International Civil Aviation Organization | Organisation de l'aviation civile internationale | Organización de Aviación Civil Internacional | Международная организация гражданской авиации | منظمة الطيران المدني الدولي | 国际民用航空组织

Tel.: +1 514-954-6717

Ref.: AN 4/16.10-20/22 6 April 2020

Subject: Adoption of Amendment 9 to Annex 14, Volume II

Action required: a) Notify any disapproval before 20 July 2020; b) Notify any differences and compliance before 5 October 2020; c) Consider the use of the Electronic Filing of Differences (EFOD) System for notification of differences and compliance

Sir/Madam,

1. I have the honour to inform you that Amendment 9 to the *International Standards and Recommended Practices, Aerodromes — Heliports* (Annex 14, Volume II to the Convention on International Civil Aviation) was adopted by the Council at the fourth meeting of its 219th Session on 9 March 2020. Copies of the Amendment and the Resolution of Adoption are available as attachments to the electronic version of this State letter on the ICAO-NET (http://portal.icao.int) where you can access all other relevant documentation.

2. When adopting the amendment, the Council prescribed 20 July 2020 as the date on which it will become effective, except for any part concerning which a majority of Contracting States have registered their disapproval before that date. In addition, the Council resolved that Amendment 9, to the extent it becomes effective, will become applicable on 5 November 2020. As part of Amendment 9, paragraph 6.2.1.1 contains an embedded date of 1 January 2023 which relates to rescue and firefighting provisions.

3. Amendment 9 arises from recommendations of the third meeting of the Aerodrome Design and Operations Panel (ADOP/3) and developed by the Heliport Design Working Group (HDWG) over the course of more than five years. The amendment covers extensive amendments related to heliport physical characteristics, visual aids and rescue and firefighting, as well as modifications to several associated definitions.

4. Due to the restructuring of Annex 15 — *Aeronautical Information Services*, a consequential editorial amendment to Notes 1 and 2 of paragraph 2.4.5 is included in the Amendment 9 to Annex 14, Volume II.

999 Robert-Bourassa Boulevard
Montréal, Quebec
Canada H3C 5H7
Tel.: +1 514-954-8219
Fax: +1 514-954-6077
Email: icaohq@icao.int
www.icao.int

5. This extensive amendment is aimed mainly at enhancing safety and efficiency of heliport operations based on updated, modern and vetted practices and technologies. The amendment is largely based on simplified, performance-based provisions which include, inter alia, a single common Standard for ground-level and elevated heliports to minimize unnecessary design complexities; amendments to definitions; updated provisions on heliport lights, markings and markers, to ensure consistency across Volume II; addition of notes to clarify the objectives of key provisions, for more effective implementation; and a thorough modernization of provisions dealing with rescue and firefighting which embraces many technological advancements made in this field and details a range of options allowing for the most appropriate solution to be selected in every case.

6. The subjects are given in the amendment to the Foreword of Annex 14, Volume II, a copy of which is in Attachment A.

7. In conformity with the Resolution of Adoption, may I request:

a) that before 20 July 2020 you inform me if there is any part of the adopted Standards and Recommended Practices (SARPs) amendments in Amendment 9 concerning which your Government wishes to register disapproval, using the form in Attachment B for this purpose. Please note that only statements of disapproval need be registered and if you do not reply it will be assumed that you do not disapprove of the amendment;

b) that before 5 October 2020 you inform me of the following, using the Electronic Filing of Differences (EFOD) System or the form in Attachment C for this purpose:

1) any differences that will exist on 5 November 2020 between the national regulations or practices of your Government and the provisions of the whole of Annex 14, Volume II, as amended by all amendments up to and including Amendment 9, and thereafter of any further differences that may arise; and

2) the date or dates by which your Government will have complied with the provisions of the whole of Annex 14, Volume II, as amended by all amendments up to and including Amendment 9.

8. With reference to the request in paragraph 7 a) above, it should be noted that a registration of disapproval of Amendment 9 or any part of it in accordance with Article 90 of the Convention does not constitute a notification of differences under Article 38 of the Convention. To comply with the latter provision, a separate statement is necessary if any differences do exist, as requested in paragraph 7 b) 1). It is recalled in this respect that international Standards in Annexes have a conditional binding force, to the extent that the State or States concerned have not notified any difference thereto under Article 38 of the Convention.

9. With reference to the request in paragraph 7 b) above, it also should be noted that the ICAO Assembly, at its 39th Session (27 September to 6 October 2016), resolved that Member States should be encouraged to use the EFOD System when notifying differences (Resolution A39-22 refers). The EFOD System is currently available on the Universal Safety Oversight Audit Programme (USOAP) restricted website (http://www.icao.int/usoap) which is accessible by all Member States. You are invited to consider using this for notification of compliance and differences.

10. Guidance on the determination and reporting of differences is given in the Note on the Notification of Differences in Attachment D. Please note that a detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.

11. I would appreciate it if you would also send a copy of your notifications, referred to in paragraph 7 b) above, to the ICAO Regional Office accredited to your Government.

12. At the fifth meeting of its 204th Session, the Council requested that States, when being advised of the adoption of an Annex amendment, be provided with information on implementation and available guidance material, as well as an impact assessment. This is presented for your information in Attachments E and F, respectively.

13. As soon as practicable after the amendment becomes effective, on 20 July 2020, replacement pages incorporating Amendment 9 will be forwarded to you.

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

Fang Liu
Secretary General

Enclosures:

A — Amendment to the Foreword of Annex 14, Volume II
B — Form on notification of disapproval of all or part of Amendment 9 to Annex 14, Volume II
C — Form on notification of compliance with or differences from Annex 14, Volume II, Amendment 9
D — Note on the Notification of Differences
E — Implementation task list and outline of guidance material in relation to Amendment 9 to Annex 14, Volume II
F — Impact assessment in relation to Amendment 9 to Annex 14, Volume II

ATTACHMENT A to State letter AN 4/16.10-20/22

AMENDMENT TO THE FOREWORD OF ANNEX 14, VOLUME II

Add the following at the end of Table A:

Amendment	***Source(s)***	***Subject***	***Adopted/Approved*** ***Effective*** ***Applicable***
9	Third meeting of the Aerodrome Design and Operations Panel (ADOP/3)	Definitions of design D, D-value, dynamic load-bearing surface, elongated, helicopter stand, helicopter taxiway, helicopter taxi-route, heliport reference point, protection area, touchdown positioning circle, and touchdown positioning marking; physical characteristics; visual aids; and rescue and firefighting.	9 March 2020 20 July 2020 5 November 2020

— — — — — — — —

ATTACHMENT B to State letter AN 4/16.10-20/22

NOTIFICATION OF DISAPPROVAL OF ALL OR PART OF AMENDMENT 9 TO ANNEX 14, VOLUME II

To: The Secretary General
International Civil Aviation Organization
999 Boulevard Robert-Bourassa
Montréal, Québec
Canada H3C 5H7

(State) _____ hereby wishes to disapprove the following parts of Amendment 9 to Annex 14, Volume II:

Signature _____ Date _____

NOTES

1) If you wish to disapprove all or part of Amendment 9 to Annex 14, Volume II, please dispatch this notification of disapproval to reach ICAO Headquarters by 20 July 2020. If it has not been received by that date it will be assumed that you do not disapprove of the amendment. **If you approve of all parts of Amendment** 9 **it is not necessary to return this notification of disapproval.**

2) This notification should not be considered a notification of compliance with or differences from Annex 14, Volume II. Separate notifications on this are necessary. (See Attachment C.)

3) Please use extra sheets as required.

— — — — — — — —

ATTACHMENT C to State letter AN 4/16.10-20/22

NOTIFICATION OF COMPLIANCE WITH OR DIFFERENCES FROM ANNEX 14, VOLUME II
(Including all amendments up to and including Amendment 9)

To: The Secretary General
International Civil Aviation Organization
999 Boulevard Robert-Bourassa
Montréal, Québec
Canada H3C 5H7

1. No differences will exist on _____ between the national regulations and/or practices of **(State)** _____ and the provisions of Annex 14, Volume II, including all amendments up to and including Amendment 9.

2. The following differences will exist on _____ between the regulations and/or practices of **(State)** _____ and the provisions of Annex 14, Volume II, including Amendment 9 (Please see Note 2) below.)

a) Annex Provision (Please give exact paragraph reference)	**b) Details of Difference** (Please describe the difference clearly and concisely)	**c) Remarks** (Please indicate reasons for the difference)

(Please use extra sheets as required)

3. By the dates indicated below, **(State)** _____will have complied with the provisions of Annex 14, Volume II, including all amendments up to and including Amendment 9 for which differences have been notified in 2 above.

a) **Annex Provision** (Please give exact paragraph reference)	**b)** **Date**	**c)** **Comments**

(Please use extra sheets as required)

Signature _____ Date _____

NOTES

1) If paragraph 1 above is applicable to you, please complete paragraph 1 and return this form to ICAO Headquarters. If paragraph 2 is applicable to you, please complete paragraphs 2 and 3 and return the form to ICAO Headquarters.

2) A detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.

3) Guidance on the notification of differences is provided in the Note on the Notification of Differences and in the *Manual on Notification and Publication of Differences* (Doc 10055).

4) Please send a copy of this notification to the ICAO Regional Office accredited to your Government.

— — — — — — — —

ATTACHMENT D to State letter AN 4/16.10-20/22

NOTE ON THE NOTIFICATION OF DIFFERENCES

(*Prepared and issued in accordance with instructions of the Council)*

1. *Introduction*

1.1 Article 38 of the *Convention on International Civil Aviation* ("Convention") requires that a Contracting State notify ICAO any time it does not comply with a Standard in all respects, it does not bring its regulations or practices into full accord with any Standard, or it adopts regulations or practices differing in any particular respect from the Standard.

1.2 The Assembly and the Council, when reviewing the notification of differences by Contracting States in compliance with Article 38 of the Convention, have repeatedly noted that the timeliness and currency of such notifications is not entirely satisfactory. Therefore, this note is issued to reiterate the primary purpose of Article 38 of the Convention and to facilitate the determination and notification of differences.

1.3 The primary purpose of the notification of differences is to promote safety, regularity and efficiency in air navigation by ensuring that governmental and other agencies, including operators and service providers, concerned with international civil aviation are made aware of all national regulations and practices in so far as they differ from those prescribed in the Standards contained in Annexes to the Convention.

1.4 Contracting States are, therefore, requested to give particular attention to the notification of differences with respect to Standards in all Annexes, as described in paragraph 4 b) 1) of the Resolution of Adoption.

1.5 Although differences from Recommended Practices are not notifiable under Article 38 of the Convention, the Assembly has urged Contracting States to extend the above considerations to Recommended Practices contained in Annexes to the Convention, as well.

2. *Notification of differences from Standards and Recommended Practices (SARPs)*

2.1 Guidance to Contracting States in the notification of differences to Standards and Recommended Practices (SARPs) can only be given in very general terms. Contracting States are further reminded that compliance with SARPs generally extends beyond the issuance of national regulations and requires establishment of practical arrangements for implementation, such as the provision of facilities, personnel and equipment and effective enforcement mechanisms. Contracting States should take those elements into account when determining their compliance and differences. The following categories of differences are provided as a guide in determining whether a notifiable difference exists:

a) ***A Contracting State's requirement is more exacting or exceeds a SARP (Category A)***. This category applies when the national regulation and practices are more demanding than the corresponding SARP, or impose an obligation within the scope of the Annex which is not covered by the SARP. This is of particular importance where a Contracting State requires a higher standard which affects the operation of aircraft of other Contracting States in and above its territory;

b) ***A Contracting State's requirement is different in character or the Contracting State has established other means of compliance (Category B)***[*]. This category applies, in particular, when the national regulation and practices are different in character from the corresponding SARP, or when the national regulation and practices differ in principle, type or system from the corresponding SARP, without necessarily imposing an additional obligation; and

c) ***A Contracting State's requirement is less protective, partially implemented or not implemented (Category C)***. This category applies when the national regulation and practices are less protective than the corresponding SARP; when no national regulation has been promulgated to address the corresponding SARP, in whole or in part; or when the Contracting State has not brought its practices into full accord with the corresponding SARP.

These categories do not apply to Not Applicable SARP. Please see the paragraph below.

2.2 **Not Applicable SARP.** When a Contracting State deems a SARP concerning aircraft, operations, equipment, personnel, or air navigation facilities or services to be not applicable to the existing aviation activities of the State, notification of a difference is not required. For example, a Contracting State that is not a State of Design or Manufacture and that does not have any national regulations on the subject, would not be required to notify differences from Annex 8 provisions related to the design and construction of an aircraft.

2.3 **Differences from appendices, tables and figures.** The material comprising a SARP includes not only the SARP itself, but also the appendices, tables and figures associated with the SARP. Therefore, differences from appendices, tables and figures are notifiable under Article 38. In order to file a difference against an appendix, table or figure, States should file a difference against the SARP that makes reference to the appendix, table or figure.

2.4 **Differences from definitions.** Contracting States should notify differences from definitions. The definition of a term used in a SARP does not have independent status but is an essential part of each SARP in which the term is used. Therefore, a difference from the definition of the term may result in there being a difference from any SARP in which the term is used. To this end, Contracting States should take into consideration differences from definitions when determining compliance or differences to SARPs in which the terms are used.

2.5 The notification of differences should be not only to the latest amendment but to the whole Annex, including the amendment. In other words, Contracting States that have already notified differences are requested to provide regular updates of the differences previously notified until the difference no longer exists.

2.6 Further guidance on the identification and notification of differences, examples of well-defined differences and examples of model processes and procedures for management of the notification of differences can be found in the *Manual on Notification and Publication of Differences* (Doc 10055).

---

[*] The expression "different in character or other means of compliance" in b) would be applied to a national regulation and practice which achieve, by other means, the same objective as that of the corresponding SARPs or for other substantive reasons so cannot be classified under a) or c).

3. *Form of notification of differences*

3.1 Differences can be notified:

a) by sending to ICAO Headquarters a form on notification of compliance or differences; or

b) through the Electronic Filing of Differences (EFOD) System at www.icao.int/usoap.

3.2 When notifying differences, the following information should be provided:

a) the number of the paragraph or subparagraph which contains the SARP to which the difference relates*;

b) the reasons why the State does not comply with the SARP, or considers it necessary to adopt different regulations or practices;

c) a clear and concise description of the difference; and

d) intentions for future compliance and any date by which your Government plans to confirm compliance with and remove its difference from the SARP for which the difference has been notified.

3.3 The differences notified will be made available to other Contracting States, normally in the terms used by the Contracting State when making the notification. In the interest of making the information as useful as possible, Contracting States are requested to ensure that:

a) statements be as clear and concise as possible and be confined to essential points;

b) the provision of extracts from national regulations not be considered as sufficient to satisfy the obligation to notify differences; and

c) general comments, unclear acronyms and references be avoided.

— — — — — — — —

* This applies only when the notification is made under 3.1 a).

ATTACHMENT E to State letter AN 4/16.10-20/22

IMPLEMENTATION TASK LIST AND OUTLINE OF GUIDANCE MATERIAL IN RELATION TO AMENDMENT 9 TO ANNEX 14, VOLUME II

1. IMPLEMENTATION TASK LIST

1.1 Essential steps to be followed by a State to implement the amendment to Annex 14, Volume II:

a) identification of the rule-making process necessary to transpose the new ICAO provisions into national regulations;

b) establishment of a national implementation plan that takes into account the new ICAO provisions;

c) conducting of a gap analysis between the new ICAO provisions and national framework;

d) drafting of the necessary modification(s) to the national regulations;

e) official adoption of the national regulations and means of compliance;

f) modification of the oversight framework according to the new national regulations;

g) filing of State differences with ICAO, if necessary;

h) publication of significant differences in the Aeronautical Information Publication (AIP);

i) implementation of the new national regulations by heliport operators; and

j) oversight by the State on the implementation of regulations.

2. STANDARDIZATION PROCESS

2.1 Effective date: 20 July 2020

2.2 Applicability date: 5 November 2020

2.3 Embedded date(s): 1 January 2023 for the provisions related to rescue and firefighting detailed in 6.2.1.1.

3. SUPPORTING DOCUMENTATION

3.1 ICAO documentation

Title	Type (PANS/TI/Manual/Circ)	Planned publication date
Heliport Manual (Doc 9261)	Updated guidance	November 2020

4. IMPLEMENTATION ASSISTANCE TASKS

Type	Global	Regional
Workshops	None	Planning and Implementation Regional Groups (PIRGs) working groups

5. UNIVERSAL SAFETY OVERSIGHT AUDIT PROGRAMME (USOAP)

5.1 Existing protocol questions (PQs) may need amendment or new PQs may be required. This will be assessed during the next amendment cycle of the PQs.

— — — — — — — —

ATTACHMENT F to State letter AN 4/16.10-20/22

IMPACT ASSESSMENT IN RELATION TO AMENDMENT 9 TO ANNEX 14, VOLUME II

1. INTRODUCTION

1.1 Amendment 9 to Annex 14, Volume II introduces new and modified provisions and definitions dealing with heliport physical characteristics, visual aids and rescue and firefighting.

2. IMPACT ASSESSMENT

2.1 *Safety impact*: Positive. The Standards and Recommended Practices (SARPs) provide updated, safer and more robust solutions when compared to the existing SARPs and, in some cases, compensate for the lack of manufacturer's data in helicopter's flight manuals (HFMs). For the first time, SARPs related to rescue and firefighting are introduced for offshore helidecks. In addition, the amendment ensures consistency among requirements, as contained in the SARPs.

2.2 *Financial impact*: Minimal financial impact to both States and industry. For States, the main impact will be related to the review and amendment of national regulations and associated procedures, and training for inspectors on the new provisions. For the industry, the flexibility provided in the amended provisions on physical characteristics and visual aids, and the array of solutions provided for rescue and firefighting, will potentially enable cost reductions related to heliport design, construction, maintenance and operations.

2.3 *Security impact*: The amendment does not contain SARPs linked to security.

2.4 *Environmental impact*: Positive. The SARPs on rescue and firefighting provide for a possibility, in specific cases, of distribution of water only as an extinguishing agent which is more environment friendly than foam-based solutions (including their disposal after discharge); in addition, the new provisions related to FATO surfaces will potentially require less construction at new heliports.

2.5 *Efficiency impact*: Positive. The introduction of more simplified, updated and performance-based provisions contained in this amendment, is expected to facilitate and enhance efficiency of heliport operations.

2.6 *Expected implementation time*: Within one to two years after the applicability date.

— END —

AMENDMENT 9

TO THE

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

AERODROMES

ANNEX 14

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

VOLUME II — HELIPORTS

The amendment to Annex 14, Volume II contained in this document was adopted by the Council of ICAO on **9 March 2020**. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before **20 July 2020** will become effective on that date and will become applicable on **5 November 2020** as specified in the Resolution of Adoption. (State letter AN 4/16.10-20/22 refers.)

MARCH 2020

INTERNATIONAL CIVIL AVIATION ORGANIZATION

AMENDMENT 9 TO THE INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

ANNEX 14 — *AERODROMES*
VOLUME II — *HELIPORTS*

RESOLUTION OF ADOPTION

The Council

Acting in accordance with the Convention on International Civil Aviation, and particularly with the provisions of Articles 37, 54 and 90 thereof,

1. *Hereby adopts* on 9 March 2020 Amendment 9 to the International Standards and Recommended Practices contained in the document entitled *International Standards and Recommended Practices, Aerodromes — Heliports* which for convenience is designated Annex 14, Volume II to the Convention;

2. *Prescribes* 20 July 2020 as the date upon which the said amendment shall become effective, except for any part thereof in respect of which a majority of the Contracting States have registered their disapproval with the Council before that date;

3. *Resolves* that the said amendment or such parts thereof as have become effective shall become applicable on 5 November 2020;

4. *Requests the Secretary General*:

a) to notify each Contracting State immediately of the above action and immediately after 20 July 2020 of those parts of the amendment which have become effective;

b) to request each Contracting State:

1) to notify the Organization (in accordance with the obligation imposed by Article 38 of the Convention) of the differences that will exist on 5 November 2020 between its national regulations or practices and the provisions of the Standards in the Annex as hereby amended, such notification to be made before 5 October 2020, and thereafter to notify the Organization of any further differences that arise;

2) to notify the Organization before 5 October 2020 of the date or dates by which it will have complied with the provisions of the Standards in the Annex as hereby amended;

c) to invite each Contracting State to notify additionally any differences between its own practices and those established by the Recommended Practices, following the procedure specified in subparagraph b) above with respect to differences from Standards.

— — — — — — — —

NOTES ON THE PRESENTATION OF THE 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:

~~Text to be deleted is shown with a line through it.~~	text to be deleted
New text to be inserted is highlighted with grey shading.	new text to be inserted
~~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

TEXT OF AMENDMENT 9

TO THE

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

AERODROMES

ANNEX 14
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

VOLUME II
(HELIPORTS)

ABBREVIATIONS AND SYMBOLS
(used in Annex 14, Volume II)

Abbreviations

. . .

cm	Centimetre
DIFFS	Deck integrated firefighting system

. . .

FAS	Fixed application system
FATO	Final approach and take-off area
FFAS	Fixed foam application system
FMS	Fixed monitor system

. . .

