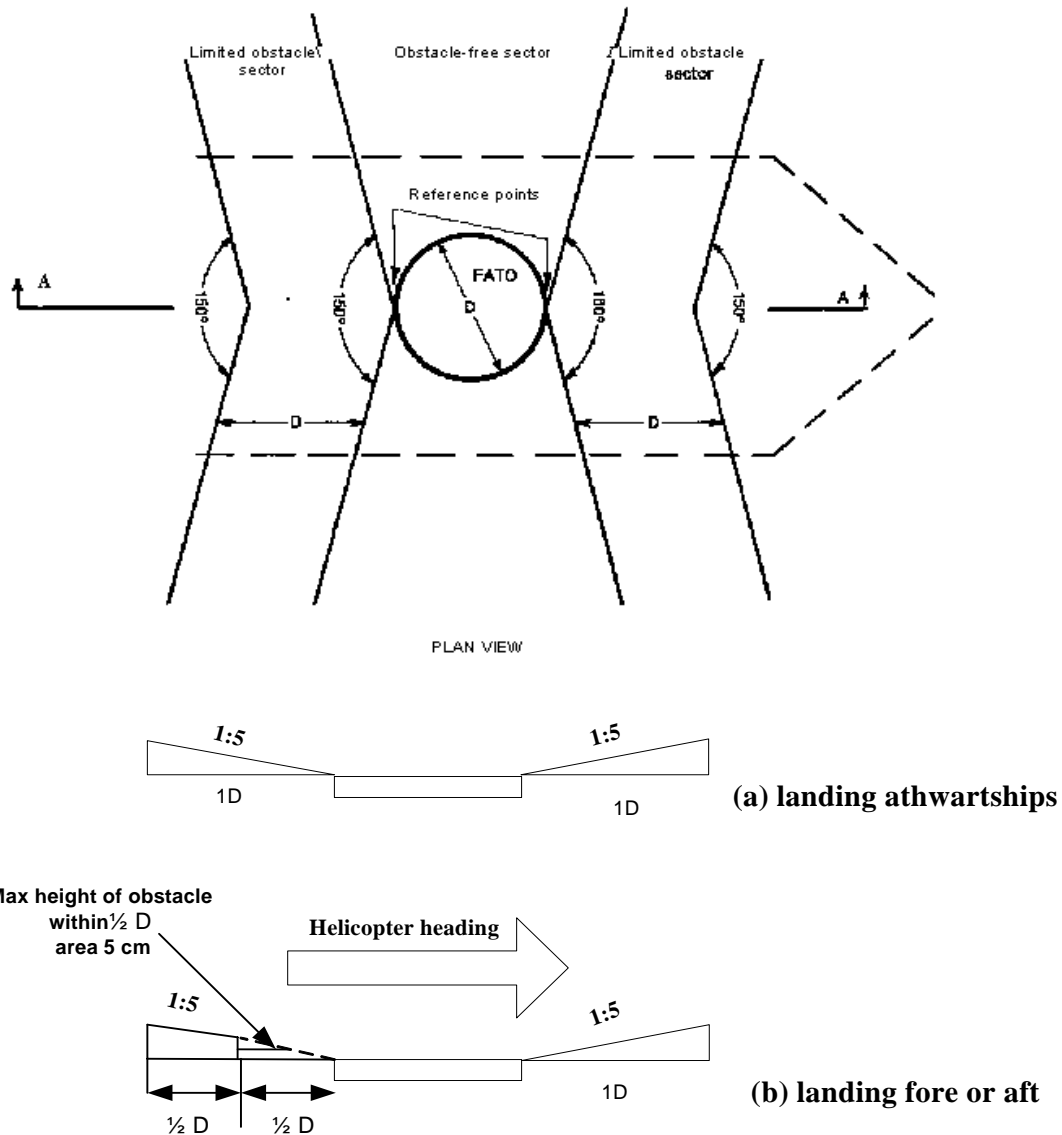
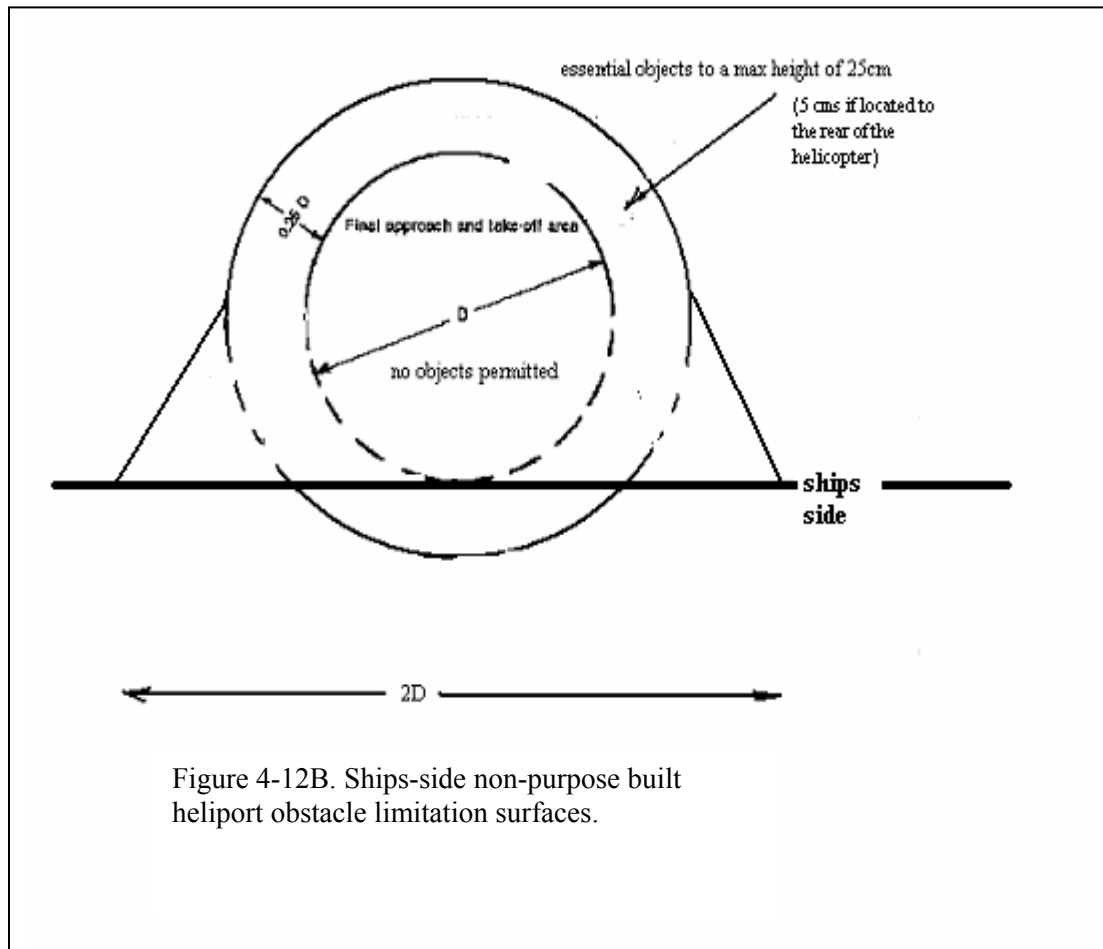
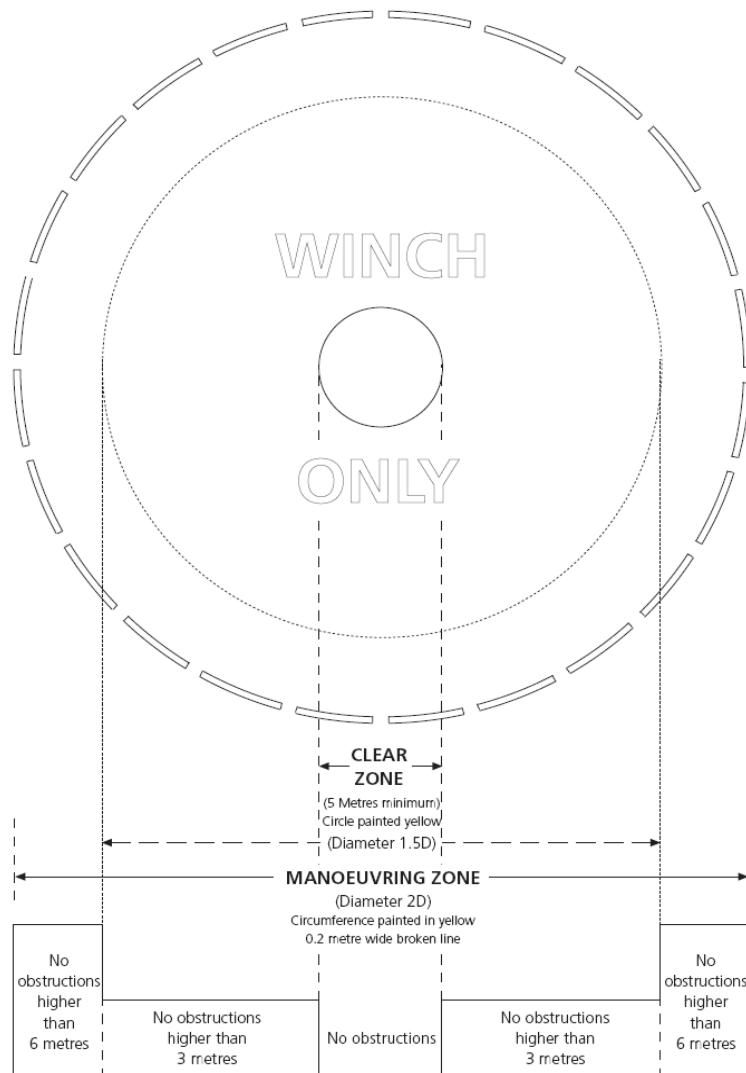