MTOM	Maximum take-off mass
NVIS	Night Vision Imaging Systems (NVIS)
OFS	Obstacle-free sector
OLS	Obstacle limitation surface

. . .

PAPI	Precision approach path indicator
PFAS	Portable foam application system
RFFS	Rescue and firefighting service
RTOD	Rejected take-off distance

. . .

CHAPTER 1. GENERAL

. . .

1.1 Definitions

. . .

D. The largest overall dimension of the helicopter when rotor(s) are turning measured from the most forward position of the main rotor tip path plane to the most rearward position of the tail rotor tip path plane or helicopter structure.

~~*Note. — "D" is sometimes referred to in the text using the terminology "D-value".*~~

. . .

Design D. The D of the design helicopter.

D-value. A limiting dimension, in terms of "D", for a heliport, helideck or shipboard heliport, or for a defined area within.

. . .

Dynamic load-bearing surface. A surface capable of supporting the loads generated by a helicopter ~~conducting an emergency touchdown on it~~ in motion.

. . .

Elongated. When used with TLOF or FATO, elongated means an area which has a length more than twice its width.

. . .

Helicopter stand. ~~An aircraft stand which provides for parking a helicopter and where ground taxi operations are completed or where the helicopter touches down and lifts off for air taxi operations.~~ A defined area intended to accommodate a helicopter for purposes of: loading or unloading passengers, mail or cargo; fuelling, parking or maintenance; and, where air taxiing operations are contemplated, the TLOF.

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

Helicopter ~~ground~~ taxiway. A ~~ground taxiway~~ defined path on a heliport intended for the ground movement of ~~wheeled undercarriage~~ helicopters and that may be combined with an air taxi-route to permit both ground and air taxiing.

Helicopter taxi-route. A defined path 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.~~

a) *An air taxi-route.* A marked taxi-route intended for air taxiing.

b) *A ground taxi-route.* A taxi-route centred on a taxiway.

. . .

Heliport reference point (HRP). The designated location of a heliport ~~or a landing location~~.

~~***Landing location.*** A marked or unmarked area that has the same physical characteristics as a visual heliport final approach and take-off area (FATO).~~

. . .

~~***Protection area.*** An area within a taxi route and around a helicopter stand which provides separation from objects, the FATO, other taxi routes and helicopter stands, for safe manoeuvring of helicopters.~~

Protection area. A defined area surrounding a stand intended to reduce the risk of damage from helicopters accidentally diverging from the stand.

Touchdown positioning circle (TDPC). A touchdown positioning marking (TDPM) in the form of a circle used for omnidirectional positioning in a TLOF.

Touchdown positioning marking (TDPM). A marking or set of markings providing visual cues for the positioning of helicopters.

. . .

CHAPTER 2. HELIPORT DATA

. . .

2.2 Heliport reference point

2.2.1 A heliport reference point shall be established for a heliport ~~or a landing location~~ not collocated with an aerodrome.

Note.— When the heliport ~~or landing location~~ is collocated with an aerodrome, the established aerodrome reference point serves both aerodrome and heliport ~~or landing location~~.

2.2.2 The heliport reference point shall be located near the initial or planned geometric centre of the heliport ~~or landing location~~ and shall normally remain where first established.

. . .

2.4 Heliport dimensions and related information

2.4.1 The following data shall be measured or described, as appropriate, for each facility provided on a heliport:

. . .

e) helicopter ~~ground~~ taxiway and helicopter ~~air taxiway~~ taxi route — designation, width, surface type;

. . .

2.4.3 The geographical coordinates of appropriate centre line points of helicopter ~~ground~~ taxiways and helicopter ~~air taxiways~~ taxi routes shall be measured and reported […].

. . .

2.4.5 The geographical coordinates of obstacles in Area 2 (the part within the heliport boundary) and in Area 3 shall be measured and reported to the aeronautical information […].

~~*Note 1.— See Annex 15, Appendix 1, for graphical illustrations of obstacle data collection surfaces and criteria used to identify obstacles in Areas 2 and 3.*~~

Note ~~2~~.— PANS-AIM (Doc 10066), Appendix ~~1~~ 8, provides requirements for obstacle data determination in Areas 2 and 3.

. . .

2.7 Rescue and firefighting

Note.— See 6.2 for information on rescue and firefighting services.

2.7.1 Information concerning the level of protection provided at a heliport for helicopter rescue and firefighting purposes shall be made available.

2.7.2 **Recommendation.—** *The level of protection normally available at a heliport should be expressed in terms of the category of the rescue and firefighting service as described in 6.2 and in accordance with the types and amounts of extinguishing agents normally available at the heliport.*

2.7.3 Changes in the level of protection normally available at a heliport for rescue and firefighting shall be notified to the appropriate aeronautical information services units and, where applicable, air traffic units to enable them to provide the necessary information to arriving and departing helicopters. When such a change has been corrected, the above units shall be advised accordingly.

Note. — Changes in the level of protection from that normally available at the heliport could result from, but may not be limited to, a change in the availability of extinguishing agent or equipment used to deliver agents, or of personnel used to operate the equipment.

2.7.4 **Recommendation.—** *A change should be expressed in terms of the new category of the rescue and firefighting service available at the heliport.*

. . .

CHAPTER 3. PHYSICAL CHARACTERISTICS

3.1 ~~Surface-level~~ Onshore heliports

Note 1.— The provisions given in this section are based on the design assumption that no more than one helicopter will be in the FATO at the same time.

Note 2.— The design provisions given in this section assume when conducting operations to a FATO in proximity to another FATO, these operations will not be simultaneous. If simultaneous helicopter operations are required, appropriate separation distances between FATOs need to be determined, giving due regard to such issues as rotor downwash and airspace, and ensuring the flight paths for each FATO, defined in Chapter 4, do not overlap. Further guidance on this issue is given in the Heliport Manual *(Doc 9261).*

~~*Note 3.— The specifications for ground taxi-routes and air taxi-routes 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.— The provisions given in this section are common for surface-level heliports and elevated heliports unless otherwise specified.

Note 4.— Guidance on the minimum size for elevated FATO/TLOFs in order to permit facilitation of essential operations around the helicopter is given in the Heliport Manual *(Doc 9261).*

Note 5.— Guidance on structural design to account for the presence on elevated heliports of personnel, snow, freight, refuelling and firefighting equipment, etc. is given in the Heliport Manual *(Doc 9261).*

Note 6.— Guidance on siting of a heliport and the location of the various defined areas, with due consideration of the effects of rotor downwash and other aspects of helicopter operations on third parties is given in the Heliport Manual *(Doc 9261).*

Final approach and take-off areas (FATO)

Note. — Guidance on siting and orientation of the FATO at a heliport to minimize interference of arrival and departure tracks with areas approved for residential use and other noise-sensitive areas close to the heliport is given in the Heliport Manual *(Doc 9261).*

. . .

3.1.1 A FATO shall:

a) provide:

1) an area free of obstacles, except for essential objects which because of their function are located on it, and of sufficient size and shape to ensure containment of every part of

the design helicopter in the final phase of approach and commencement of take-off - in accordance with the intended procedures;

Note.— Essential objects are visual aids (e.g. lighting) or others (e.g. firefighting systems) necessary for safety purposes. For further requirements regarding penetration of a FATO by essential objects, see 3.1.4.

2) when solid, a surface which is resistant to the effects of rotor downwash; and

i) when collocated with a TLOF, is contiguous and flush with the TLOF; has bearing strength capable of withstanding the intended loads; and ensures effective drainage; or

ii) when not collocated with a TLOF, is free of hazards should a forced landing be required; and

Note.— Resistant implies that effects from the rotor downwash neither cause a degradation of the surface nor result in flying debris.

b) be associated with a safety area.

3.1.~~1~~2 A ~~surface-level~~ heliport shall be provided with at least one ~~final approach and take-off area~~ (~~FATO~~), which need not be solid.

Note.— A FATO may be located on or near a runway strip or taxiway strip.

~~3.1.2 A FATO shall be obstacle free.~~

~~3.1.3 The dimensions of a FATO shall be:~~

~~a) 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:~~

~~1) 1 D of the largest helicopter when the maximum take-off mass (MTOM) of helicopters the FATO is intended to serve is more than 3 175 kg;~~

~~2) 0.83 D of the largest helicopter when the MTOM of helicopters the FATO is intended to serve is 3 175 kg or less.~~

~~*Note.— The term FATO is not used in the HFM. The minimum landing/take-off area specified in the HFM for the appropriate performance class 1 flight profile is necessary to determine the size of the FATO. However, for vertical take-off procedures in performance class 1, the required rejected take-off area is not normally quoted in the HFM, and it will be necessary to obtain information which includes complete containment — this figure will always be greater than 1 D.*~~

~~3.1.4 **Recommendation.** — *Where intended to be used by helicopters operated in performance class 2 or 3 with MTOM of 3 175 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.*~~

3.1.3 The minimum dimensions of a FATO shall be:

a) where intended to be used by helicopters operated in performance class 1:

1) the length of the Rejected Take-Off Distance (RTOD) for the required Take-Off procedure prescribed in the helicopter flight manual (HFM) of the helicopters for which the FATO is intended, or 1.5 Design D, whichever is greater; and

2) the width for the required procedure prescribed in the HFM of the helicopters for which the FATO is intended, or 1.5 Design D, whichever is greater.

b) where intended to be used by helicopters operated in performance classes 2 or 3, the lesser of:

1) an area within which can be drawn a circle of diameter of 1.5 Design D; or,

2) when there is a limitation on the direction of approach and touchdown, an area of sufficient width to meet the requirement of 3.1.1 a) 1) but not less than 1.5 times the overall width of the design helicopter.

Note 1.— The RTOD is intended to ensure containment of the helicopter during a rejected take-off. Although some flight manuals provide the RTOD, in others the dimension provided is the "minimum demonstrated … size" (where "…" could be "heliport", "runway", "helideck" etc.) and this may not include helicopter containment. When this is the case, it is necessary to consider sufficient safety area dimensions as well as the dimensions of l.5·D for the FATO, should the HFM not deliver data. For further guidance see Heliport Manual *(Doc 9261).*

Note 2.— Local conditions, such as elevation, ~~*and*~~ *temperature*~~,~~ *and permitted manoeuvring may need to be considered when determining the size of a FATO. Guidance is given in the* Heliport Manual *(Doc 9261)*.

3.1.4 Essential objects located in a FATO shall not penetrate a horizontal plane at the FATO elevation by more than 5 cm.

~~3.1.5 The FATO shall provide rapid drainage but the mean slope in any direction 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 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.~~

3.1.5 **Recommendation.—** *When the FATO is solid the slope should not:*

a) except as provided in b) or c) below; exceed 2 per cent in any direction;

b) when the FATO is elongated and intended to be used by helicopters operated in performance class 1, exceed 3 per cent overall, or have a local slope exceeding 5 per cent; and

c) when the FATO is elongated and intended to be used solely by helicopters operated in performance class 2 or 3, exceed 3 per cent overall, or have a local slope exceeding 7 per cent.

~~3.1.6 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 helicopters operated in performance class 1.~~

~~3.1.7 The surface of a FATO surrounding a touchdown and lift-off area (TLOF) intended for use by helicopters operated in performance classes 2 and 3 shall be static load-bearing.~~

~~3.1.8 **Recommendation.** *The FATO should provide ground effect.*~~

3.1.~~9~~6 **Recommendation.—** *The FATO should be located so as to minimize the influence of the surrounding environment, including turbulence, which could have an adverse impact on helicopter operations.*

Note.— Guidance on determining the influence of turbulence is given in the Heliport Manual *(Doc 9261). If turbulence mitigating design measures are warranted but not practical, operational limitations may need to be considered under certain wind conditions.*

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

. . .

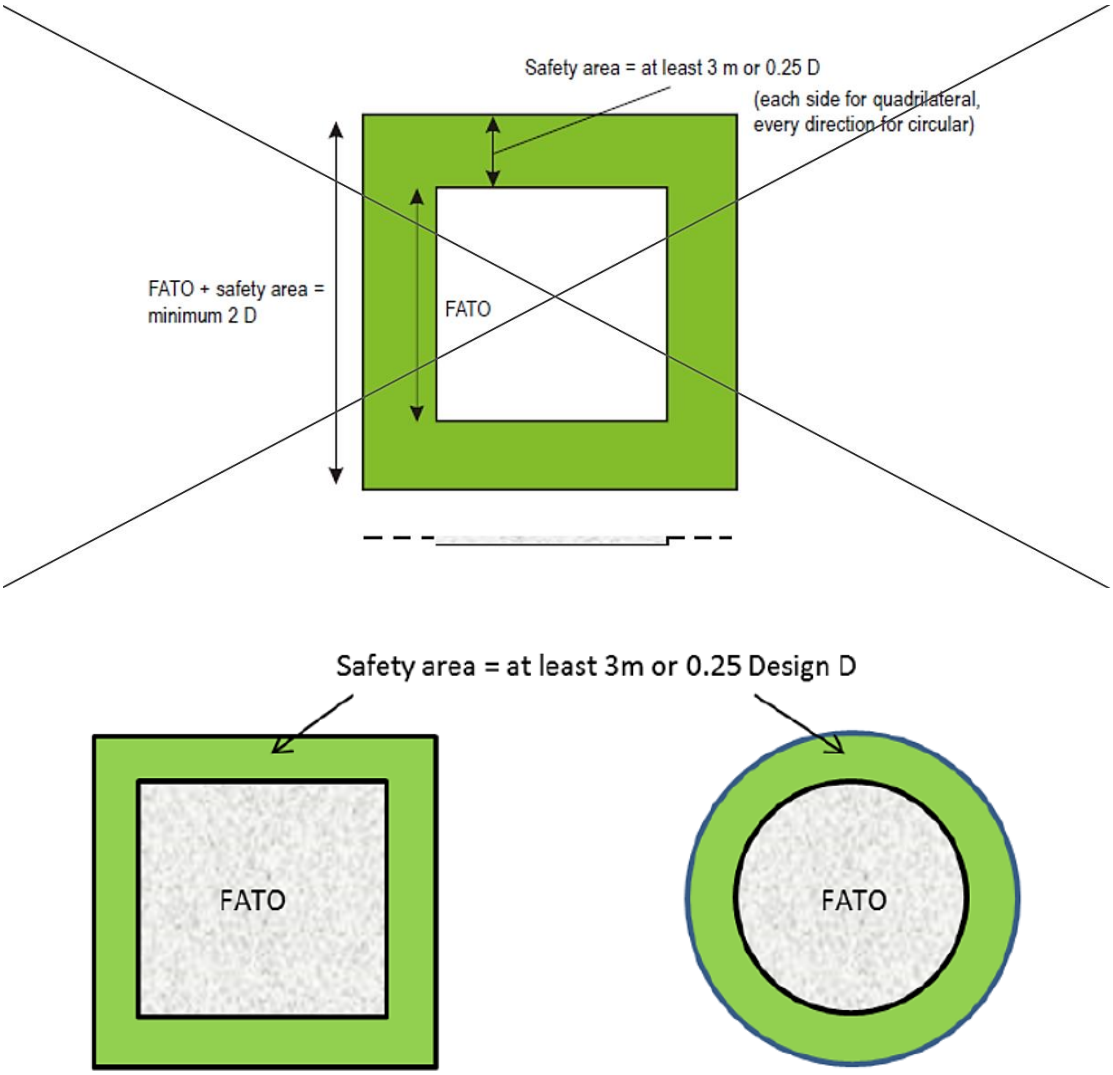


Figure 3-1. FATO and associated safety area

. . .

Safety areas

3.1.8 A safety area shall provide:

a) an area free of obstacles, except for essential objects which because of their function are located on it, to compensate for manoeuvring errors; and

b) when solid, a surface which: is contiguous and flush with the FATO; is resistant to the effects of rotor downwash; and ensures effective drainage.

~~3.1.21 A FATO shall be surrounded by a safety area which need not be solid.~~

~~3.1.22 A safety area surrounding a FATO 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.~~

~~(See Figure 3-1.)~~

3.1.9 The safety area surrounding a FATO shall extend outwards from the periphery of the FATO for a distance of at least 3 m or 0.25 Design D, whichever is greater.

3.1.~~24~~10 ~~No fixed object shall be permitted above the plane of the FATO 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~~ in a safety area during helicopter operations.

~~3.1.25 Objects whose function requires them to be located on the safety area shall not:~~

~~a) if located at a distance of less than 0.75 D from the centre of the FATO, penetrate a plane at a height of 5 cm above the plane of the FATO; and~~

~~b) if located at a distance of 0.75 D or more from the centre of the FATO, penetrate a plane originating at a height of 25 cm above the plane of the FATO and sloping upwards and outwards at a gradient of 5 per cent.~~

3.1.11 Essential objects located in the safety area shall not penetrate a surface originating at the edge of the FATO at a height of 25 cm above the plane of the FATO sloping upwards and outwards at a gradient of 5 per cent.

3.1.~~26~~12 **Recommendation.**— ~~*The surface of the safety area, w*~~ *When solid, ~~shall~~ the slope of the safety area should not exceed an upward slope of 4 per cent outwards from the edge of the FATO.*

Protected side slope

3.1.~~23~~13 ~~There~~A heliport shall be ~~a~~ provided with at least one protected side slope, rising at 45 degrees outward from the edge of the safety area and extending to a distance of 10 m (see Figure 3.2).~~, 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.~~

3.1.14 **Recommendation.**— *A heliport should be provided with at least two protected side slopes, rising at 45 degrees outward from the edge of the safety area and extending to a distance of 10 m.*

3.1.15 The surface of a protected side slope shall not be penetrated by obstacles.

~~*Note.— When only a single approach and take-off climb surface is provided, the need for specific protected side slopes would be addressed in the aeronautical study required in 4.2.7*~~

~~3.1.27 Where applicable, the surface of the safety area shall be treated to prevent flying debris caused by rotor downwash.~~

~~3.1.28 When solid, the surface of the safety area abutting the FATO shall be continuous with the FATO.~~

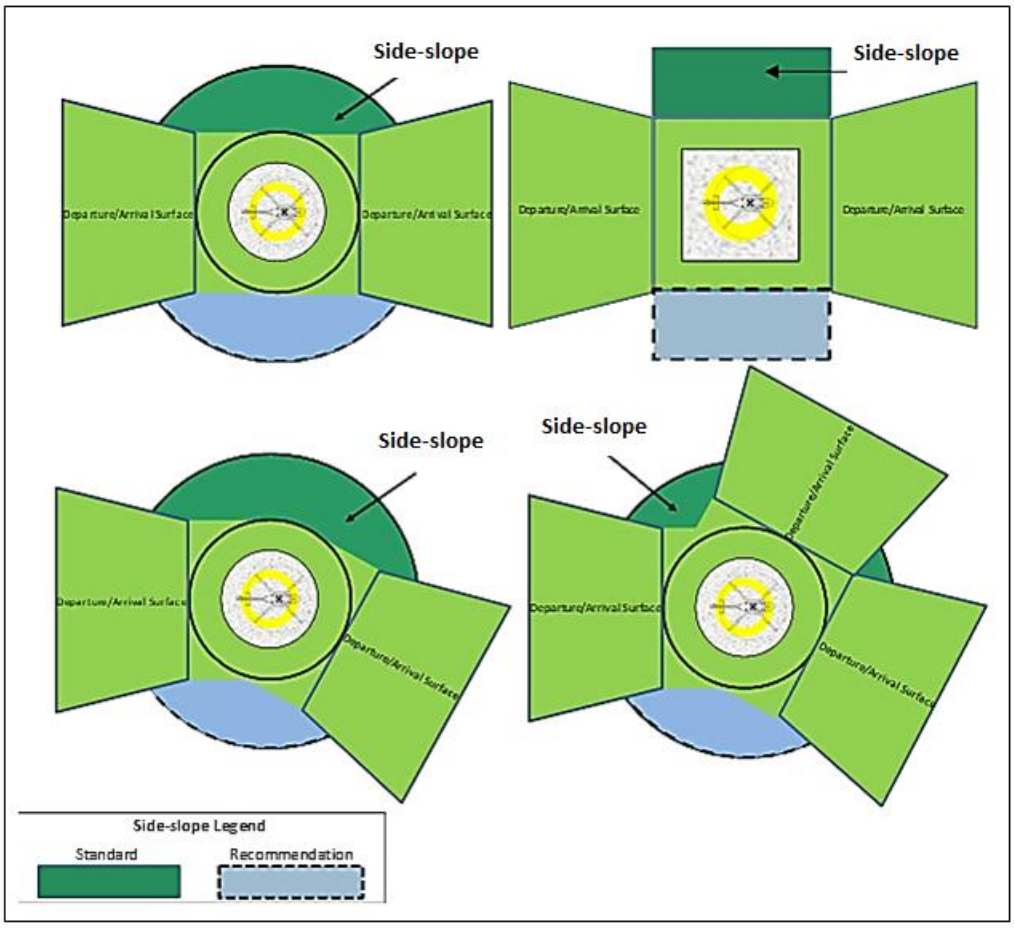


Figure 3-2. FATO simple/complex safety area and side slope protection

Note.— These diagrams show a number of configurations of FATO/Safety Areas/Side slopes. For a more complex arrival/departure arrangement which consists of: two surfaces that are not diametrically opposed; more than two surfaces; or an extensive obstacle free sector (OFS) which abuts directly to the FATO, it can be seen that appropriate provisions are necessary to ensure that there are no obstacles between the FATO and/or safety area and the arrival/departure surfaces.

Helicopter clearways

~~*Note.— A helicopter clearway would need to be considered when the heliport is intended to be used by helicopters operating in performance class 1. See the* Heliport Manual *(Doc 9261).*~~

Note.— The inclusion of detailed specifications for helicopter clearways in this section is not intended to imply that a clearway has to be provided.

3.1.16 A helicopter clearway shall provide:

a) an area free of obstacles, except for essential objects which because of their function are located on it, and of sufficient size and shape to ensure containment of the design helicopter when it is accelerating in level flight, and close to the surface, to achieve its safe climbing speed; and

b) when solid, a surface which: is contiguous and flush with the FATO; is resistant to the effects of rotor downwash; and is free of hazards if a forced landing is required.

3.1.1~~0~~7 When a helicopter clearway is provided, it shall be located beyond the end of the FATO.

3.1.1~~1~~8 **Recommendation.—** *The width of a helicopter clearway should not be less than the width of the FATO and associated safety area. (See Figure 3-1.)*

3.1.1~~2~~9 **Recommendation.—** *When solid, ~~T~~the ground in a helicopter clearway should not project above a surface having an overall upward slope of 3 per cent or having a local upward slope exceeding 5 per cent, the lower limit of this surface being a horizontal line which is located on the periphery of the FATO.*

3.1.~~13~~20 **Recommendation.—** *An object situated in 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

3.1.21 A TLOF shall:

a) provide:

1) an area free of obstacles and of sufficient size and shape to ensure containment of the undercarriage of the most demanding helicopter the TLOF is intended to serve in accordance with the intended orientation;

2) a surface which:

i) has sufficient bearing strength to accommodate the dynamic loads associated with the anticipated type of arrival of the helicopter at the designated TLOF;

ii) is free of irregularities that would adversely affect the touchdown or lift-off of helicopters;

iii) has sufficient friction to avoid skidding of helicopters or slipping of persons;

iv) is resistant to the effects of rotor downwash; and

v) ensures effective drainage while having no adverse effect on the control or stability of a helicopter during touchdown and lift-off, or when stationary; and

b) be associated with a FATO or a stand.

3.1.~~14~~22 ~~At least~~ A heliport ~~one TLOF~~ shall be provided ~~at a heliport~~ with at least one TLOF.

~~3.1.15 One TLOF shall be located within the FATO or one or more TLOFs shall be collocated with helicopter stands. For runway-type FATOs, additional TLOFs located in the FATO are acceptable.~~

~~*Note.— For further guidance see the* Heliport Manual *(Doc 9261).*~~

3.1.23 A TLOF shall be provided whenever it is intended that the undercarriage of the helicopter will touch down within a FATO or stand, or lift off from a FATO or stand.

~~3.1.16 The TLOF shall be of sufficient size to contain a circle of diameter of at least 0.83 D of the largest helicopter the area is intended to serve.~~

3.1.24 The minimum dimensions of a TLOF shall be:

a) when in a FATO intended to be used by helicopters operated in performance class 1, the dimensions for the required procedure prescribed in the helicopter flight manuals (HFMs) of the helicopters for which the TLOF is intended; and

b) when in a FATO intended to be used by helicopters operated in performance classes 2 or 3, or in a stand:

1) when there is no limitation on the direction of touchdown, of sufficient size to contain a circle of diameter of at least 0.83 D of:

i) in a FATO, the design helicopter; or

ii) in a stand, the largest helicopter the stand is intended to serve;

2) when there is a limitation on the direction of touchdown, of sufficient width to meet the requirement of 3.1.21 a) 1) above but not less than twice the undercarriage width (UCW) of:

i) in a FATO, the design helicopter; or,

ii) in a stand, the most demanding helicopter the stand is intended to serve.

~~*Note.— A TLOF may be any shape.*~~

3.1.25 For an elevated heliport, the minimum dimensions of a TLOF, when in a FATO, shall be of sufficient size to contain a circle of diameter of at least 1 Design-D.

~~3.1.17 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.~~

3.1.26 **Recommendation.—** *Slopes on a TLOF should not:*

a) except as provided in b) or c) below; exceed 2 per cent in any direction;

b) when the TLOF is elongated and intended to be used by helicopters operated in performance class 1; exceed 3 per cent overall, or have a local slope exceeding 5 per cent; and

c) when the TLOF is elongated and intended to be used solely by helicopters operated in performance class 2 or 3, exceed 3 per cent overall, or have a local slope exceeding 7 per cent.

~~3.1.18 Where the TLOF is within the FATO, the TLOF shall be dynamic load-bearing.~~

~~3.1.19 Where a 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.~~

~~3.1.20 Where a TLOF is located within a FATO which can contain a circle of diameter more than 1 D, the centre of the TLOF shall be located not less than 0.5 D from the edge of the FATO.~~

3.1.27 **Recommendation.—** *When a TLOF is within a FATO it should be:*

a) centred on the FATO; or

b) for an elongated FATO, centred on the longitudinal axis of the FATO.

3.1.28 When a TLOF is within a helicopter stand, it shall be centred on the stand.

3.1.29 A TLOF shall be provided with markings which clearly indicate the touchdown position and, by their form, any limitations on manoeuvring.

Note.— When a TLOF in a FATO is larger than the minimum dimensions, the TDPM may be offset while ensuring containment of the undercarriage within the TLOF and the helicopter within the FATO.

3.1.30 **Recommendation**.— *Where an elongated Performance Class 1 FATO/TLOF contains more than one TDPM, measures should be in place to ensure that only one can be used at a time.*

3.1.31 **Recommendation**.— *Where alternative TDPMs are provided they should be placed to ensure containment of the undercarriage within the TLOF and the helicopter within the FATO.*

Note.— The efficacy of the rejected take-off or landing distance will be dependent upon the helicopter being correctly positioned for take-off, or landing.

3.1.32 Safety devices such as safety nets or safety shelves shall be located around the edge of an elevated heliport but shall not exceed the height of the TLOF.

Helicopter ~~ground~~ taxiways and ~~helicopter ground~~ taxi-routes

Note 1.— The specifications for ground taxi-routes and air taxi-routes are intended for the safety of simultaneous operations during the manoeuvring of helicopters. The effect of wind velocity/turbulence induced by the rotor downwash would need to be considered.

Note 2.— The defined areas addressed in this section are taxiways and ground/air taxi-routes:

a) Taxiways associated with air taxi-routes may be used by both wheeled and skidded helicopters for either ground or air taxiing.

b) Ground taxi-routes are meant for use by wheeled helicopters, for ground taxiing only.

c) Air taxi-routes are meant for use by air taxiing only.

Helicopter taxiways

Note 1.— A helicopter ~~ground~~ taxiway is intended to permit the surface movement of a wheeled helicopter under its own power.

Note 2.— A helicopter taxiway can be used by a wheeled helicopter for air taxi if associated with a helicopter air taxi-route.

Note ~~2~~3.— When a taxiway is intended for use by aeroplanes and helicopters, the provisions for aeroplane taxiways; ~~for aeroplanes~~ taxiway strips; ~~and~~ helicopter ~~ground~~ taxiways; and taxi-routes will be taken into consideration and the more stringent requirements will be applied.

3.1.33 A helicopter taxiway shall:

a) provide:

1) an area free of obstacles and of sufficient width to ensure containment of the undercarriage of the most demanding wheeled helicopter the taxiway is intended to serve;

2) a surface which:

i) has bearing strength to accommodate the taxiing loads of the helicopters the taxiway is intended to serve;

ii) is free of irregularities that would adversely affect the ground taxiing of helicopters;

iii) is resistant to the effects of rotor downwash; and

iv) ensures effective drainage while having no adverse effect on the control or stability of a wheeled helicopter when being manoeuvred under its own power, or when stationary; and

b) be associated with a taxi-route.

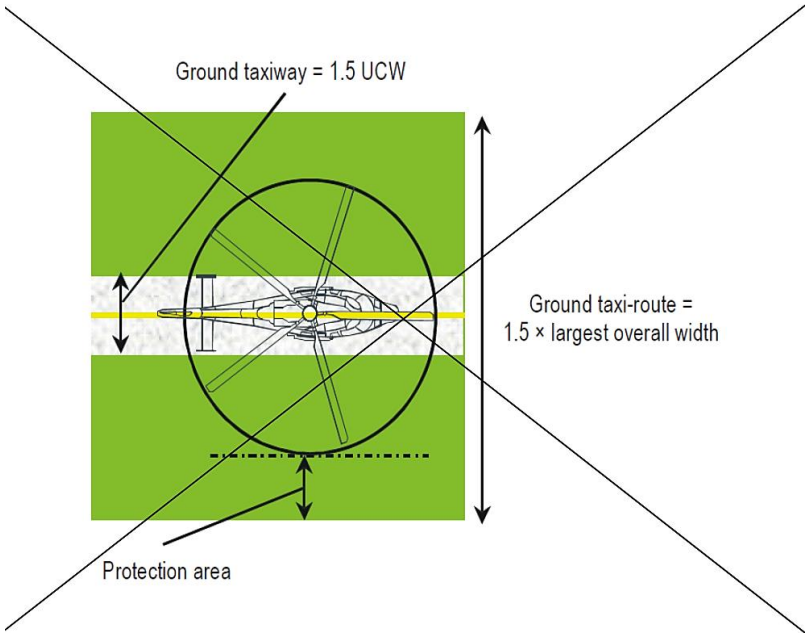
~~3.1.29 The width of a helicopter ground taxiway shall not be less than 1.5 times the largest width of the undercarriage (UCW) of the helicopters the helicopter ground taxiway is intended to serve. (See Figure 3-2.)~~

3.1.34 The minimum width of a helicopter taxiway shall be the lesser of:

a) two times the undercarriage width (UCW) of the most demanding helicopter the taxiway is intended to serve; or

b) a width meeting the requirements of 3.1.33 a) 1).

3.1.35~~0~~ **Recommendation.—** *The transverse slope of a taxiway should not exceed 2 per cent and the longitudinal slope ~~of a helicopter ground taxiway shall~~ should not exceed 3 per cent.*



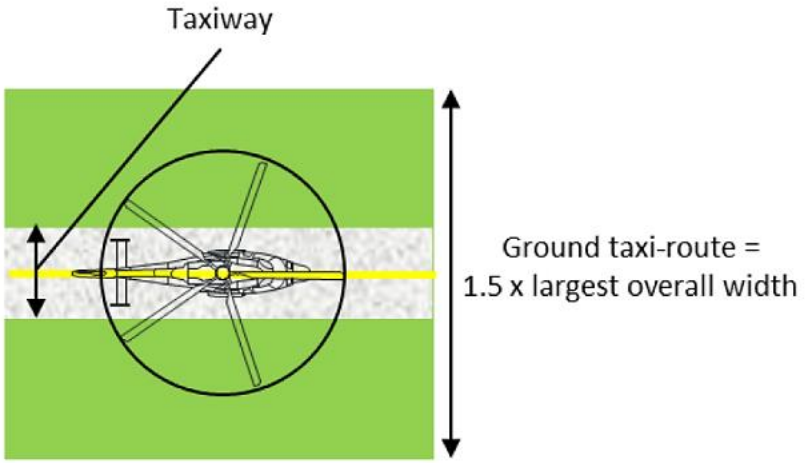


Figure 3-~~2~~3. Helicopter ~~ground taxi-route~~/taxiway/ground taxi-route

~~3.1.31 A helicopter ground taxiway shall be static load-bearing and be capable of withstanding the traffic of the helicopters the helicopter ground taxiway is intended to serve.~~

~~3.1.32 A helicopter ground taxiway shall be centred on a ground taxi-route.~~

~~3.1.33 A helicopter ground taxi-route shall extend symmetrically on each side of the centre line for at least 0.75 times the largest overall width of the helicopters it is intended to serve.~~

Helicopter taxi-routes

~~*Note.— The part of the helicopter ground taxi-route that extends symmetrically on each side of the centre line from 0.5 times the largest overall width of the helicopters it is intended to serve to the outermost limit of the helicopter ground taxi-route is its protection area.*~~

3.1.36 A helicopter taxi-route shall provide:

a) an area free of obstacles, except for essential objects which because of their function are located on it, established for the movement of helicopters; with sufficient width to ensure containment of the largest helicopter the taxi-route is intended to serve;

b) when solid, a surface which is resistant to the effects of rotor downwash; and

1) when collocated with a taxiway:

i) is contiguous and flush with the taxiway;

ii) does not present a hazard to operations; and

iii) ensures effective drainage; and

2) when not collocated with a taxiway:

i) is free of hazards if a forced landing is required.

3.1.34~~7~~ ~~No fixed object shall be permitted above the surface of the ground on a helicopter ground taxi-route, except for frangible objects, which, because of their function, must be located thereon~~. No mobile object shall be permitted on a ~~ground~~ taxi-route during helicopter ~~movements~~ operations.

Note.— See the Heliport Manual *(Doc 9261) for further guidance.*

3.1.38 **Recommendation.—** *When solid and collocated with a taxiway, the taxi-route should not exceed an upward transverse slope of 4 per cent outwards from the edge of the taxiway.*

Helicopter ground taxi-routes

3.1.39 A helicopter ground taxi-route shall have a minimum width of 1.5 x the overall width of the largest helicopter it is intended to serve, and be centred on a taxiway.

3.1.~~35~~40 Essential ~~O~~objects ~~whose function requires them to be~~ located ~~on~~ in a helicopter ground taxi-route shall not:

a) be located at a distance of less than 50 cm outwards from the edge of the helicopter ground taxiway; and

b) penetrate a surface originating ~~at a height of 25 cm above the plane of the helicopter ground taxiway, at a distance of 50 cm from the edge of the helicopter ground taxiway~~ 50 cm outwards of the edge of the helicopter taxiway and a height of 25 cm above the surface of the taxiway and sloping upwards and outwards at a gradient of 5 per cent.

~~3.1.36 The helicopter ground taxiway and the helicopter ground taxi-route shall provide rapid drainage but the helicopter ground taxiway transverse slope shall not exceed 2 per cent.~~

~~3.1.37 The surface of a helicopter ground taxi-route shall be resistant to the effect of rotor downwash.~~

~~3.1.38 For simultaneous operations, the helicopter ground taxi-routes shall not overlap.~~

Helicopter ~~air taxiways and helicopter~~ air taxi-routes

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

~~3.1.39 The width of a helicopter air taxiway shall be at least two times the largest width of the undercarriage (UCW) of the helicopters that the helicopter air taxiway is intended to serve. (See Figure 3-3.)~~

3.1.41 A helicopter air taxi-route shall have a minimum width of twice the overall width of the largest helicopter it is intended to serve.

3.1.42 If collocated with a taxiway for the purpose of permitting both ground and air taxi operations (see Figure 3.4):

a) the helicopter air taxi-route shall be centred on the taxiway; and

b) essential objects located in the helicopter air taxi-route shall not:

1) be located at a distance of less than 50 cm outwards from the edge of the helicopter taxiway; and

2) penetrate a surface originating 50 cm outwards of the edge of the helicopter taxiway and a height of 25 cm above the surface of the taxiway and sloping upwards and outwards at a gradient of 5 per cent.

~~3.1.40 **Recommendation.** — *The surface of a helicopter air taxiway should be static load-bearing.*~~

3.1.41~~3~~ **Recommendation.**— *When not collocated with a taxiway, ~~T~~the slopes of the surface of ~~a helicopter air taxiway~~ an air taxi-route should not exceed the slope landing limitations of the helicopters ~~the helicopter air taxiway~~ the taxi-route is intended to serve. In any event, the transverse slope should not exceed 10 per cent and the longitudinal slope should not exceed 7 per cent.*

~~3.1.42 A helicopter air taxiway shall be centred on an air taxi-route.~~

~~3.1.43 A helicopter air taxi-route shall extend symmetrically on each side of the centre line for a distance at least equal to the largest overall width of the helicopters it is intended to serve.~~

~~*Note. — The part of the helicopter air taxi-route that extends symmetrically on each side of the centre line from 0.5 times the largest overall width of the helicopters it is intended to serve to the outermost limit of the helicopter air taxi-route is its protection area.*~~

~~3.1.44 No fixed object shall be permitted above the surface of the ground on an air taxi-route, except for frangible objects, which, because of their function, must be located thereon. No mobile object shall be permitted on an air taxi-route during helicopter movements.~~

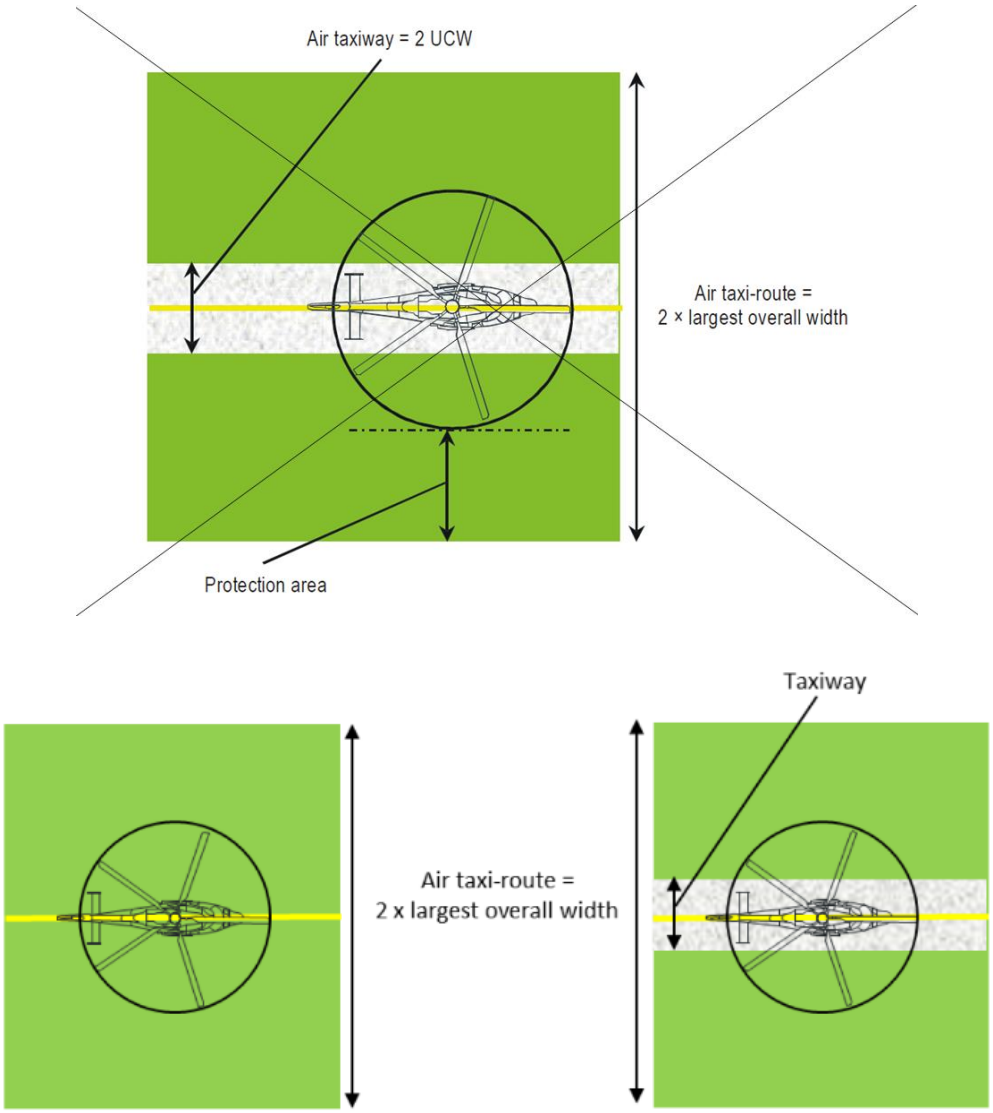


Figure 3-43. Helicopter air taxi-route and combined air taxi-route/taxiway

~~3.1.45 Objects above ground level whose function requires them to be located on a helicopter air taxi-route shall not:~~

~~a) be located at a distance of less than 1 m from the edge of the helicopter air taxiway; and~~

~~b) penetrate a plane originating at a height of 25 cm above the plane of the helicopter air taxiway, at a distance of 1 m from the edge of the helicopter air taxiway and sloping upwards and outwards at a gradient of 5 per cent.~~

~~3.1.46 **Recommendation.** *Objects above ground level whose function requires them to be located on a helicopter air taxi-route should not:*~~

~~*a) be located at a distance of less than 0.5 times the largest overall width of the helicopter for which the helicopter air taxi-route is designed from the centre line of the helicopter air taxiway; and*~~

~~*b) penetrate a plane originating at a height of 25 cm above the plane of the helicopter air taxiway, at a distance of 0.5 times the largest overall width of the helicopter for which the helicopter air taxi route is designed from the centre line of the helicopter air taxiway, and sloping upwards and outwards at a gradient of 5 per cent.*~~

~~3.1.47 The surface of a helicopter air taxi route shall be resistant to the effect of rotor downwash.~~

~~3.1.48 The surface of a helicopter air taxi route shall provide ground effect.~~

~~3.1.49 For simultaneous operations, the helicopter air taxi routes shall not overlap.~~

Helicopter stands

Note.— The provisions of this section do not specify the location for helicopter stands but allow a high degree of flexibility in the overall design of the heliport. However, it is not considered good practice to locate helicopter stands under a flight path. See the Heliport Manual *(Doc 9261) for further guidance.*

3.1.44 A helicopter stand shall:

a) provide:

1) an area free of obstacles and of sufficient size and shape to ensure containment of every part of the largest helicopter the stand is intended to serve when it is being positioned within the stand;

2) a surface which:

i) is resistant to the effects of rotor downwash;

ii) is free of irregularities that would adversely affect the manoeuvring of helicopters;

iii) has bearing strength capable of withstanding the intended loads;

iv) has sufficient friction to avoid skidding of helicopters or slipping of persons; and

v) ensures effective drainage while having no adverse effect on the control or stability of a wheeled helicopter when being manoeuvred under its own power, or when stationary; and

b) be associated with a protection area.