Figure 4-11B. Midship heliport obstacle limitation surface

Editorial Note.— Renumber existing Figure 4-12 as 4-12A and insert new Figure 4-12B as follows.



Editorial Note.— Insert new Figure 4-13 as follows.



WINCH ONLY to be marked in white so as to be easily visible to the helicopter pilot.

Figure 4-13. Winching area of a ship.

CHAPTER 5. VISUAL AIDS

5.1 Indicators

5.1.1 Wind direction indicators

Application

5.1.1.1 A heliport shall be equipped with at least one wind direction indicator.

Location

5.1.1.2 A wind direction indicator shall be located so as to indicate the wind conditions over the ~~final approach and take-off area~~ **FATO** and in such a way as to be free from the effects of airflow disturbances caused by nearby objects or rotor downwash. It shall be visible from a helicopter in flight, in a hover or on the movement area.

5.1.1.3 **Recommendation.**— *Where a ~~touchdown and lift-off area~~ **TLOF** may be subject to a disturbed air flow, then additional wind direction indicators located close to the area should be provided to indicate the surface wind on the area.*

Note.— *Guidance on the location of wind direction indicators is given in the Heliport Manual.*

1.

5.2 Markings and markers

Note.— *See Annex 14, Volume I, 5.2.1.4, Note 1, concerning improving conspicuity of markings.*

5.2.1 Winching area marking

Application

5.2.1.1 **Recommendation.**— *A winching area marking should be provided at a winching area.*

5.2.1.2 **Recommendation.**— *A **As of 1 January 2012,** winching area markings ~~should~~ **shall** be provided at a **designated** winching area-, (see Figure 4-13).*

Location

5.2.1.2³ A ~~w~~Winching area markings shall be located so that its centre(s) coincides with the centre of the clear zone of the winching area(s).

Characteristics

5.2.1.4 Winching area markings shall comprise of a winching area clear zone marking and a winching area manoeuvring zone marking.

5.2.1.5⁵ A winching area clear zone marking shall consist of a solid circle of not less than 5 m in diameter and ~~painted yellow~~ of a conspicuous colour.

5.2.1.6 A winching circle maneuvering zone shall consist of a broken circle of line width 0.2m and of a diameter not less than 2 D and be marked in a conspicuous colour. Within it “WINCH ONLY” shall be marked to be easily visible to the pilot.

5.2.2 Heliport identification marking

Application

5.2.2.1 A heliport identification marking shall be provided at a heliport.

...

Characteristics

5.2.2.3 A heliport identification marking, except for a heliport at a hospital, shall consist of a letter H, white in colour. The dimensions of the marking shall be no less than those shown in Figure 5-1 and where the marking is used in conjunction with the ~~final approach and take-off area~~ FATO designation marking specified in 5.2.5, its dimensions shall be increased by a factor of 3.

Note.—On a helideck covered with a rope netting, it may be advantageous to increase the height of the marking to 4 m and the other dimensions proportionally.