~~3.1.50 When a TLOF is collocated with a helicopter stand, the protection area of the stand shall not overlap the protection area of any other helicopter stand or associated taxi route.~~

3.1.45 The minimum dimensions of a helicopter stand shall be:

a) a circle of diameter of 1.2 D of the largest helicopter the stand is intended to serve; or

b) when there is a limitation on manoeuvring and positioning, of sufficient width to meet the requirement of 3.1.44 a) 1) above but not less 1.2 times overall width of largest helicopter the stand is intended to serve.

Note 1.— For a helicopter stand intended to be used for taxi-through only, a width less than 1.2D but which provides containment and still permits all required functions of a stand to be performed, might be used (in accordance with 3.1.44 a) 1)).

Note 2.— For a helicopter stand intended to be used for turning on the ground, the minimum dimensions may be influenced by the turning circle data provided by the manufacturer and are likely to exceed 1.2 D. See the Heliport Manual *(Doc 9261) for further guidance.*

3.1.~~51~~46 **Recommendation.—** *The ~~helicopter stand shall provide rapid drainage but the~~ mean slope of a helicopter stand in any direction ~~shall~~ should not exceed 2 per cent.*

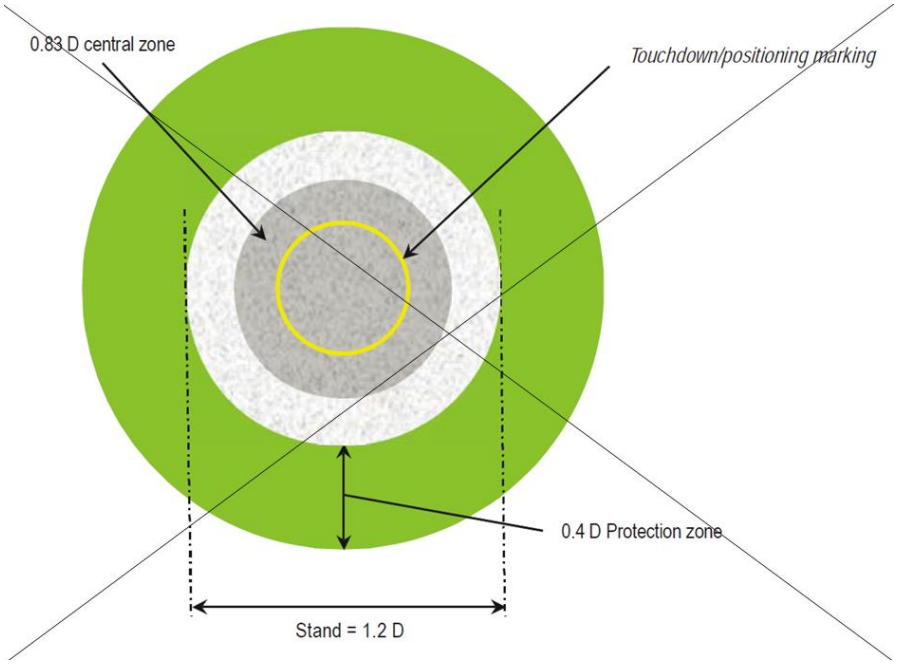
~~*Note.— The requirements on the dimensions of helicopter stands assume the helicopter will turn in a hover when operating over a stand.*~~

~~3.1.52 A helicopter stand intended to be used by helicopters turning in a hover shall be of sufficient size to contain a circle of diameter of at least 1.2 D of the largest helicopter the stand is intended to serve. (See Figure 3-4.)~~

~~3.1.53 Where a helicopter stand is intended to be used for taxi-through and where the helicopter using the stand is not required to turn, the minimum width of the stand and associated protection area shall be that of the taxi-route.~~

~~3.1.54 Where a helicopter stand is intended to be used for turning, the minimum dimension of the stand and protection area shall be not less than 2 D.~~

~~3.1.55 Where a helicopter stand is intended to be 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~~.



~~Figure 3-4. Helicopter stand and associated protection area~~

3.1.47 Each helicopter stand shall be provided with positioning markings to clearly indicate where the helicopter is to be positioned and, by their form, any limitations on manoeuvring.

3.1.48 A stand shall be surrounded by a protection area which need not be solid.

Protection areas

3.1.49 A protection area shall provide:

a) an area free of obstacles, except for essential objects which because of their function are located on it; and

b) when solid, a surface which is contiguous and flush with the stand; is resistant to the effects of rotor downwash; and ensures effective drainage.

3.1.50 When associated with a stand designed for turning, the protection area shall extend outwards from the periphery of the stand for a distance of 0.4D. (See Figure 3.5).

3.1.51 When associated with a stand designed for taxi-through, the minimum width of the stand and protection area shall not be less than the width of the associated taxi-route (see Figures 3.6 and 3.7).

~~3.1.56 For simultaneous operations, the protection areas of helicopter stands and their associated taxi-routes shall not overlap. (See Figure 3-5.)~~

~~*Note.— Where non-simultaneous operations are envisaged, the protection areas of helicopter stands and their associated taxi-routes may overlap. (See Figure 3-6.)*~~

3.1.52 When associated with a stand designed for non-simultaneous use (see Figures 3.8 and 3.9):

a) the protection area of adjacent stands may overlap but shall not be less than the required protection area for the larger of the adjacent stands; and

b) the adjacent non-active stand may contain a static object but it shall be wholly within the boundary of the stand.

Note.— To ensure that only one of the adjacent stands is active at a time, instruction to pilots in the AIP make clear that a limitation on the use of the stands is in force.

3.1.53 No mobile object shall be permitted in a protection area during helicopter operations.

~~3.1.57 A helicopter stand and associated protection area intended to be used for air taxiing shall provide ground effect.~~

~~3.1.58 No fixed object shall be permitted above the surface of the ground on a helicopter stand.~~

~~3.1.59 No fixed object shall be permitted above the surface of the ground in the protection area around a helicopter stand except for frangible objects, which because of their function, must be located there.~~

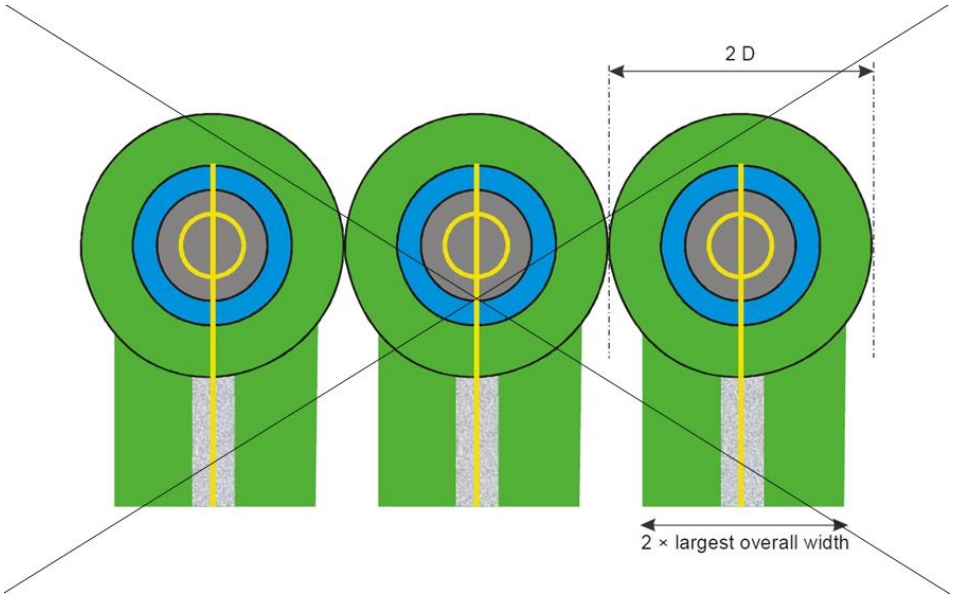
~~3.1.60 No mobile object shall be permitted on a helicopter stand and the associated protection area during helicopter movements.~~

3.1.~~61~~54 Essential ~~O~~objects ~~whose function requires them to be~~ located in the protection area shall not:

a) if located at a distance of less than 0.75 D from the centre of the helicopter stand, penetrate a surface at a height of 5 cm above the surface of the central zone; and

b) if located at a distance of 0.75 D or more from the centre of the helicopter stand, penetrate a surface at a height of 25 cm above the plane of the central zone and sloping upwards and outwards at a gradient of 5 per cent.

3.1.55 **Recommendation.—** *When solid, the slope of a protection area should not exceed an upward slope of 4 per cent outwards from the edge of the stand.*



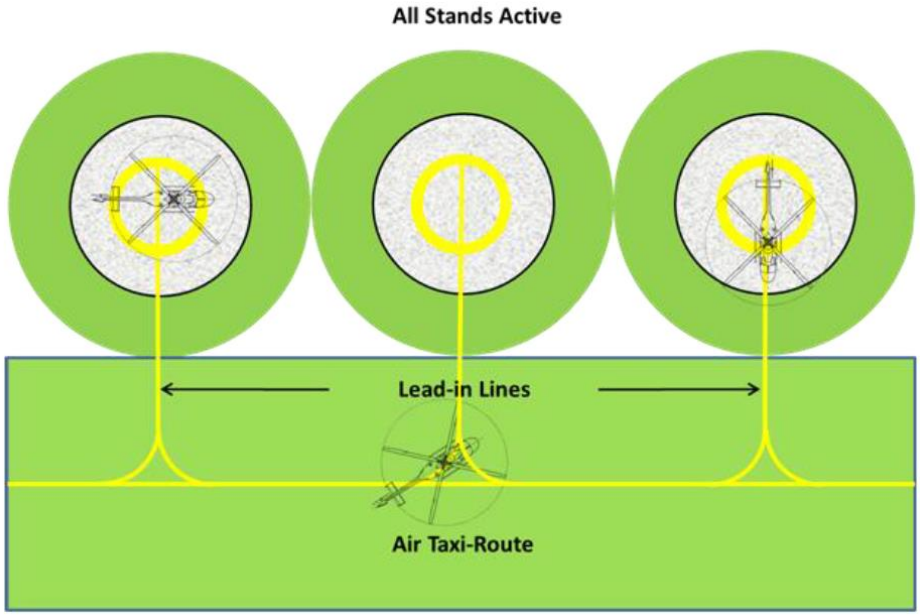


Figure 3-5. ~~Helicopter~~ Turning stands ~~designed for hover turns~~ (with air taxi-routes) ~~/taxiways —~~ simultaneous use ~~operations~~

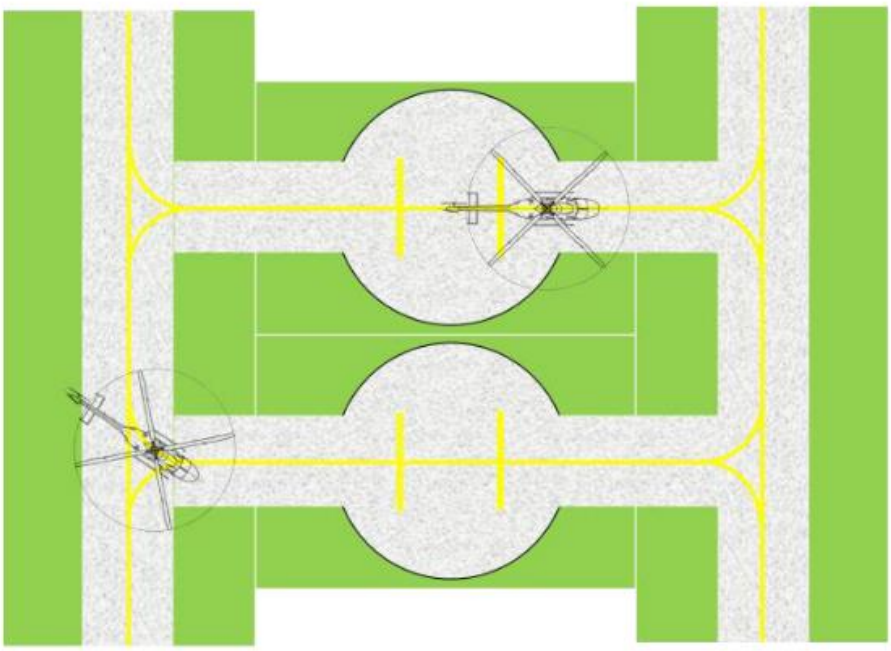


Figure 3-6. Ground taxi-through stands (with taxiway/ground taxi-route) simultaneous use

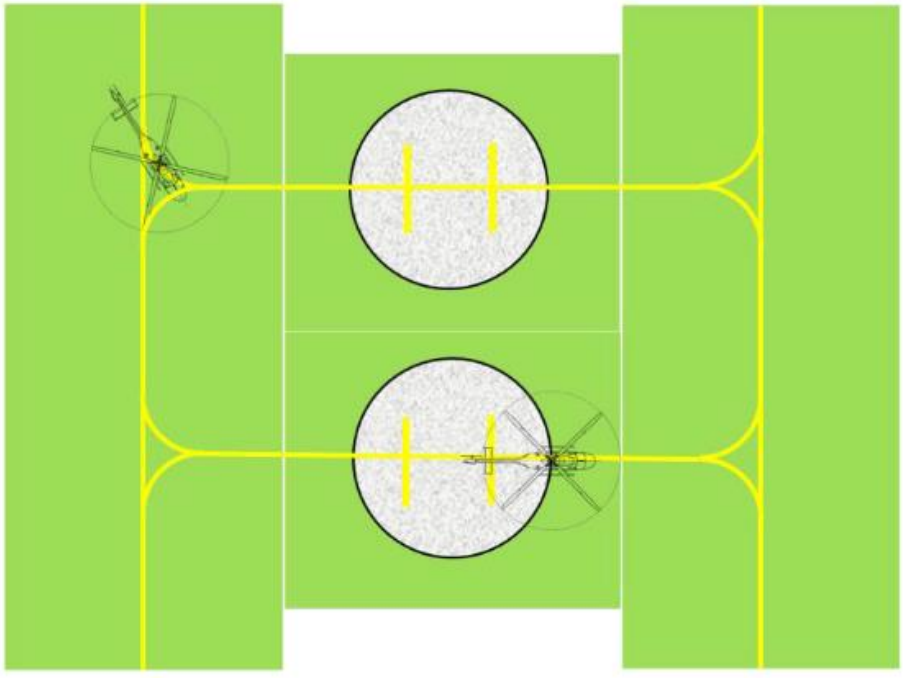
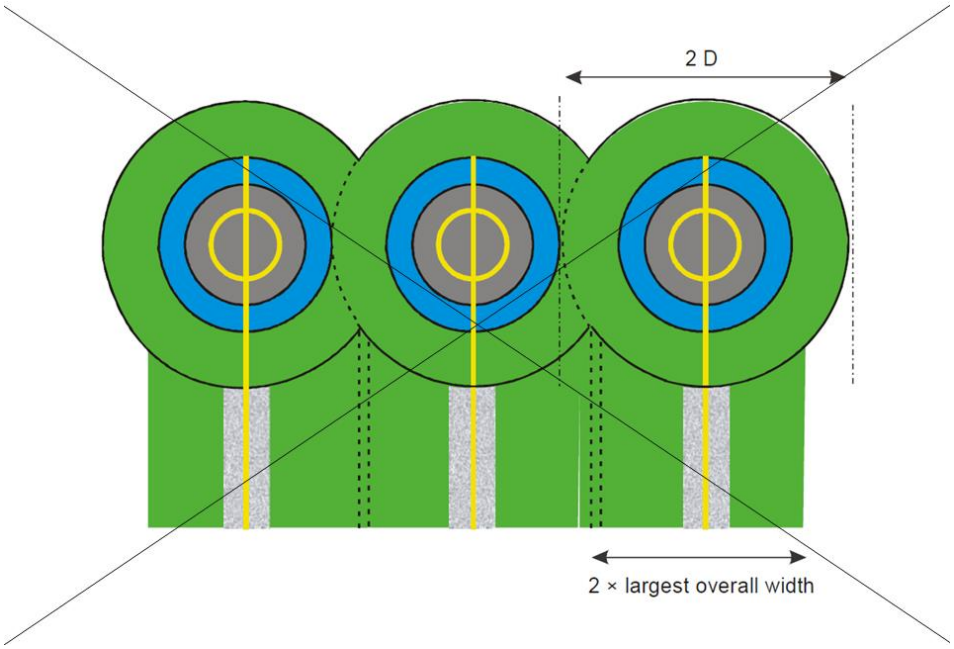


Figure 3-7. Air taxi-through stands (with air taxi-route) simultaneous use



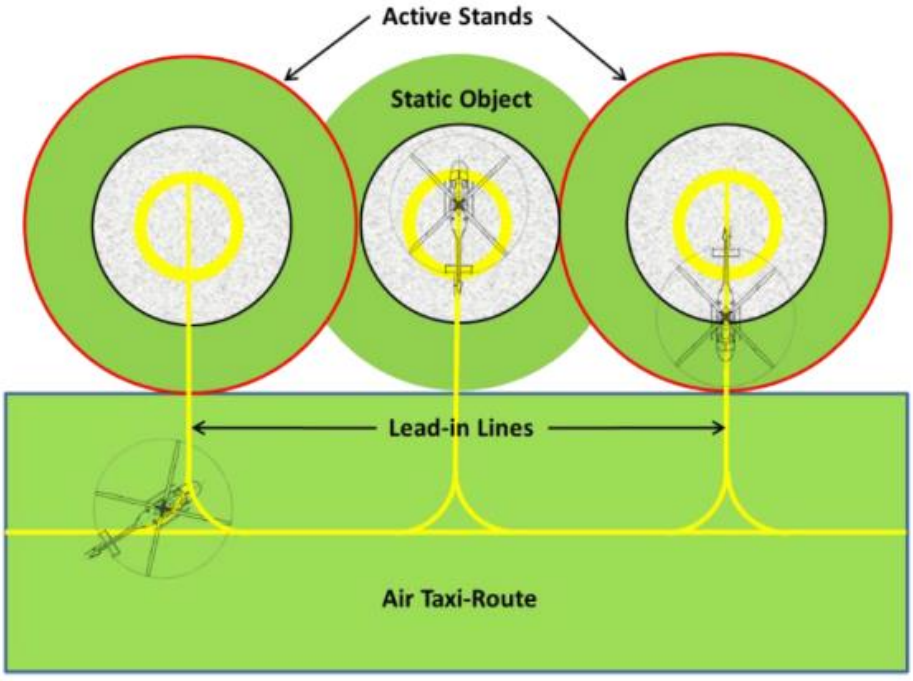


Figure 3-~~6~~8. ~~Helicopter~~ Turning stands ~~designed for hover turns~~ (with air taxi-routes) ~~/taxiways —~~ non-simultaneous ~~operations~~use – outer stands active

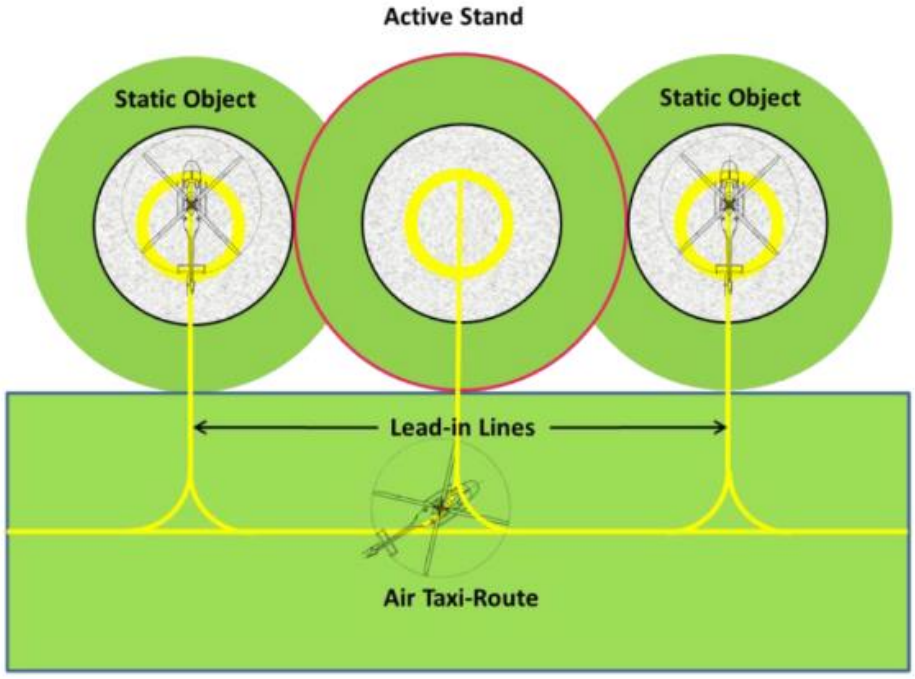


Figure 3-9. Turning stands (with air taxi-route) non-simultaneous use – inner stand active

~~3.1.62 The central zone of a helicopter stand shall be capable of withstanding the traffic of helicopters 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 taxi-through, and where the helicopter using the stand is not required to turn, the same width as the helicopter ground taxiway.~~

~~*Note. — For a helicopter stand intended to be used for turning on the ground by wheeled helicopters, the dimension of the helicopter stand, including the dimension of the central zone, would need to be significantly increased. See the* Heliport Manual *(Doc 9261) for further guidance.*~~

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

3.1.~~63~~56 Where a FATO is located near a runway or taxiway, and where simultaneous 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 3-1.