5.2.2.4 A heliport identification marking for a heliport at a hospital shall consist of a letter H, red in colour, on a white cross made of squares adjacent to each of the sides of a square containing the H as shown in Figure 5-1.

5.2.2.5 A heliport identification marking shall be oriented with the cross arm of the H at right angles to the preferred final approach direction. For a helideck the cross arm shall be on or parallel to the bisector of the obstacle-free sector as shown in Figure 5-1.

5.2.2.6 **Recommendation.**— *On a helideck, the size of the heliport identification ‘H’ marking should have a height of 4 m with an overall width not exceeding 3m and a stroke width not exceeding 0.75m.*

5.2.2.7 As of 1 January 2012, when a net is located on the surface of a FATO, it shall be large enough to cover the whole of the touchdown marking and shall not obscure other essential markings.

5.2.3 Maximum allowable mass marking

Characteristics

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5.2.3.3 A maximum allowable mass marking shall consist of a two digit number followed by a letter “t” to indicate the allowable helicopter mass in tonnes (1 000 kg). The marking shall be expressed to one decimal place, rounded to the nearest 100kg. Where the maximum allowable mass permitted is in excess of 10,050 kg, the marking shall be a three-digit number expressed to one decimal place. Where States use mass in pounds, the maximum allowable mass marking shall normally consist of a two-three digit number to indicate the allowable helicopter mass in thousands of pounds expressed to one decimal place, rounded to the nearest 100 pounds.

5.2.3.4 **Recommendation.**— *The numbers and the letter of the marking should have a colour contrasting with the background and should be in the form and proportion shown in Figure 5-2, except that where space is limited, such as on an offshore helideck or shipboard heliport, it may be necessary to reduce the size of the marking to characters with an overall height of not less than 90 cm with a corresponding reduction in the width and thickness of the figures.*

Editorial Note.— Insert new Section 5.2.4 following existing Section 5.2.3. Renumber remaining Sections accordingly.

5.2.4 Maximum allowable D-value marking

Application

5.2.4.1 **Recommendation.**— *The D-value marking should be displayed at an elevated heliport and at a helideck.*

Location

5.2.4.2 **Recommendation.**— *A maximum allowable D-value marking should be located within the FATO and so arranged as to be readable from the preferred final approach direction.*

Characteristics

5.2.4.3 The D-value shall be marked on the FATO in a contrasting colour to it, preferably white. The D-value shall be rounded to the nearest whole number with 0.5 rounded down. e.g. 19.5 becomes 19 and 19.6 becomes 20.

...

5.2.78 Touchdown and lift-off area marking

Application

5.2.7.1—A touchdown and lift-off area marking shall be provided on a helideck.

5.2.78.21 **Recommendation.**— A touchdown and lift-off area TLOF marking should shall be provided on a heliport other than a helideck if the perimeter of the touchdown and lift-off area TLOF is not self-evident.

Location

5.2.78.32 The touchdown and lift-off area TLOF marking shall be located along the perimeter of the touchdown and lift-off area TLOF.

Characteristics

5.2.78.43 A touchdown and lift-off area TLOF marking shall consist of a continuous white line with a width of at least 30 cm.

5.2.89 Touchdown/Positioning marking

Application

5.2.89.1 **Recommendation.**— A touchdown marking should be provided where it is necessary for a helicopter to touch down in a specific position.

5.2.89.42 **Recommendation.**— As of 1 January 2012, A a touchdown/positioning marking should shall be provided where it is necessary for a helicopter to touch down or be accurately placed by the pilot in a specific position

Location

5.2.89.23 A touchdown/positioning marking shall be located so that when a helicopter for which the marking is intended is positioned, with the main undercarriage inside the marking and the pilot situated over the marking, the pilot's seat is over the marking, the undercarriage will be inside the load bearing area and all parts of the helicopter will be clear of any obstacle by a safe margin.

5.2.89.34 On a helideck ~~or on an elevated heliport~~ the centre of the touchdown marking shall be located at the centre of the ~~touchdown and lift-off area~~ FATO except that the marking may be offset away from the origin of the obstacle-free sector by no more than 0.1 D where an aeronautical study indicates such offsetting to be necessary and that a marking so offset would not adversely affect the safety.

Note.— It is not considered appropriate to offset a touchdown marking on a heliport located on the bow of a vessel, or for any helideck where the D-value is 16m or less.

Characteristics

5.2.89.45 A touchdown/positioning marking shall be a yellow circle and have a line width of at least 0.5 m. For a helideck, the line width shall be at least 1 m.

5.2.89.56 On helidecks ~~†~~ The inner diameter of the circle shall be half the 0.5 D value of the largest helicopter the helideck TLOF is intended to serve, or 6 m whichever is the greater.

...

5.2.4011 Helideck obstacle-free sector marking

Application

5.2.4011.1 **Recommendation.**— *A helideck obstacle-free sector marking should be provided at a helideck.*

Location

5.2.4011.2 A helideck obstacle-free sector marking shall be located on the FATO perimeter or on the ~~touchdown and lift-off area~~ TLOF marking if provided.

Characteristics

5.2.4011.3 The helideck obstacle-free sector marking shall indicate the origin of the obstacle free sector, the directions of the limits of the sector, and the D value of the helideck as shown in Figure 5-5 for a hexagonal shaped helideck. Example figures are given in the Heliport Manual.

Note.— D is the largest dimension of the helicopter when the rotors are turning.

5.2.4011.4 The height of the chevron shall equal the width of the touchdown and lift-off area marking but shall be not less than 30 cm.

5.2.4011.5 The chevron shall be black marked in a conspicuous colour.

Editorial Note.— Insert new Sections 5.2.12 and 5.2.13 and renumber remaining Sections accordingly.

5.2.12 Helideck surface marking

Characteristics

5.2.12.1 **Recommendation.**— *The helideck surface, bounded by the FATO should be of a dark colour using a high friction coating. Where the surface coating may have a degrading effect on friction qualities it may be necessary to leave the helideck surface untreated. In such cases, the conspicuity of the markings should be enhanced by outlining the deck markings with a contrasting colour.*

5.2.13 Helideck prohibited landing sector marking

Application

5.2.13.1 **Recommendation.**— *Helideck prohibited landing sector marking should be provided where it is necessary to prevent the helicopter from landing within specified headings.*

Location

5.2.13.2 **Recommendation.**— *The prohibited landing sector markings should be located on the touchdown/positioning marking to the edge of the FATO ,within the relevant headings as shown in Figure 5.5 .*

Characteristics

5.2.13.3 *The prohibited landing sector markings shall be indicated by white and red hatched markings as shown in Figure 5.5.*

Editorial Note.— Delete existing Figure 5-5 and insert new Figure 5-5 as follows.



Figure 5.5 Helideck prohibited landing sector marking

ATTACHMENT C to State letter AN 4/1.1.50-07/54

**PROPOSED AMENDMENT TO
INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

AERONAUTICAL CHARTS

**ANNEX 4
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION**

**NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT TO
ANNEX 4**

he text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

1. ~~Text to be deleted is shown with a line through it.~~ text to be deleted
2. **New text to be inserted is highlighted with grey shading.** new text to be inserted
3. ~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading. new text to replace existing text

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

...

CHAPTER 16. WORLD AERONAUTICAL CHART — ICAO 1:1 000 000

...

16.7 Culture and topography

...

16.7.4 Landmarks

Recommendation.— Natural and cultural landmarks, such as bridges, prominent transmission lines, permanent cable car installations, wind turbines, mine structures, forts, ruins, levees, pipelines, and rocks, bluffs, cliffs, sand dunes, isolated lighthouses, lightships, etc., when considered to be of importance for visual air navigation, should be shown.

Note.— Descriptive notes may be added.

...

16.9 Aeronautical Data

...

16.9.3 Obstacles

16.9.3.1 Obstacles shall be shown.

Note.— Objects of a height of 100 m (300 ft) or more above ground are normally regarded as obstacles.

16.9.3.2 When considered of importance to visual flight, prominent transmission lines, and permanent cable car installations and wind turbines, which are obstacles, shall be shown.

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CHAPTER 17. AERONAUTICAL CHART — ICAO 1:500 000

...

17.7 Culture and topography

...

17.7.4 Landmarks

Recommendation.— Natural and cultural landmarks, such as bridges, mine structures, lookout towers, forts, ruins, levees, pipelines, prominent transmission lines, permanent cable car installations, wind turbines and rocks, bluffs, cliffs, sand dunes, isolated lighthouses, lightships, etc., when considered to be of importance for visual air navigation, should be shown.