3.1.~~64~~57 **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 3-1. FATO minimum separation distance for simultaneous operations

If aeroplane mass and/or helicopter mass are	Distance between FATO edge and runway edge or taxiway edge
up to but not including 3 175 kg	60 m
3 175 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 helicopter stands include a protection area.*~~

~~*Note 2.— Guidance on structural design for elevated heliports is given in the* Heliport Manual *(Doc 9261).*~~

~~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 areas and touchdown and lift-off areas***~~

~~*Note.— On elevated heliports it is presumed that the FATO and one TLOF will be coincidental.*~~

~~3.2.2 An elevated heliport shall be provided with one FATO.~~

~~3.2.3 A FATO shall be obstacle free.~~

~~3.2.4 The dimensions of the FATO shall be:~~

~~a) 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) 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:~~

~~1) 1 D of the largest helicopter when the MTOM of helicopters the FATO is intended to serve is more than 3 175 kg;~~

~~2) 0.83 D of the largest helicopter when the MTOM of helicopters the FATO is intended to serve is 3 175 kg or less.~~

3.2.5 **Recommendation.** — *Where intended to be used by helicopters operated in performance class 2 or 3 with MTOM of 3 175 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 *(Doc 9261).*

3.2.6 Slopes on a FATO at an elevated heliport shall be sufficient to prevent accumulation of water on the surface of the area, but shall not exceed 2 per cent in any direction.

3.2.7 The FATO shall be dynamic load-bearing.

3.2.8 The surface of the FATO shall be:

a) resistant to the effects of rotor downwash; and

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

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

Helicopter clearways

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

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

3.2.12 **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.*

3.2.13 **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

3.2.14 One TLOF shall be coincidental with the FATO.

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

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

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

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

3.2.18 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 the helicopters the area is intended to serve.

3.2.19 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 areas

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

3.2.21 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.

3.2.22 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.

3.2.23 There shall be a protected side slope rising at 45 degrees from the edge of the safety area to a distance of 10 m, 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.

3.2.24 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.

3.2.25 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.

3.2.26 **Recommendation.** — *In the case of a FATO of diameter less than 1 D, 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.*

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

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

3.2.29 The surface of the safety area abutting the FATO shall be continuous with the FATO.

Helicopter ground taxiways and ground taxi-routes

Note. — 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.

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

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

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

3.2.33 A helicopter ground taxiway shall be centred on a ground taxi-route.

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

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

3.2.36 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.

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

Helicopter air taxiways and air taxi-routes

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

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

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

3.2.40 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.

3.2.41 A helicopter air taxiway shall be centred on an air taxi-route.

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

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

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

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

Aprons

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

3.2.47 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.

3.2.48 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.

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

3.2.50 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.

3.2.51 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.

3.2.52 When intended to be used for ground taxi operations by wheeled helicopters, the dimensions of a helicopter stand shall take into account the minimum turn radius of the wheeled helicopters the stand is intended to serve.

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

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

3.2.55 The central zone of the helicopter stand shall be capable of withstanding the traffic of the helicopters 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 the ground taxiway.

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

3.2.57 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.

. . .

CHAPTER 4. OBSTACLE ENVIRONMENT

. . .

4.2 Obstacle limitation requirements

. . .

Note 2.— ~~If a visual approach slope indicator (VASI) is installed, there are additional obstacle protection surfaces, detailed in Chapter 5, that need to be considered and may be more demanding than the obstacle limitation surfaces prescribed in Table 4-1~~Guidance on obstacle protection surfaces, for when a visual approach slope indicator (VASI) is installed, is given in the onshore section of the Heliport Manual *(Doc 9261).*

. . .

4.2.7 A surface-level heliport shall have at least one approach and take-off climb surface. An aeronautical study shall be undertaken by an appropriate authority when only a single approach and take-off climb surface is provided considering as a minimum, the following factors:

. . .

b) the obstacle environment surrounding the heliport and the availability of at least one protected side slope;

. . .

4.2.10 An elevated heliport shall have at least one approach and take-off climb surface. An aeronautical study shall be undertaken by an appropriate authority when only a single approach and take-off climb surface is provided considering as a minimum, the following factors:

. . .

b) the obstacle environment surrounding the heliport and the availability of at least one protected side slope;

. . .

CHAPTER 5. VISUAL AIDS

. . .

Note 3.— Guidance is given in the Heliport Manual *(Doc 9261) on marking the maximum allowable mass (5.2.3) and the D-value (5.2.4) ~~and, if required, the actual FATO dimension(s) (5.2.5)~~ on the heliport surface to avoid confusion between markings where metric units are used and markings where imperial units are used.*

. . .

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

Note.— The objective of the winching area markings is to provide visual cues which assist a helicopter to be positioned over, and retained within, an area from which a passenger or equipment can be lowered or raised.

. . .

5.2.2 Heliport identification marking

. . .

Note 1.— The objective of a heliport identification marking is to provide to the pilot an indication of the presence of a heliport and, by its form, likely usage; the preferred direction(s) of approach; or the FATO orientation within the helideck obstacle environment.

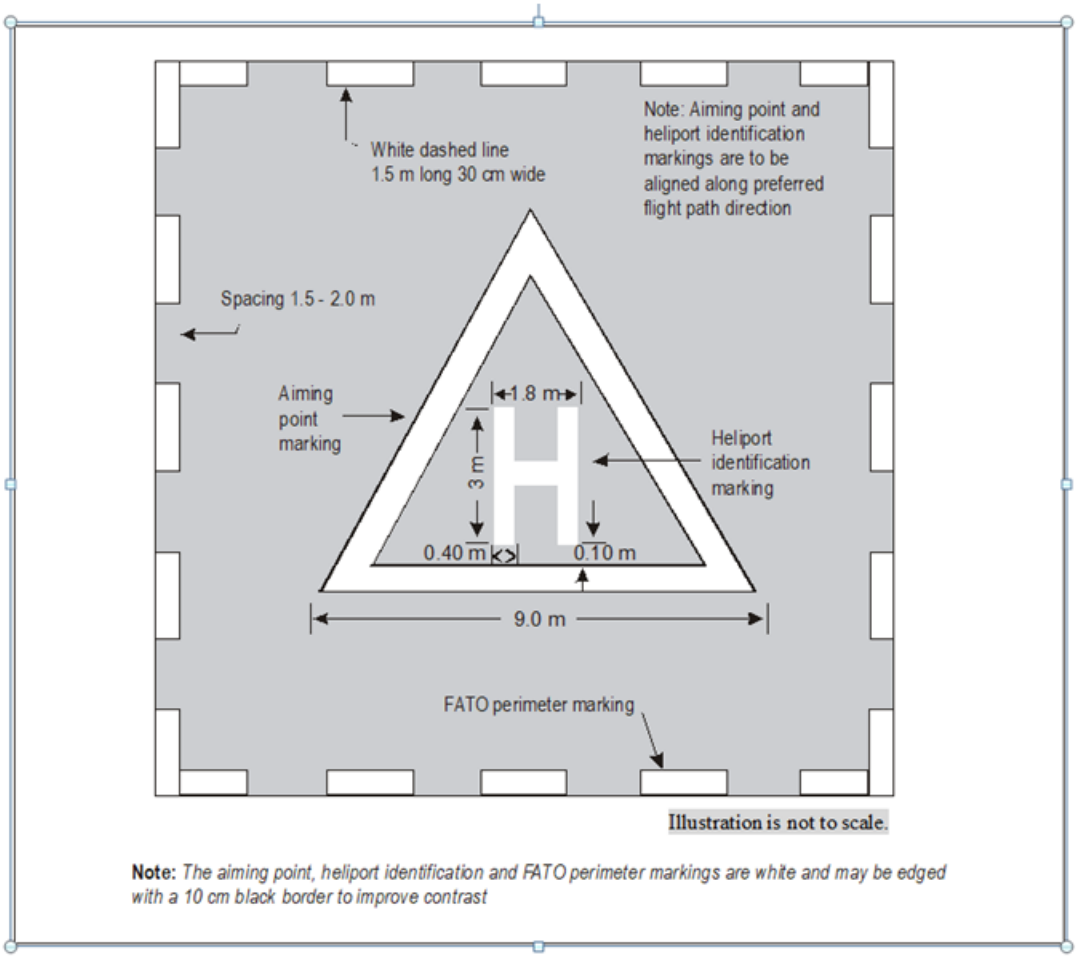
Note 2.— For other than helidecks, the preferred direction(s) of approach corresponds to the median of the departure/arrival surface(s).

Note 3.— For helidecks, the bar of the "H" points to the centre of the Limited Obstacle Sector.

Note ~~1~~4.— If the touchdown/positioning marking is offset ~~on a helideck~~, the heliport identification marking is established in the centre of the touchdown/positioning marking.

Note ~~2~~5.— On a FATO, which does not contain a TLOF and which is marked with an aiming point marking (see 5.2.~~7~~8), ~~except for a heliport at a hospital~~, the heliport identification marking is established in the centre of the aiming point marking as shown in Figures 5-1 and 5-1A.

. . .



Note: *The aiming point, heliport identification and FATO perimeter markings are white and may be edged with a 10 cm black border to improve contrast*

Figure 5-1. Combined heliport identification, aiming point and FATO perimeter marking

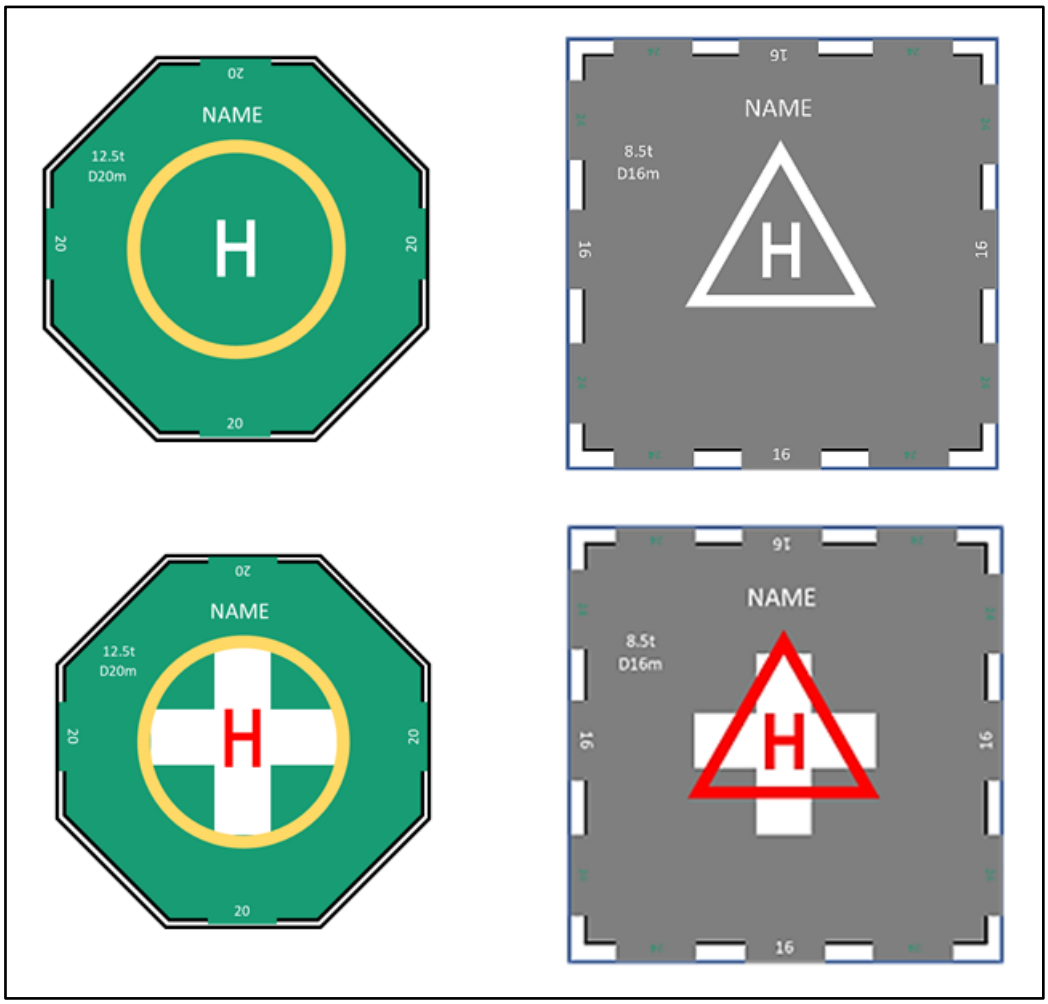


Figure 5-1A. Heliport identification markings with TLOF and aiming markings for heliport and hospital heliport

. . .

5.2.3 Maximum allowable mass marking

Note 1.— The objective of the maximum allowable mass marking is to provide the mass limitation of the heliport such that it is visible to the pilot from the preferred final approach direction.

Note 2.— Where States express the maximum allowable mass in pounds, it is not appropriate to suffix with the letter "t" which is used only to indicate metric tonnes. Guidance on markings where States use imperial units is given in the Heliport Manual *(Doc 9261).*

. . .

All FATOs except runway-type FATOs

5.2.3.8 **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 5-4 for a ~~FATO with a dimension~~ D-value of more than 30 m. For a ~~FATO~~ D-value ~~a dimension of~~ between 15 m to 30 m the height of the numbers and the letter of the marking should be a minimum of 90 cm, and for a ~~FATO with a dimension of~~ D-value of less than 15 m the height of the numbers and the letter of the marking should be a minimum of 60 cm, each with a proportional reduction in width and thickness.*

. . .

5.2.4 D-value marking

Note.— The objective of the D-value marking is to provide to the pilot the "D" of the largest helicopter that can be accommodated on the heliport. This value may differ in size from the FATO and the TLOF provided in compliance with Chapter 3.

. . .

5.2.4.2 **Recommendation.—** The D-value marking ~~*should*~~ shall be displayed at surface-level and elevated heliports ~~*designed for helicopters operated in Performance Class 2 or 3*~~.

. . .

5.2.4.6 **Recommendation.—** *The numbers of the marking should have a colour contrasting with the background and should be in the form and proportion shown in Figure 5-4 for a ~~FATO with a dimension~~ D-value of more than 30 m. For a ~~FATO~~ D-value with a dimension of between 15 m to 30 m the height of the numbers of the marking should be a minimum of 90 cm, and for a ~~FATO with a dimension~~ D-value of less than 15 m the height of the numbers of the marking should be a minimum of 60 cm, each with a proportional reduction in width and thickness.*

~~5.2.5 Final approach and take-off area dimension(s) marking~~

~~***Application***~~

~~5.2.5.1 **Recommendation.** *The actual dimension(s) of the FATO intended to be used by helicopters operated in performance class 1 should be marked on the FATO.*~~

~~5.2.5.2 **Recommendation.** *If the actual dimension(s) of the FATO to be used by helicopters operated in performance class 2 or 3 is less than 1 D, the dimension(s) should be marked on the FATO.*~~

~~***Location***~~

~~5.2.5.3 A FATO dimension marking shall be located within the FATO and so arranged as to be readable from the preferred final approach direction.~~

~~***Characteristics***~~

~~5.2.5.4 The dimension(s) shall be rounded to the nearest metre or foot.~~

~~*Note. If the FATO is rectangular but not a runway type, both the length and width of the FATO relative to the preferred final approach direction is indicated.*~~

~~*All FATOs except runway type FATOs*~~

~~5.2.5.5 **Recommendation.** *The numbers of the marking should have a colour contrasting with the background and should be in the form and proportion shown in Figure 5-4 for a FATO with a dimension of more than 30 m. For a FATO with a dimension between 15 m to 30 m the height of the numbers of the marking should be a minimum of 90 cm, and for a FATO with a dimension of less than 15*~~

~~*m the height of the numbers of the marking should be a minimum of 60 cm, each with a proportional reduction in width and thickness.*~~

~~*Runway-type FATOs*~~

~~5.2.5.6 **Recommendation.—** *The numbers of the marking should have a colour contrasting with the background and should be in the form and proportion shown in Figure 5-4.*~~

5.2.5~~6~~ Final approach and take-off area perimeter marking or markers for surface-level heliports

Note.— The objective of final approach and take-off area perimeter marking, or markers, is to provide to the pilot, where the perimeter of the FATO is not self-evident, an indication of the area that is free of obstacles and in which intended procedures, or permitted manoeuvring, may take place.

Application

5.2.5~~6~~.1 FATO perimeter marking or markers shall be provided at a surface-level heliport where the extent of ~~the~~ a FATO with a solid surface is not self-evident.

Location

5.2.5~~6~~.2 The FATO perimeter marking or markers shall be located on the edge of the FATO.

Characteristics — Runway-type FATOs

5.2.5~~6~~.3 The perimeter of the FATO shall be defined with markings or markers spaced at equal intervals of not more than 50 m with at least three markings or markers on each side including a marking or marker at each corner.

5.2.5~~6~~.4 A FATO perimeter marking shall be a rectangular stripe with a length of 9 m or one-fifth of the side of the FATO which it defines and a width of 1 m.

5.2.5~~6~~.5 FATO perimeter markings shall be white.

5.2.5~~6~~.6 A FATO perimeter marker shall have dimensional characteristics as shown in Figure 5-5.

5.2.5~~6~~.7 FATO perimeter markers shall be of colour(s) that contrast effectively against the operating background.

5.2.5~~6~~.8 **Recommendation.—** *FATO perimeter markers should be a single colour, orange or red, or two contrasting colours, orange and white or, alternatively, red and white should be used except where such colours would merge with the background.*

Characteristics — All FATOs except runway-type FATOs

5.2.5~~6~~.9 For an unpaved FATO the perimeter shall be defined with flush in-ground markers. The FATO perimeter markers shall be 30 cm in width, 1.5 m in length, and with end-to-end spacing of not less than 1.5 m and not more than 2 m. The corners of a square or rectangular FATO shall be defined.

5.2.56.10 For a paved FATO the perimeter shall be defined with a dashed line. The FATO perimeter marking segments shall be 30 cm in width, 1.5 m in length, and with end-to-end spacing of not less than 1.5 m and not more than 2 m. The corners of the square or rectangular FATO shall be defined.

5.2.56.11 FATO perimeter markings and flush in-ground markers shall be white.

. . .

5.2.67 Final approach and take-off area designation markings for runway-type FATOs

Note.— The objective of final approach and take-off area designation markings for runway-type FATOs is to provide to the pilot an indication of the magnetic heading of the runway.

Application

5.2.67.1 **Recommendation.—** *A FATO designation marking should be provided at a heliport where it is necessary to designate the FATO to the pilot.*

Location

5.2.67.2 A FATO designation marking shall be located at the beginning of the FATO as shown in Figure 5-2.

Characteristics

5.2.67.3 A FATO designation marking shall consist of a two-digit number. The two-digit number shall be the whole number nearest the one-tenth of the magnetic North when viewed from the direction of approach. When the above rule would give a single digit number, it shall be preceded by a zero. The marking as shown in Figure 5-2, shall be supplemented by the heliport identification marking.

5.2.78 Aiming point marking

Note.— The objective of the aiming point marking is to provide a visual cue indicating to the pilot the preferred approach/departure direction; the point to which the helicopter approaches to the hover before positioning to a stand where a touchdown can be made; and that the surface of the FATO is not intended for touchdown.

Application

5.2.78.1 **Recommendation.—** *An aiming point marking should be provided at a heliport where it is necessary for a pilot to make an approach to a particular point above a FATO before proceeding to a TLOF.*

Location — Runway-type FATOs

5.2.78.2 The aiming point marking shall be located within the FATO.

Location — All FATOs except runway-type FATOs

5.2.78.3 The aiming point marking shall be located at the centre of the FATO as shown in Figure 5-1.

Characteristics

5.2.78.4 The aiming point marking shall be an equilateral triangle with the bisector of one of the angles aligned with the preferred approach direction. The marking shall consist of continuous ~~white~~ lines, providing a contrast with the background colour, and the dimensions of the marking shall conform to those shown in Figure 5-6.