Note.— Descriptive notes may be added.

...

17.9 Aeronautical Data

...

17.9.3 Obstacles

17.9.3.1 Obstacles shall be shown.

Note.— Objects of a height of 100 m (300 ft) or more above ground are normally regarded as obstacles.





17.9.3.2 When considered of importance to visual flight, prominent transmission lines, and permanent cable car installations and wind turbines, which are obstacles, shall be shown.

...

APPENDIX 2. ICAO CHART SYMBOLS

...

Editorial Note.— Add the following new symbols to page APP2-9 Miscellaneous section:

	Wind turbine - unlighted and lighted	 
	Wind turbines - minor group and group in major area, lighted	 

Editorial Note.— End of new symbols.

...

ATTACHMENT D to State letter AN 4/1.1.50-07/54

**PROPOSED AMENDMENT TO
INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

AERONAUTICAL INFORMATION SERVICES

**ANNEX 15
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION**

**NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT TO
ANNEX 15**

he text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

1. ~~Text to be deleted is shown with a line through it.~~ text to be deleted
2. New text to be inserted is highlighted with grey shading. new text to be inserted
3. ~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading. new text to replace existing text

**APPENDIX 1. CONTENTS OF
AERONAUTICAL INFORMATION PUBLICATION (AIP)**
(see Chapter 4)

....

PART 3 — AERODROMES (AD)

If an AIP is produced and made available in more than one volume with each having a separate amendment and supplement service, a separate preface, record of AIP Amendments, record of AIP Supplements, checklist of AIP pages and list of current hand amendments must be included in each volume. In the case of an AIP being published as one volume, the annotation “not applicable” must be entered against each of the above subsections.

AD 0.6 Table of contents to Part 3

A list of sections and subsections contained in Part 3 — Aerodromes (AD).

Note.— Subsections may be listed alphabetically.

**AD 1. AERODROMES/HELIPORTS —
INTRODUCTION**

**AD 1.1 Aerodrome/heliport
availability**

Brief description of the State’s designated authority responsible for aerodromes and heliports, including:

- 1) the general conditions under which aerodromes/heliports and associated facilities are available for use;
- 2) a statement concerning the ICAO documents on which the services are based and a reference to the AIP location where differences, if any, are listed;
- 3) regulations, if any, concerning civil use of military air bases;
- 4) the general conditions under which the low visibility procedures applicable to Cat II/III operations at aerodromes, if any, are applied;
- 5) friction measuring device used and the runway friction level below which the State will declare the runway to be slippery when wet; and
- 6) other information of a similar nature.

...

AD 1.3 Index to aerodromes and heliports

A list, supplemented by graphic portrayal, of aerodromes and heliports within a State, including:

- 1) aerodrome/heliport name and ICAO location indicator;
- 2) type of traffic permitted to use the aerodrome/heliport (international/national, IFR/VFR, scheduled/non-scheduled, private); and
- 3) reference to AIP, Part 3 subsection in which aerodrome/ heliport details are presented.

AD 1.4 Grouping of aerodromes/heliports

Brief description of the criteria applied by the State in grouping aerodromes/heliports for the production/distribution/ provision of information purposes (e.g. international/national; primary/secondary; major/other; civil/military; etc.).

AD 1.5 Status of certification of aerodromes

A list of aerodromes in the State, indicating the status of certification, including :

- 1) aerodrome name and ICAO location indicator;
- 2) date and if applicable, validity of certification ; and
- 3) remarks, if any.

AD 2. AERODROMES

Note.— **** is to be replaced by the relevant ICAO location indicator.

****** AD 2.1 Aerodrome location indicator and name**

The requirement is for the ICAO location indicator allocated to the aerodrome and the name of aerodrome. An ICAO location indicator must be an integral part of the referencing system applicable to all subsections in section AD 2.

— — — — —

BACKGROUND INFORMATION ON THE PROPOSED WITHDRAWAL OF THE PROVISION TO LOWER THE LEVEL OF PROTECTION PROVIDED FOR RESCUE AND FIRE FIGHTING (RFF) BASED ON THE FREQUENCY OF AIRCRAFT MOVEMENTS

1.1 In 1989, IFALPA brought to the attention of the Commission that the quantities of extinguishing agents actually used at ten aircraft accidents far exceeded those recommended in Annex 14. Subsequent updated information for twenty-six aircraft accidents, during the period from 1978 to 1989, from IFALPA had indicated that the amount of water actually used in combating aircraft fires ranged from 10% to 1800% more than the quantities specified in the Annex.

1.2 In 1995, the Council, during its consideration of the Commission's recommendations on the phased withdrawal of the provision to lower the level of protection based on the frequency of movements (also known as remission factor), agreed that the proposed removal of the remission factor be carried out in two stages i.e. a) up to 31 December 1999, not less than two category below the determined category and b) from 1 January 2000 not less than one category below the determined category. Additionally, as from 1 January 2005, the level of protection provided at an aerodrome was recommended to be equal to the RFF category determined using the principles stipulated in the Annex.

1.3 The Secretariat had conducted a cost and benefit study associated with the withdrawal of the remission factor, in particular the safety aspects of the proposed amendment. The study revealed that the costs of upgrading existing facilities by one category represent an insignificant proportion of the total cost of a new airport. Additionally, it was felt that public safety was not an issue that should be evaluated in the light of costs of providing the services.

1.4 Currently, the quantities of extinguishing agents required for RFF at an aerodrome are based on the critical area concept. However, in the interest of economy, concessions had been applied in determining the quantities of extinguishing agents by the application of the following principles:

- a) the use of a reduced area (called the "practical critical area" which involves a 33% reduction of the "theoretical critical area") in the critical area concept;
- b) the use of the median aircraft in each category instead of the largest; and
- c) frequency of movements.

1.5 An analysis of statistics provided by the ICAO Accident/Incident Report (ADREP) database of aircraft destroyed by post-impact fires for the period from 1997 to June 2006 had revealed that seventy nine accidents had occurred involving 1406 fatalities. These aircraft accidents happened during the landing, taxiing, manoeuvring and take-off phases, all occurring at aerodromes where the services of an efficient and fully-equipped RFF unit in saving lives are expected. Furthermore, in a nine-month period from July 2006 until March 2007, statistics had indicated an increasing number of aircraft destroyed by post-impact fires. Ten accidents within this period resulted in 127 fatalities. In addition, recent information for six aircraft accidents for the period from 1991 to 2000 indicated that the amount of water actually used in combating aircraft fires ranged from 600% to 900% more than the quantities specified in Annex.14, Volume I.

1.6 In order to meet the objective of saving lives during aircraft accidents, it was considered highly undesirable to permit the specified water quantities to be further reduced through the use of the remission factors. The proposed amendment to withdraw the remaining remission factor is fully justified in light of

the various concessions applied in the determination of quantities of water for RFF as well as the incidences of post-impact aircraft accidents involving fires and fatalities.

— — — — —

ATTACHMENT F State letter AN 4/1.1.50–07/54

**RESPONSE FORM TO BE COMPLETED AND RETURNED TO ICAO TOGETHER
WITH ANY COMMENTS YOU MAY HAVE ON THE PROPOSED AMENDMENTS**

To: The Secretary General
International Civil Aviation Organization
999 University Street
Montreal, Quebec
Canada, H3C 5H7

(State) _____

Please make a checkmark (✓) against one option for each amendment. If you choose options “agreement with comments” or “disagreement with comments”, **please provide your comments on separate sheets.**

	<i>Agreement without comments</i>	<i>Agreement with comments*</i>	<i>Disagreement without comments</i>	<i>Disagreement with comments</i>	<i>No position</i>
Amendment to Annex 14 — <i>Aerodromes</i> and Volume I — <i>Aerodrome Design and Operations</i> (Attachment A refers)					
Amendment to Annex 14 — <i>Aerodromes</i> and Volume II — <i>Heliports</i> (Attachment B refers)					
Amendment to Annex 4 — <i>Aeronautical Charts</i> (Attachment C refers)					
Amendment to Annex 15 — <i>Aeronautical Information Services</i> (Attachment D refers)					

*“Agreement with comments” indicates that your State or organization agrees with the intent and overall thrust of the amendment proposal; the comments themselves may include, as necessary, your reservations concerning certain parts of the proposal and/or offer an alternative proposal in this regard.

Signature _____

Date _____

— END —