5.2.89 Touchdown and lift-off area perimeter marking

Note.— The objective of the touchdown and lift-off area perimeter marking is to provide to the pilot an indication of an area that is free of obstacles; has dynamic load bearing; and in which, when positioned in accordance with the TDPM, undercarriage containment is assured.

Application

5.2.89.1 A TLOF perimeter marking shall be displayed on a TLOF located in a FATO at a surface-level heliport if the perimeter of the TLOF is not self-evident.

5.2.89.2 A TLOF perimeter marking shall be displayed on an elevated heliport, a helideck and a shipboard heliport.

~~5.2.9.3 **Recommendation.** *A TLOF perimeter marking should be provided on each TLOF collocated with a helicopter stand at a surface-level heliport.*~~

Location

5.2.89.34 The TLOF perimeter marking shall be located along the edge of the TLOF.

Characteristics

5.2.89.45 A TLOF perimeter marking shall consist of a continuous white line with a width of at least 30 cm.

5.2.910 Touchdown/positioning marking

~~***Application***~~

~~5.2.10.1 A touchdown/positioning marking shall be provided where it is necessary for a helicopter to touch down and/or be accurately positioned by the pilot. A touchdown/positioning marking shall be provided on a helicopter stand designed for turning.~~

~~***Location***~~

~~5.2.10.2 A touchdown/positioning marking shall be located so that when the pilot's seat is over the marking, the whole of the undercarriage will be within the TLOF and all parts of the helicopter will be clear of any obstacle by a safe margin.~~

~~5.2.10.3 On a heliport the centre of the touchdown/positioning marking shall be located at the centre of the TLOF, except the centre of the touchdown/positioning marking may be offset away from the centre of the TLOF where an aeronautical study indicates such offsetting to be necessary and providing that a marking so offset would not adversely affect safety. For a helicopter stand designed for hover turning, the touchdown/positioning marking shall be located in the centre of the central zone. (See Figure 3-4.)~~

~~5.2.10.4 On a helideck the centre of the touchdown marking shall be located at the centre of the 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.— See the* Heliport Manual *(Doc 9261) for guidance.*~~

~~***Characteristics***~~

~~5.2.10.5 A touchdown positioning marking shall be a yellow circle and have a line width of at least 0.5 m. For a helideck or a purpose-built shipboard heliport with a D-value of 16.0 m or larger, the line width shall be at least 1 m.~~

~~5.2.10.6 The inner diameter of the touchdown/positioning marking shall be 0.5 D of the largest helicopter the TLOF and/or the helicopter stand is intended to serve.~~

Note.— The objective of a touchdown/positioning marking (TDPM) is to provide visual cues which permit a helicopter to be placed in a specific position such that, when the pilot's seat is above the marking, the undercarriage is within the load-bearing area and all parts of the helicopter will be clear of any obstacles by a safe margin.

Application

5.2.9.1 A touchdown/positioning marking shall be provided for a helicopter to touch down or be accurately placed in a specific position.

5.2.9.2 The touchdown/positioning marking shall be:

a) when there is no limitation on the direction of touchdown/positioning, a touchdown/positioning circle (TDPC) marking; and

b) when there is a limitation on the direction of touchdown/positioning:

1) for unidirectional applications, a shoulder line with an associated centreline; or

2) for multidirectional applications, a TDPC marking with prohibited landing sector(s) marked.

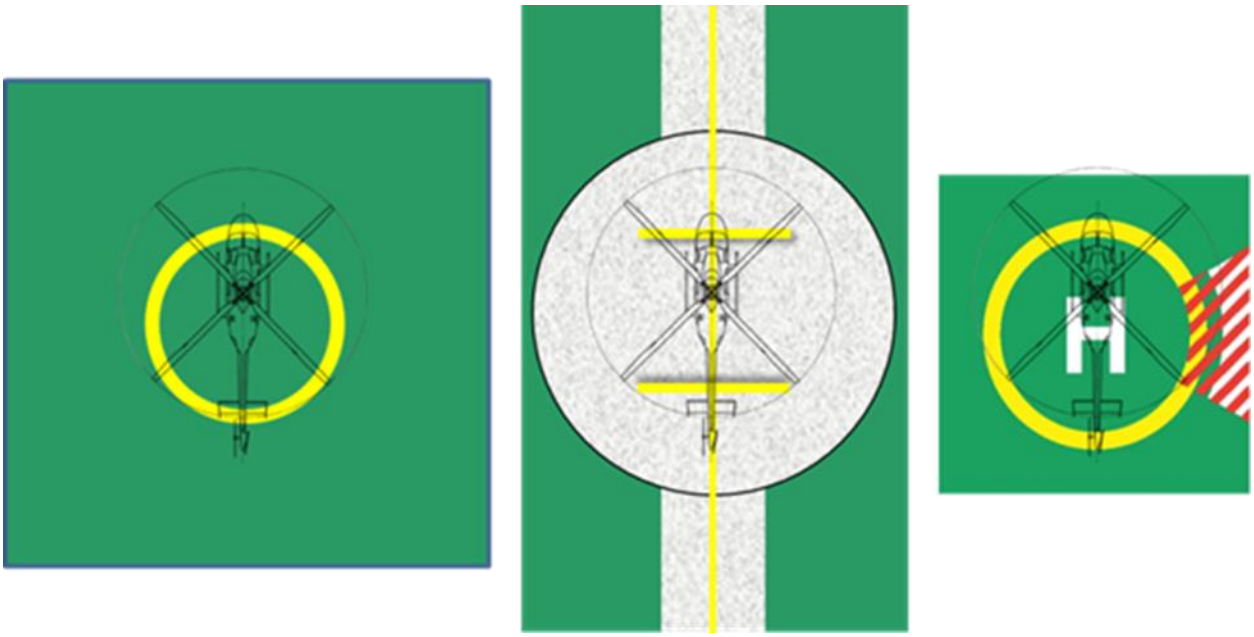


Figure 5-7. ~~Helideck prohibited landing sector marking~~(Left) multidirectional TDPC with no limitations. (Centre) unidirectional marking shoulder line with associated centreline. (Right) multidirectional TDPC with prohibited landing sector marking

Note.— The prohibited landing sector (PLS) marking, when provided, is not intended to move the helicopter away from objects around the FATO, but to ensure that the tail is not placed in an orientation that might constitute a hazard. This is achieved by having the helicopter nose clear of the hatched markings during the touchdown.

Location

5.2.9.3 The inner edge/inner circumference of the touchdown/positioning marking shall be at a distance of 0.25 D from the centre of the area in which the helicopter is to be positioned.

5.2.9.4 On a helideck, the centre of the TDPC marking shall be located at the centre of the 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 is necessary and would not impair safety.

5.2.9.5 Prohibited landing sector markings, when provided, shall be located on the touchdown/positioning marking, within the relevant headings, and extend to the inner edge of the TLOF perimeter marking**.**

Characteristics

5.2.9.6 The inner diameter of the TDPC shall be 0.5 D of the largest helicopter the area is intended to serve.

5.2.9.7 A touchdown/positioning marking shall have a line width of at least 0.5 m. For a helideck and a purpose-built shipboard heliport, the line width shall be at least 1 m.

5.2.9.8 The length of a shoulder line shall be 0.5D of the largest helicopter the area is intended to serve.

5.2.9.9 The prohibited landing sector markings, when provided, shall be indicated by white and red hatched markings as shown in Figure 5-7.

5.2.9.10 The TDPM shall take precedent when used in conjunction with other markings on the TLOF except for the prohibited landing sector marking.

5.2.10~~1~~ Heliport name marking

Note.— The objective of a heliport name marking is to provide to the pilot a means of identifying a heliport which can be seen, and read, from all directions of approach.

Application

5.2.10~~1~~.1 **Recommendation.—** *A heliport name marking should be provided at a heliport and helideck where there is insufficient alternative means of visual identification.*

Location

5.2.10~~1~~.2 **Recommendation.~~— The heliport name marking should be displayed on the heliport so as to be visible, as far as practicable, at all angles above the horizontal.~~** *Where ~~an~~a limited obstacle sector (LOS) exists on a helideck the marking should be located on ~~the obstacle~~ that side of the "heliport identification marking". For a non-purpose-built heliport located on a ship's side the marking should be located on the inboard side of the heliport identification marking in the area between the TLOF perimeter marking and the boundary of the LOS.*

Characteristics

5.2.10~~1~~.3 A heliport name marking shall consist of the name or the alphanumeric designator of the heliport as used in the radio (R/T) communications

5.2.10~~1~~.4 **Recommendation.—** *A heliport name marking intended for use at night or during conditions of poor visibility should be illuminated, either internally or externally.*

Runway-type FATOs

5.2.10~~1~~.5 **Recommendation.—** *The characters of the marking should be not less than 3 m in height.*

All FATOs except runway-type FATOs.

5.2.10~~1~~.6 **Recommendation.—** *The characters of the marking should be not less than 1.5 m in height at surface-level heliports and not less than 1.2 m on elevated heliports, helidecks and shipboard heliports. The colour of the marking should contrast with the background and preferably be white.*

5.2.11~~2~~ Helideck obstacle-free sector (chevron) marking

Note.— The objective of the helideck obstacle-free sector (chevron) marking is to indicate the direction and limits of a sector that is free of obstacles above the level of the helideck for the preferred approach and departure directions.

Application

5.2.11~~2~~.1 A helideck with adjacent obstacles that penetrate above the level of the helideck shall have an obstacle-free sector marking.

Location

5.2.11~~2~~.2 A helideck obstacle-free sector marking shall be located, where practicable, at a distance from the centre of the TLOF equal to the radius of the largest circle that can be drawn in the TLOF or 0.5 D, whichever is greater.

Note.— Where the Point of Origin is outside the TLOF, and it is not practicable to physically paint the chevron, the chevron is relocated to the TLOF perimeter on the bisector of the OFS. In this case, the distance and direction of displacement, along with the attention getting "WARNING DISPLACED CHEVRON", with the distance and direction of displacement, is marked in a box beneath the chevron in black characters not less than 10 cm high — an example Figure is given in the Heliport Manual *(Doc 9261).*

Characteristics

5.2.11~~2~~.3 The helideck obstacle-free sector marking shall indicate the location of the obstacle-free sector and the directions of the limits of the sector.

Note.— Example figures are given in the Heliport Manual *(Doc 9261)*.

5.2.11~~2~~.4 The height of the chevron shall not be less than 30 cm.

5.2.11~~2~~.5 The chevron shall be marked in a conspicuous colour.

5.2.11~~2~~.6 **Recommendation.—** *The colour of the chevron should be black.*

5.2.12~~3~~ Helideck and shipboard heliport surface marking

Note.— The objective of the helideck and shipboard heliport surface marking is to provide, by colour and conspicuity, the location of the TLOF on a helideck or shipboard heliport.

Application

5.2.12~~3~~.1 **Recommendation.—** *A surface marking should be provided to assist the pilot to identify the location of the helideck or shipboard heliport during an approach by day.*

Location

5.2.123.2 **Recommendation.—** *A surface marking should be applied to the dynamic load bearing area bounded by the TLOF perimeter marking.*

Characteristics

5.2.123.3 **Recommendation.—** *The helideck or shipboard heliport surface bounded by the TLOF perimeter marking should be of dark green using a high friction coating.*

Note.— Where the application of a surface coating may have a degrading effect on friction qualities the surface might not be painted. In such cases the best operating practice to enhance the conspicuity of markings is to outline deck markings with a contrasting colour.

~~**5.2.14 Helideck prohibited landing sector markings**~~

~~***Application***~~

~~5.2.14.1 **Recommendation.** *Helideck prohibited landing sector markings should be provided where it is necessary to prevent the helicopter from landing within specified headings.*~~

~~***Location***~~

~~5.2.14.2 The prohibited landing sector markings shall be located on the touchdown/positioning marking to the edge of the TLOF, within the relevant headings.~~

~~***Characteristics***~~

~~5.2.14.3 The prohibited landing sector markings shall be indicated by white and red hatched markings as shown in Figure 5-7.~~

~~*Note.— Prohibited landing sector markings, where deemed necessary, are applied to indicate a range of helicopter headings that are not to be used by a helicopter when landing. This is to ensure that the nose of the helicopter is kept clear of the hatched markings during the manoeuvre to land.*~~

5.2.135 Helicopter ~~ground~~ taxiway markings and markers

Note 1.— The objective of helicopter taxiway markings and markers is, without being a hazard to the helicopter, to provide to the pilot by day and, if necessary, by night, visual cues to guide movement along the taxiway.

Note ~~1~~2.— The specifications for taxi-holding position markings in Annex 14, Volume I, 5.2.10 are equally applicable to taxiways intended for ground taxiing of helicopters.

Note ~~2~~3.— Ground taxi-routes and air taxi-routes over a taxiway are not required to be marked.

Note 4.— Unless otherwise indicated it may be assumed that a helicopter taxiway is suitable for both ground taxiing and air taxiing of helicopters.

Note 5.— Signage may be required on an aerodrome where it is necessary to indicate that a helicopter taxiway is suitable only for the use of helicopters.

~~**Figure 5-7. Helideck prohibited landing sector marking**~~

Application

5.2.13.1 The centre line of a helicopter taxiway shall be identified with a marking.

5.2.13.2~~5.1~~ **Recommendation.**— ~~*The centre line of a helicopter ground taxiway should be identified with a marking, and t*~~*The edges of a helicopter* ~~*ground*~~ *taxiway, if not self-evident, should be identified with markers or markings.*

Location

5.2.13.3~~5.2~~ Helicopter ~~ground~~ taxiway markings shall be along the centre line and, if required, along the edges of a helicopter ~~ground~~ taxiway.

5.2.13.4~~5.3~~ Helicopter ~~ground~~ taxiway edge markers shall be located at a distance of ~~0.5~~ 1 m to 3 m beyond the edge of the helicopter ~~ground~~ taxiway.

5.2.13.5~~5.4~~ Helicopter ~~ground~~ taxiway edge markers~~, where provided,~~ shall be spaced at intervals of not more than 15 m on each side of straight sections and 7.5 m on each side of curved sections with a minimum of four equally spaced markers per section.

Characteristics

5.2.13.6~~5.5~~ On a paved taxiway, ~~A~~a helicopter ~~ground~~ taxiway centre line marking shall be a continuous yellow line 15 cm in width.

5.2.13.7 On an unpaved taxiway that will not accommodate painted markings, a helicopter taxiway centre line shall be marked with flush in-ground 15 cm wide and approximately 1.5 m in length yellow markers, spaced at intervals of not more than 30 m on straight sections and not more than 15 m on curves, with a minimum of four equally spaced markers per section.

5.2.13.8~~5.6~~ Helicopter ~~ground~~ taxiway edge markings shall be a continuous double yellow line, each 15 cm in width, and spaced 15 cm apart (nearest edge to nearest edge).

~~*Note.— Signage may be required on an aerodrome where it is necessary to indicate that a helicopter ground taxiway is suitable only for the use of helicopters.*~~

5.2.13.9~~5.7~~ A helicopter ~~ground~~ taxiway edge marker shall be frangible to the wheeled undercarriage of a helicopter.

5.2.13.10~~5.8~~ A helicopter ~~ground~~ taxiway edge marker shall not exceed a plane originating at a height of 25 cm above the plane of the helicopter ~~ground~~ taxiway, at a distance of 0.5 m from the edge of

the helicopter ~~ground~~ taxiway and sloping upwards and outwards at a gradient of 5 per cent to a distance of 3 m beyond the edge of the helicopter ~~ground~~ taxiway.

5.2.13.11~~5.9~~ A helicopter ~~ground~~ taxiway edge marker shall be blue.

Note 1.— Guidance on suitable edge markers is given in the Heliport Manual *(Doc 9261).*

Note 2.— If blue markers are used on an aerodrome, signage may be required to indicate that the helicopter ~~ground~~ taxiway is suitable only for helicopters.

5.2.13.12~~5.10~~ If the helicopter ~~ground~~ taxiway is to be used at night, the edge markers, shall be internally illuminated or retro-reflective.

5.2.14~~6~~ Helicopter air taxi-route markings and markers

Note.— The objective of helicopter air taxi-route markings and markers is to provide to the pilot by day and, if necessary, by night, visual cues to guide movement along the air taxi-route.

~~*Note.— Air taxi-routes are not required to be marked.*~~

Application

5.2.14~~6~~.1 **~~Recommendation.~~** ~~—~~The centre line of a helicopter air taxi-route ~~way or, if not self-evident, the edges of a helicopter air taxiway should be identified~~ shall be identified with markers or markings.

Location

5.2.14~~6~~.2 A helicopter air ~~taxiway~~ taxi-route centre line marking or flush in-ground centre line marker shall be located along the centre line of the helicopter air taxiway.

~~5.2.16.3 Helicopter air taxiway edge markings shall be located along the edges of a helicopter air taxiway.~~

~~5.2.16.4 Helicopter air taxiway edge markers shall be located at a distance of 1 m to 3 m beyond the edge of the helicopter air taxiway.~~

~~5.2.16.5 **Recommendation.** *Helicopter air taxiway edge markers should not be located at a distance of less than 0.5 times the largest overall width of the helicopter for which it is designed from the centre line of the helicopter air taxiway.*~~

Characteristics

5.2.14.3~~6.6~~ A helicopter air ~~taxiway~~ taxi-route centre line, when on a paved surface, shall be marked with a continuous yellow line 15 cm in width.

~~5.2.16.7 The edges of a helicopter air taxiway, when on a paved surface, shall be marked with continuous double yellow lines each 15 cm in width, and spaced 15 cm apart (nearest edge to nearest edge).~~

~~*Note.— Where there is potential for a helicopter air taxiway to be confused with a helicopter ground taxiway, signage may be required to indicate the mode of taxi operations that are permitted.*~~

5.2.14.4~~6.8~~ A helicopter air ~~taxiway~~ taxi-route centre line, when on an unpaved surface that will not accommodate painted markings, shall be marked with flush in-ground 15 cm wide and approximately 1.5 m in length yellow markers, spaced at intervals of not more than 30 m on straight sections and not more than 15 m on curves, with a minimum of four equally spaced markers per section.

~~5.2.16.9 Helicopter air taxiway edge markers, where provided, shall be spaced at intervals of not more than 30 m on each side of straight sections and not more than 15 m on each side of curves, with a minimum of four equally spaced markers per section.~~

~~5.2.16.10 Helicopter air taxiway edge markers shall be frangible.~~

~~5.2.16.11 Helicopter air taxiway edge markers shall not penetrate a plane originating at a height of 25 cm above the plane of the helicopter air taxiway, at a distance of 1 m from the edge of the helicopter air taxiway and sloping upwards and outwards at a gradient of 5 per cent to a distance of 3 m beyond the edge of the helicopter air taxiway.~~

~~5.2.16.12 **Recommendation.** *Helicopter air taxiway edge markers should not penetrate a plane originating at a height of 25 cm above the plane of the helicopter air taxiway, at a distance of 0.5 times the largest overall width of the helicopter for which it is designed from the centre line of the helicopter air taxiway, and sloping upwards and outwards at a gradient of 5 per cent.*~~

~~5.2.16.13 A helicopter air taxiway edge marker shall be of colour(s) that contrast effectively against the operating background. The colour red shall not be used for markers.~~

~~*Note. Guidance for suitable edge markers is given in the* Heliport Manual *(Doc 9261).*~~

5.2.14.5~~6.14~~ If the helicopter air ~~taxiway~~ taxi-route is to be used at night, ~~helicopter air taxiway edge~~ markers shall be either internally illuminated or retro-reflective.

5.2.15~~7~~ Helicopter stand markings

Note.— The objective of the helicopter stand markings is to provide to the pilot a visual indication of an area that is free of obstacles and in which permitted manoeuvring, and all necessary ground functions, may take place; identification, mass and D-value limitations, when required; and, guidance for manoeuvring and positioning of the helicopter within the stand.

Application

5.2.157.1 A helicopter stand perimeter marking shall be provided ~~on a helicopter stand designed for turning. If a helicopter stand perimeter marking is not practicable, a central zone perimeter marking shall be provided instead if the perimeter of the central zone is not self-evident~~.

5.2.157.2 ~~For a helicopter stand intended to be used for taxi-through and which does not allow the helicopter to turn, a stop line(s) shall be provided.~~A helicopter stand shall be provided with the appropriate TDPM. See Figure 5-7 in section 5.2.9.

5.2.157.3 **Recommendation.—** *Alignment lines and lead-in/lead-out lines should be provided on a helicopter stand.*

Note 1.— See Figures ~~5-8.~~ 3.5 to 3.9 of Chapter 3.

Note 2.— Helicopter stand identification markings may be provided where there is a need to identify individual stands.

Note 3.— Additional markings relating to stand size may be provided. See the Heliport Manual *(Doc 9261).*

Location

5.2.157.4 The TDPM, alignment lines and lead-in/lead-out lines ~~A helicopter stand perimeter marking on a helicopter stand designed for turning or, a central zone perimeter marking, shall be concentric~~ shall be located such that every part of the helicopter can be contained within the helicopter stand during positioning and permitted manoeuvring ~~with the central zone of the stand~~.

~~5.2.17.5 For a helicopter stand intended to be used for taxi-through and which does not allow the helicopter to turn, a stop line shall be located on the helicopter ground taxiway axis at right angles to the centre line.~~

5.2.15.5~~7.6~~ Alignment lines and lead-in/lead-out lines shall be located as shown in Figures 5-8.

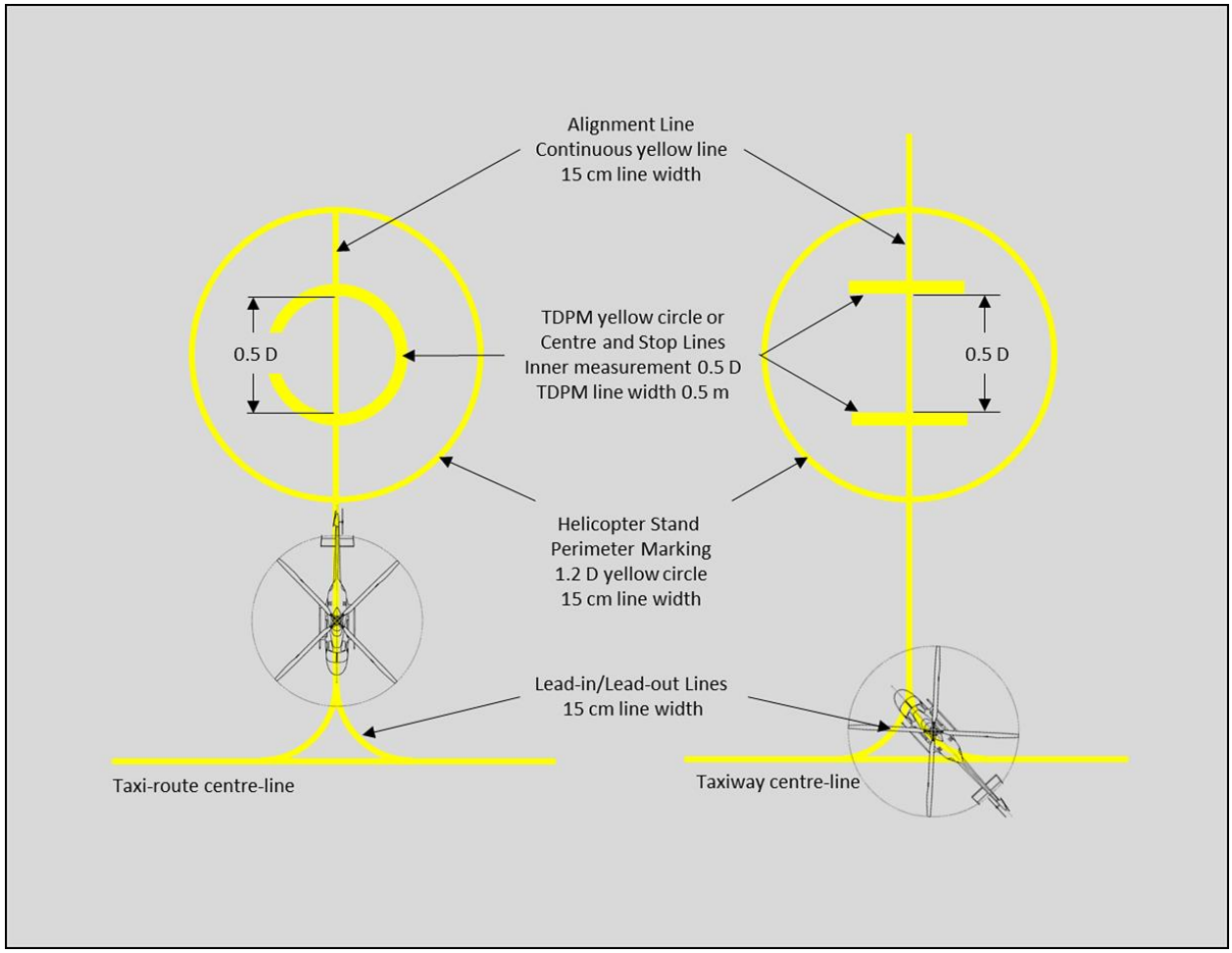


Figure 5-8. Helicopter stand markings

Characteristics

5.2.15.6~~7.7~~ A helicopter stand perimeter marking shall ~~be a~~ consist of a continuous yellow ~~circle~~ line and have a line width of 15 cm.

5.2.15.7~~7.8 A central zone perimeter marking shall be a yellow circle and have a line width of 15 cm, except when the TLOF is collocated with a helicopter stand, the characteristics of the TLOF perimeter markings shall apply.~~ The TDPM shall have the characteristics described in Section 5.2.9 above.

~~5.2.17.9 For a helicopter stand intended to be used for taxi-through and which does not allow the helicopter to turn, a yellow stop line shall not be less than the width of the helicopter ground taxiway and have a line thickness of 50 cm.~~

5.2.15.8~~7.10~~ Alignment lines and lead-in/lead-out lines shall be continuous yellow lines and have a width of 15 cm.

5.2.15.9~~7.11~~ Curved portions of alignment lines and lead-in/lead-out lines shall have radii appropriate to the most demanding helicopter type the helicopter stand is intended to serve.

5.2.15.107~~.12~~ Stand identification markings shall be marked in a contrasting colour so as to be easily readable.

Note 1.— Where it is intended that helicopters proceed in one direction only, arrows indicating the direction to be followed may be added as part of the alignment lines.

Note 2.— The characteristics of markings related to the stand size and alignment and lead-in/lead-out lines are illustrated in Figure 5-8. – examples of stands and their markings can be seen in Figures 3.5 to 3.9 of Chapter 3.

5.2.168 Flight path alignment guidance marking

Note.— The objective of a flight path alignment guidance marking is to provide the pilot with a visual indication of the available approach and/or departure path direction(s)

Application

5.2.168.1 **Recommendation.—** *Flight path alignment guidance marking(s) should be provided at a heliport where it is desirable and practicable to indicate available approach and/or departure path direction(s).*

Note.— The flight path alignment guidance marking can be combined with a flight path alignment guidance lighting system described in 5.3.4.

Location

5.2.168.2 The flight path alignment guidance marking shall be located in a straight line along the direction of approach and/or departure path on one or more of the TLOF, FATO, safety area or any suitable surface in the immediate vicinity of the FATO or safety area.

Characteristics

5.2.168.3 A flight path alignment guidance marking shall consist of one or more arrows marked on the TLOF, FATO and/or safety area surface as shown in Figure 5-9. The stroke of the arrow(s) shall be 50 cm in width and at least 3 m in length. When combined with a flight path alignment guidance lighting system it shall take the form shown in Figure 5-9 which includes the scheme for marking "heads of the arrows" which are constant regardless of stroke length.

Note.— In the case of a flight path limited to a single approach direction or single departure direction, the arrow marking may be unidirectional. In the case of a heliport with only a single approach/departure path available, one bidirectional arrow is marked.

5.2.168.4 **Recommendation.—** *The markings should be in a colour which provides good contrast against the background colour of the surface on which they are marked, preferably white.*

. . .

5.3 Lights

5.3.1 General

Note 1.— See Annex 14, Volume I, 5.3.1, concerning specifications on screening of non-aeronautical ground lights, and design of elevated and inset lights.

Note 2.— In the case of helidecks and heliports located near navigable waters, consideration needs to be given to ensuring that aeronautical ground lights do not cause confusion to mariners.

Note 3.— As helicopters will generally come very close to extraneous light sources, it is particularly important to ensure that, unless such lights are navigation lights exhibited in accordance with international regulations, they are screened or located so as to avoid direct and reflected glare.

Note 4.— ~~Specifications~~ Systems addressed in sections 5.3.4, 5.3.6, 5.3.7, and 5.3.8 are designed to provide effective lighting ~~systems~~ cues based on night conditions. Where lights are to be used in conditions other than night (i.e. day or twilight) it may be necessary to increase the intensity of the lighting to maintain effective visual cues by use of a suitable brilliancy control. Guidance is provided in the Aerodrome Design Manual *(Doc 9157), Part 4 —* Visual Aids.

Note 5.— The specifications for marking and lighting of obstacles included in Annex 14, Volume I, Chapter 6, are equally applicable to heliports and winching areas.

Note 6.— In cases where operations into a heliport are to be conducted at night with Night Vision Imaging Systems (NVIS), it is important to establish the compatibility of the NVIS system with all heliport lighting through an assessment by the helicopter operator prior to use.

Editorial Note.— Extract Illustration 4 – HAPI system from Figure 5-11. Isocandela diagrams and *insert* it into the *Heliport Manual* (Doc 9261) and renumber subsequent illustrations.

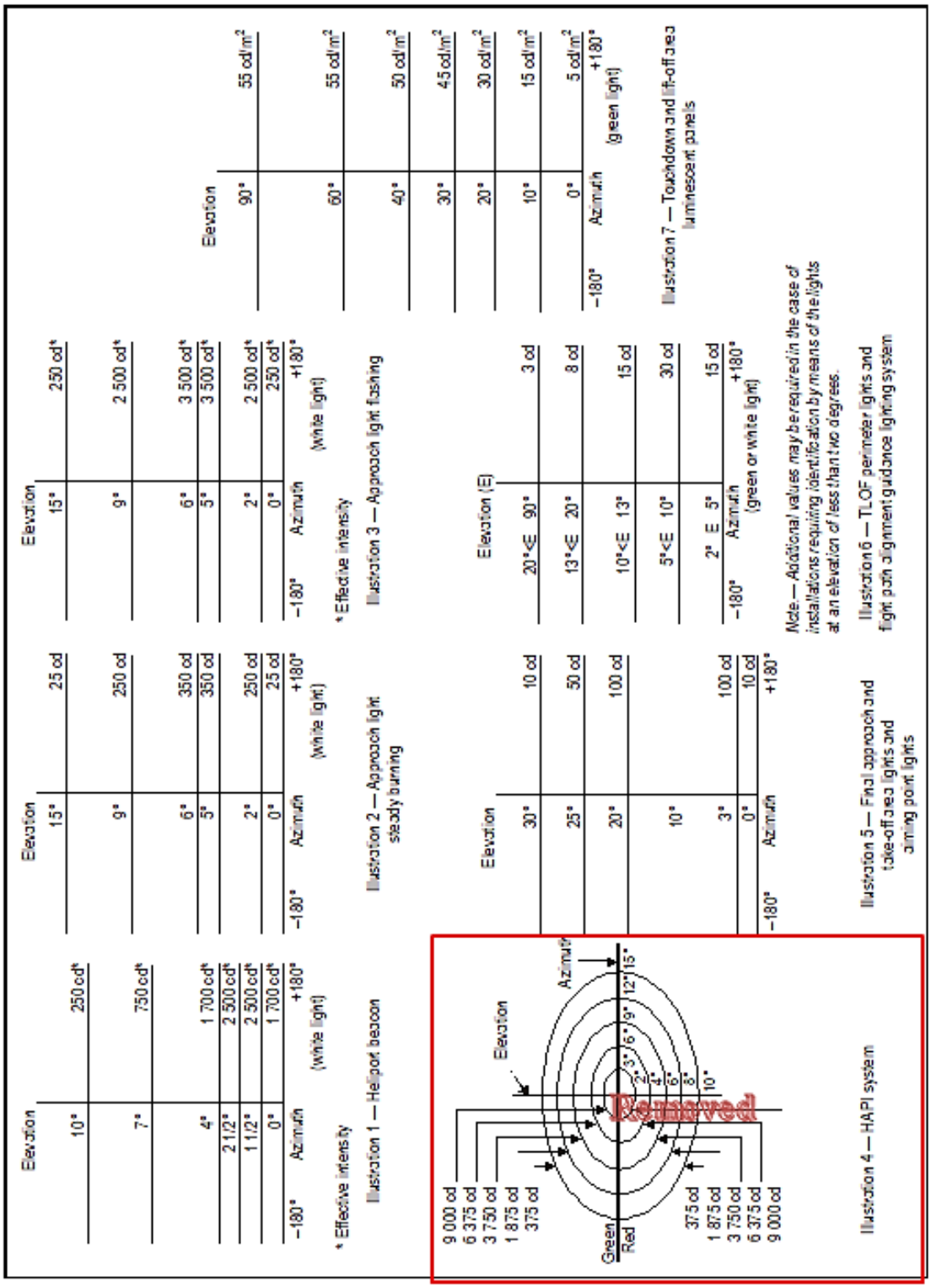


Figure 5-11. Isocandela diagrams

. . .

5.3.5 Visual alignment guidance system

Note.— The objective of a visual alignment guidance system is to provide conspicuous and discrete cues to assist the pilot to attain, and maintain, a specified approach track to a heliport. Guidance on suitable visual alignment guidance systems is given in the Heliport Manual *(Doc 9261).*

Application

5.3.5.1 **Recommendation.**— *A visual alignment guidance system should be provided to serve the approach to a heliport where one or more of the following conditions exist especially at night:*

a) obstacle clearance, noise abatement or traffic control procedures require a particular direction to be flown;

b) the environment of the heliport provides few visual surface cues; and

c) it is physically impracticable to install an approach lighting system.

~~***Location***~~

~~5.3.5.2 The visual alignment guidance system shall be located such that a helicopter is guided along the prescribed track towards the FATO.~~

~~5.3.5.3 **Recommendation.** — *The system should be located at the downwind edge of the FATO and aligned along the preferred approach direction.*~~

~~5.3.5.4 The light units shall be frangible and mounted as low as possible.~~

~~5.3.5.5 Where the lights of the system need to be seen as discrete sources, light units shall be located such that at the extremes of system coverage the angle subtended between units as seen by the pilot shall not be less than 3 minutes of arc.~~

~~5.3.5.6 The angles subtended between light units of the system and other units of comparable or greater intensities shall also be not less than 3 minutes of arc.~~

~~*Note. — Requirements of 5.3.5.5 and 5.3.5.6 can be met for lights on a line normal to the line of sight if the light units are separated by 1 m for every kilometre of viewing range.*~~

~~***Signal format***~~

~~5.3.5.7 The signal format of the alignment guidance system shall include a minimum of three discrete signal sectors providing "offset to the right", "on track" and "offset to the left" signals.~~

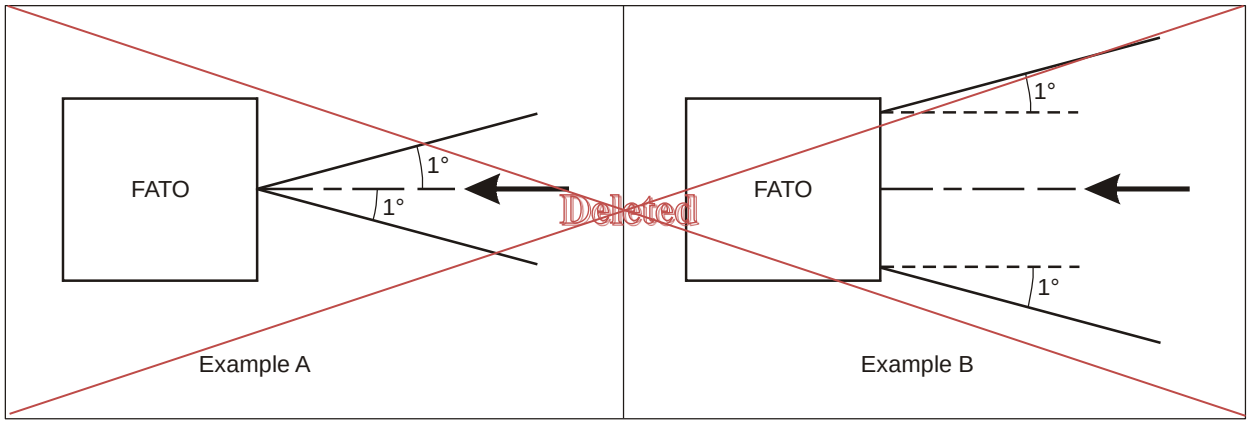
~~5.3.5.8 The divergence of the "on track" sector of the system shall be as shown in Figure 5-13.~~

~~5.3.5.9 The signal format shall be such that there is no possibility of confusion between the system and any associated visual approach slope indicator or other visual aids.~~

~~5.3.5.10 The system shall avoid the use of the same coding as any associated visual approach slope indicator.~~

~~5.3.5.11 The signal format shall be such that the system is unique and conspicuous in all operational environments.~~

~~5.3.5.12 The system shall not significantly increase the pilot workload.~~



~~Figure 5-13. Divergence of the "on track" sector~~

~~Light distribution~~

~~5.3.5.13 The usable coverage of the visual alignment guidance system shall be equal to or better than that of the visual approach slope indicator system with which it is associated.~~

~~5.3.5.14 A suitable intensity control shall be provided so as to allow adjustment to meet the prevailing conditions and to avoid dazzling the pilot during approach and landing.~~

~~Approach track and azimuth setting~~

~~5.3.5.15 A visual alignment guidance system shall be capable of adjustment in azimuth to within ±5 minutes of arc of the desired approach path.~~

~~5.3.5.16 The angle of the azimuth guidance system shall be such that during an approach the pilot of a helicopter at the boundary of the "on track" signal will clear all objects in the approach area by a safe margin.~~

~~5.3.5.17 The characteristics of the obstacle protection surface specified in 5.3.6.23, Table 5-1 and Figure 5-14 shall equally apply to the system.~~

~~Characteristics of the visual alignment guidance system~~

~~5.3.5.18 In the event of the failure of any component affecting the signal format the system shall be automatically switched off.~~

~~5.3.5.19 The light units shall be so designed that deposits of condensation, ice, dirt, etc., on optically transmitting or reflecting surfaces will interfere to the least possible extent with the light signal and will not cause spurious or false signals to be generated.~~

Table 5-1. Dimensions and slopes of the obstacle protection surface

SURFACE AND DIMENSIONS	FATO	
Length of inner edge	Width of safety area	
Distance from end of FATO	3 m minimum	
Divergence	10%	
Total length	2 500 m	
Slope	PAPI	A[a] — 0.57°
	HAPI	A[b] — 0.65°
	APAPI	A[a] — 0.9°

a. As indicated in Annex 14, Volume I, Figure 5-19.
b. The angle of the upper boundary of the "below slope" signal.

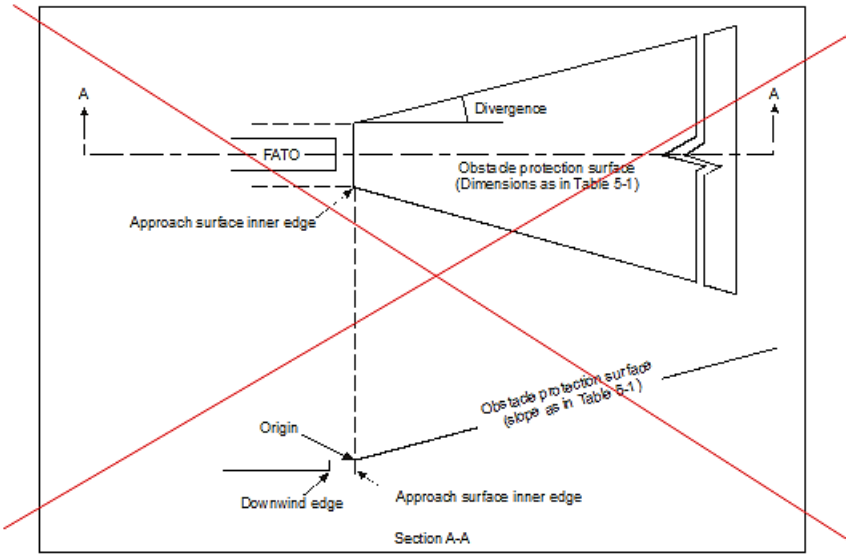


Figure 5-14. Obstacle protection surface for visual approach slope indicator systems

5.3.6 Visual approach slope indicator

Note.— The objective of a visual approach slope indicator is to provide conspicuous and discrete colour cues within a specified elevation and azimuth, to assist the pilot to attain and maintain the approach slope to a desired position within a FATO. Guidance on suitable visual approach slope indicators is given in the Heliport Manual *(Doc 9261).*

Application

5.3.6.1 **Recommendation.—** *A visual approach slope indicator should be provided to serve the approach to a heliport, whether or not the heliport is served by other visual approach aids or by non-visual aids, where one or more of the following conditions exist especially at night:*

a) obstacle clearance, noise abatement or traffic control procedures require a particular slope to be flown;

b) the environment of the heliport provides few visual surface cues; and

c) the characteristics of the helicopter require a stabilized approach.

~~5.3.6.2 The standard visual approach slope indicator systems for helicopter operations shall consist of the following:~~

~~a) PAPI and APAPI systems conforming to the specifications contained in Annex 14, Volume I, 5.3.5.23 to 5.3.5.40 inclusive, except that the angular size of the on-slope sector of the systems shall be increased to 45 minutes; or~~

~~b) helicopter approach path indicator (HAPI) system conforming to the specifications in 5.3.6.6 to 5.3.6.21 inclusive.~~

~~***Location***~~

~~5.3.6.3 A visual approach slope indicator shall be located such that a helicopter is guided to the desired position within the FATO and so as to avoid dazzling the pilot during final approach and landing.~~

~~5.3.6.4 **Recommendation.** *A visual approach slope indicator should be located adjacent to the nominal aiming point and aligned in azimuth with the preferred approach direction.*~~

~~5.3.6.5 The light unit(s) shall be frangible and mounted as low as possible.~~

~~***HAPI signal format***~~

~~5.3.6.6 The signal format of the HAPI shall include four discrete signal sectors, providing an "above slope", an "on slope", a "slightly below" and a "below slope" signal.~~

~~5.3.6.7 The signal format of the HAPI shall be as shown in Figure 5-15, Illustrations A and B.~~

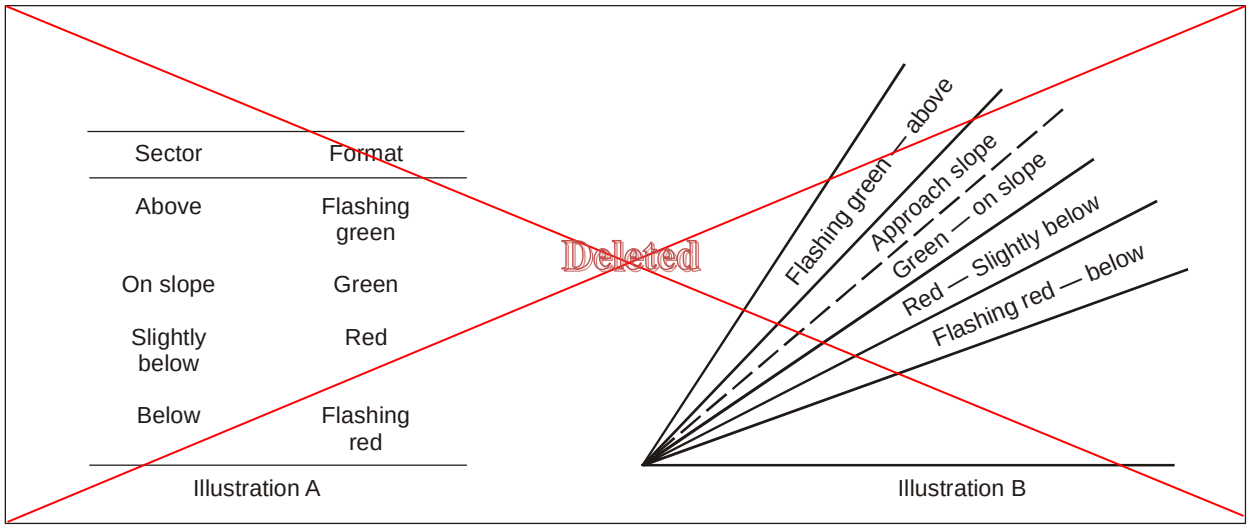
~~*Note. — Care is required in the design of the unit to minimize spurious signals between the signal sectors and at the azimuth coverage limits.*~~

~~5.3.6.8 The signal repetition rate of the flashing sector of the HAPI shall be at least 2 Hz.~~

~~5.3.6.9 **Recommendation.** *The on-to-off ratio of pulsing signals of the HAPI should be 1 to 1, and the modulation depth should be at least 80 per cent.*~~

~~5.3.6.10 The angular size of the "on-slope" sector of the HAPI shall be 45 minutes.~~

~~5.3.6.11 The angular size of the "slightly below" sector of the HAPI shall be 15 minutes.~~



~~Figure 5-15. HAPI signal format~~

~~Light distribution~~

~~5.3.6.12 **Recommendation.** — *The light intensity distribution of the HAPI in red and green colours should be as shown in Figure 5-11, Illustration 4.*~~

~~*Note. — A larger azimuth coverage can be obtained by installing the HAPI system on a turntable.*~~

~~5.3.6.13 Colour transition of the HAPI in the vertical plane shall be such as to appear to an observer at a distance of not less than 300 m to occur within a vertical angle of not more than three minutes.~~

~~5.3.6.14 The transmission factor of a red or green filter shall be not less than 15 per cent at the maximum intensity setting.~~

~~5.3.6.15 At full intensity the red light of the HAPI shall have a Y-coordinate not exceeding 0.320, and the green light shall be within the boundaries specified in Annex 14, Volume I, Appendix 1, 2.1.3.~~

~~5.3.6.16 A suitable intensity control shall be provided so as to allow adjustment to meet the prevailing conditions and to avoid dazzling the pilot during approach and landing.~~

~~Approach slope and elevation setting~~

~~5.3.6.17 A HAPI system shall be capable of adjustment in elevation at any desired angle between 1 degree and 12 degrees above the horizontal with an accuracy of ±5 minutes of arc.~~

~~5.3.6.18 The angle of elevation setting of HAPI shall be such that during an approach, the pilot of a helicopter observing the upper boundary of the "below slope" signal will clear all objects in the approach area by a safe margin.~~

~~Characteristics of the light unit~~

5.3.6.19 The system shall be so designed that:

a) in the event the vertical misalignment of a unit exceeds ±0.5 degrees (±30 minutes), the system will switch off automatically; and

b) if the flashing mechanism fails, no light will be emitted in the failed flashing sector(s).

5.3.6.20 The light unit of the HAPI shall be so designed that deposits of condensation, ice, dirt, etc., on optically transmitting or reflecting surfaces will interfere to the least possible extent with the light signal and will not cause spurious or false signals to be generated.

5.3.6.21 **Recommendation.** — *A HAPI system intended for installation on a floating helideck should afford a stabilization of the beam to an accuracy of ± 1/4 degree within ± 3-degree pitch and roll movement of the heliport.*

Obstacle protection surface

Note.— The following specifications apply to PAPI, APAPI and HAPI.

5.3.6.22 An obstacle protection surface shall be established when it is intended to provide a visual approach slope indicator system.

5.3.6.23 The characteristics of the obstacle protection surface, i.e. origin, divergence, length and slope, shall correspond to those specified in the relevant column of Table 5-1 and in Figure 5-14.

5.3.6.24 New objects or extensions of existing objects shall not be permitted above an obstacle protection surface except when, in the opinion of the appropriate authority, the new object or extension would be shielded by an existing immovable object.

Note.— Circumstances in which the shielding principle may reasonably be applied are described in the Airport Services Manual, *Part 6 (Doc 9137).*

5.3.6.25 Existing objects above an obstacle protection surface shall be removed except when, in the opinion of the appropriate authority, the object is shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety of operations of helicopters.

5.3.6.26 Where an aeronautical study indicates that an existing object extending above an obstacle protection surface could adversely affect the safety of operations of helicopters, one or more of the following measures shall be taken:

a) suitably raise the approach slope of the system;

b) reduce the azimuth spread of the system so that the object is outside the confines of the beam;

c) displace the axis of the system and its associated obstacle protection surface by no more than 5 degrees;

d) suitably displace the FATO; and

e) install a visual alignment guidance system specified in 5.3.5.

Note.— Guidance on this issue is contained in the Heliport Manual (*Doc 9261*).

5.3.7 Final approach and take-off area lighting systems for onshore surface-level heliports

Note.— The objective of a final approach and take-off area lighting system for onshore surface-level heliports is to provide to the pilot operating at night an indication of the shape, location and extent of the FATO.

Application

5.3.7.1 Where a FATO with a solid surface is established at a surface-level heliport ~~on ground~~ intended for use at night, FATO lights shall be provided except that they may be omitted where the FATO and the TLOF are nearly coincidental or the extent of the FATO is self-evident.

Location

5.3.7.2 FATO lights shall be placed along the edges of the FATO. The lights shall be uniformly spaced as follows:

a) for an area in the form of a square or rectangle, at intervals of not more than 50 m with a minimum of four lights on each side including a light at each corner; and

b) for any other shaped area, including a circular area, at intervals of not more than 5 m with a minimum of ten lights.

Characteristics

5.3.7.3 FATO lights shall be fixed omnidirectional lights showing white. Where the intensity of the lights is to be varied the lights shall show variable white.

5.3.7.4 **Recommendation.—** *The light distribution of FATO lights should be as shown in Figure 5-11, Illustration ~~4~~5.*

5.3.7.5 **Recommendation.—** *The lights should not exceed a height of 25 cm and should be inset when a light extending above the surface would endanger helicopter operations. Where a FATO is not meant for lift-off or touchdown, the lights should not exceed a height of 25 cm above ground or snow level.*

5.3.8 Aiming point lights

Note.— The objective of aiming point lights is to provide a visual cue indicating to the pilot by night the preferred approach/departure direction; the point to which the helicopter approaches to a hover before positioning to a TLOF, where a touchdown can be made; and that the surface of the FATO is not intended for touchdown.

Application

5.3.8.1 **Recommendation.—** *Where an aiming point marking is provided at a heliport intended for use at night, aiming point lights should be provided.*

Location

5.3.8.2 Aiming point lights shall be collocated with the aiming point marking.

Characteristics

5.3.8.3 Aiming point lights shall form a pattern of at least six omnidirectional white lights as shown in Figure 5-6. The lights shall be inset when a light extending above the surface could endanger helicopter operations.

5.3.8.4 **Recommendation.—** *The light distribution of aiming point lights should be as shown in Figure 5-11, Illustration ~~45~~.*

5.3.9 Touchdown and lift-off area lighting system

Note.— The objective of a touchdown and lift-off area lighting system is to provide illumination of the TLOF and required elements within. For a TLOF located in a FATO, the objective is to provide discernibility, to the pilot on a final approach, of the TLOF and required elements within; while for a TLOF located on an elevated heliport, shipboard heliport or helideck, the objective is visual acquisition from a defined range and to provide sufficient shape cues to permit an appropriate approach angle to be established.

Application

5.3.9.1 A TLOF lighting system shall be provided at a heliport intended for use at night.

Note.— Where a TLOF is located in a stand, the objective may be met with the use of ambient lighting or stand floodlighting.

5.3.9.2 ~~The TLOF lighting system f~~For a surface-level heliport, lighting for the TLOF in a FATO shall consist of one or more of the following:

a) perimeter lights; ~~or~~

b) floodlighting; ~~or~~

c) arrays of segmented point source lighting (ASPSL) or luminescent panel (LP) lighting to identify the TLOF when a) and b) are not practicable and FATO lights are available.

5.3.9.3 ~~The TLOF lighting system f~~For an elevated heliport, shipboard heliport or helideck, lighting of the TLOF in a FATO shall consist of:

a) perimeter lights; and

b) ASPSL and/or LPs to identify the ~~touchdown marking~~ TDPM ~~where it is provided~~ and/or floodlighting to illuminate the TLOF.

Note.— At elevated heliports, shipboard heliports and helidecks, surface texture cues within the TLOF are essential for helicopter positioning during the final approach and landing. Such cues can be provided using various forms of lighting (ASPSL, LP, floodlights or a combination of these lights, etc.) in addition to perimeter lights. Best results have been demonstrated by the combination of perimeter lights and ASPSL in the form of encapsulated strips of light emitting diodes (LEDs) and inset lights to identify the ~~touchdown~~ TDPM and heliport identification markings.

5.3.9.4 **Recommendation.—** *TLOF ASPSL and/or LPs to identify the ~~touchdown marking~~ TDPM and/ or floodlighting should be provided at a surface-level heliport intended for use at night when enhanced surface texture cues are required.*

Location

5.3.9.5 TLOF perimeter lights shall be placed along the edge of the area designated for use as the TLOF or within a distance of 1.5 m from the edge. Where the TLOF is a circle the lights shall be:

a) located on straight lines in a pattern which will provide information to pilots on drift displacement; and

b) where a) is not practicable, evenly spaced around the perimeter of the TLOF at the appropriate interval, except that over a sector of 45 degrees the lights shall be spaced at half spacing.

5.3.9.6 TLOF perimeter lights shall be uniformly spaced at intervals of not more than 3 m for elevated heliports and helidecks and not more than 5 m for surface-level heliports. There shall be a minimum number of four lights on each side including a light at each corner. For a circular TLOF, where lights are installed in accordance with 5.3.9.5 b) there shall be a minimum of fourteen lights.

Note.— Guidance on this issue is contained in the Heliport Manual *(Doc 9261).*

5.3.9.7 The TLOF perimeter lights shall be installed at an elevated heliport or fixed helideck such that the pattern cannot be seen by the pilot from below the elevation of the TLOF.

5.3.9.8 The TLOF perimeter lights shall be installed ~~at~~on a ~~floating~~moving helideck or shipboard heliport, such that the pattern cannot be seen by the pilot from below the elevation of the TLOF when the helideck or shipboard heliport is level.

5.3.9.9 On surface-level heliports, ASPSL or LPs, if provided to identify the TLOF, shall be placed along the marking designating the edge of the TLOF. Where the TLOF is a circle, they shall be located on straight lines circumscribing the area.

5.3.9.10 On surface-level heliports the minimum number of LPs on a TLOF shall be nine. The total length of LPs in a pattern shall not be less than 50 per cent of the length of the pattern. There shall be an odd number with a minimum number of three panels on each side of the TLOF including a panel at each corner. LPs shall be uniformly spaced with a distance between adjacent panel ends of not more than 5 m on each side of the TLOF.

5.3.9.11 **Recommendation.—** *When LPs are used on an elevated heliport or helideck to enhance surface texture cues, the panels should not be placed adjacent to the perimeter lights. They should be placed around a touchdown marking ~~where it is provided~~ or coincident with heliport identification marking.*

5.3.9.12 TLOF floodlights shall be located so as to avoid glare to pilots in flight or to personnel working on the area. The arrangement and aiming of floodlights shall be such that shadows are kept to a minimum.

Note.— ASPSL and LPs used to designate the ~~touchdown~~ TDPM and/or heliport identification marking have been shown to provide enhanced surface texture cues when compared to low-level floodlights. Due to the risk of misalignment, if floodlights are used, there will be a need for them to be checked periodically to ensure they remain within the specifications contained within 5.3.9.

Characteristics

5.3.9.13 The TLOF perimeter lights shall be fixed omnidirectional lights showing green.

5.3.9.14 At a surface-level heliport, ASPSL or LPs shall emit green light when used to define the perimeter of the TLOF.

5.3.9.15 **Recommendation.—** *The chromaticity and luminance of colours of LPs should conform to Annex 14, Volume I, Appendix 1, 3.4.*

5.3.9.16 An LP shall have a minimum width of 6 cm. The panel housing shall be the same colour as the marking it defines.

5.3.9.17 For a surface level or elevated heliport, ~~T~~the TLOF perimeter lights located in a FATO shall not exceed a height of ~~2~~5 cm and shall be inset when a light extending above the surface could endanger helicopter operations.

5.3.9.18 For a helideck or shipboard heliport, the TLOF perimeter lights shall not exceed a height of 5 cm, or for a FATO/TLOF, 15 cm.

5.3.9.19~~8~~ **Recommendation.—** *When located within the safety area of a surface level or elevated heliport ~~or within the obstacle-free sector of a helideck~~, the TLOF floodlights should not exceed a height of 25 cm.*

5.3.9.20 For a helideck or shipboard heliport, the TLOF floodlights shall not exceed a height of 5 cm, or for a FATO/TLOF, 15 cm.

5.3.9.21~~9~~ The LPs shall not extend above the surface by more than 2.5 cm.

5.3.9.22~~0~~ **Recommendation.—** *The light distribution of the perimeter lights should be as shown in Figure 5-11, Illustration 5~~6.~~*

5.3.9.23~~1~~ **Recommendation.—** *The light distribution of the LPs should be as shown in Figure 5-11, Illustration 6~~7~~.*

5.3.9.24~~2~~ The spectral distribution of TLOF area floodlights shall be such that the surface and obstacle marking can be correctly identified.

5.3.9.25~~3~~ **Recommendation.—** *The average horizontal illuminance of the floodlighting should be at least 10 lux, with a uniformity ratio (average to minimum) of not more than 8:1 measured on the surface of the TLOF.*

5.3.9.264 **Recommendation.—** *Lighting used to identify the ~~touchdown marking~~ TDPC should comprise a segmented circle of omnidirectional ASPSL strips showing yellow. The segments should consist of ASPSL strips, and the total length of the ASPSL strips should not be less than 50 per cent of the circumference of the circle.*

5.3.9.275 **Recommendation.—** *If utilized, the heliport identification marking lighting should be omnidirectional showing green.*

5.3.10 Helicopter stand floodlighting

Note.— The objective of helicopter stand floodlighting is to provide illumination of the stand surface and associated markings to assist the manoeuvring and positioning of a helicopter and facilitation of essential operations around the helicopter.

Application

5.3.10.1 Recommendation.— *Floodlighting should be provided on a helicopter stand intended to be used at night.*

Note.— Guidance on stand floodlighting is given in the apron floodlighting section in the Aerodrome Design Manual *(Doc 9157), Part 4.*

Location

5.3.10.2 **Recommendation.—** *Helicopter stand floodlights should be located so as to provide adequate illumination, with a minimum of glare to the pilot of a helicopter in flight and on the ground, and to personnel on the stand. The arrangement and aiming of floodlights should be such that a helicopter stand receives light from two or more directions to minimize shadows.*

Characteristics

5.3.10.3 The spectral distribution of stand floodlights shall be such that the colours used for surface and obstacle marking can be correctly identified.

5.3.10.4 Horizontal and vertical illuminance shall be sufficient to ensure that visual cues are discernible for required manoeuvring and positioning, and essential operations around the helicopter can be performed expeditiously without endangering personnel or equipment.

5.3.1110 Winching area floodlighting

Note.— The objective of winching area floodlighting is to provide illumination of the surface, obstacles and visual cues to assist a helicopter to be positioned over, and retained within, an area from which a passenger or equipment can be lowered or raised.

Application

5.3.110.1 Winching area floodlighting shall be provided at a winching area intended for use at night.

Location

5.3.110.2 Winching area floodlights shall be located so as to avoid glare to pilots in flight or to personnel working on the area. The arrangement and aiming of floodlights shall be such that shadows are kept to a minimum.

Characteristics

5.3.110.3 The spectral distribution of winching area floodlights shall be such that the surface and obstacle markings can be correctly identified.

5.3.110.4 **Recommendation.—** *The average horizontal illuminance should be at least 10 lux, measured on the surface of the winching area.*

5.3.121 Taxiway lights

Note.— The specifications for taxiway centre line lights and taxiway edge lights in Annex 14, Volume I, 5.3.176 and 5.3.187, are equally applicable to taxiways intended for ground taxiing of helicopters.

5.3.132 Visual aids for denoting obstacles outside and below the obstacle limitation surfaces

~~*Note.— The specifications for marking and lighting of obstacles included in Annex 14, Volume I, Chapter 6, are equally applicable to heliports and winching areas.*~~

Note.— Arrangements for an aeronautical study of objects outside the obstacle limitation surface (OLS) and for other objects are addressed in Annex 14, Volume I, Chapter 4.

5.3.13.1 **Recommendation.—** *Where an aeronautical study indicates that obstacles in areas outside and below the boundaries of the OLS, established for a heliport, constitute a hazard to helicopters, they should be marked and lit, except that the marking may be omitted when the obstacle is lighted with high-intensity obstacle lights by day.*

5.3.13.2 **Recommendation.—** *Where an aeronautical study indicates that overhead wires or cables crossing a river, waterway, valley or highway constitute a hazard to helicopters, they should be marked, and their supporting towers marked and lit.*

5.3.143 Floodlighting of obstacles

Application

5.3.143.1 At a heliport intended for use at night, obstacles shall be floodlighted if it is not possible to display obstacle lights on them.

Location

5.3.143.2 Obstacle floodlights shall be arranged so as to illuminate the entire obstacle and as far as practicable in a manner so as not to dazzle the helicopter pilots.

Characteristics

5.3.143.3 **Recommendation.—** *Obstacle floodlighting should be such as to produce a luminance of at least 10 cd/m^2.*

CHAPTER 6. HELIPORT EMERGENCY RESPONSE

. . .

~~**6.2 Rescue and firefighting**~~

~~***General***~~

~~*Introductory Note.— These specifications apply to surface-level heliports and elevated heliports only. The specifications complement those in Annex 14, Volume I, 9.2, concerning rescue and firefighting requirements at aerodromes.*~~

~~*The principal objective of a rescue and firefighting service is to save lives. For this reason, the provision of means of dealing with a helicopter accident or incident occurring at or in the immediate vicinity of a heliport assumes primary importance because it is within this area that there are the greatest opportunities for saving lives. This must assume at all times the possibility of, and need for, extinguishing a fire which may occur either immediately following a helicopter accident or incident or at any time during rescue operations.*~~

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

~~*For an elevated heliport, requirements to protect any building or structure on which the heliport is located are not taken into account.*~~

~~*Rescue and firefighting requirements for helidecks may be found in the* Heliport Manual *(Doc 9261).*~~

Level of protection to be provided

6.2.1 **Recommendation.** — *The level of protection to be provided for rescue and firefighting should be based on the overall length of the longest helicopter normally using the heliport and in accordance with the heliport firefighting category determined from Table 6-1, except at an unattended heliport with a low movement rate.*

Note. — *Guidance to assist the appropriate authority in providing rescue and firefighting equipment and services at surface-level and elevated heliports is given in the* Heliport Manual *(Doc 9261).*

Table 6-1. Heliport firefighting category

Category	Helicopter overall length[a]
H1	up to but not including 15 m
H2	from 15 m up to but not including 24 m
H3	from 24 m up to but not including 35 m

a. Helicopter length, including the tail boom and the rotors.

6.2.2 **Recommendation.** — *During anticipated periods of operations by smaller helicopters, the heliport firefighting category may be reduced to that of the highest category of helicopter planned to use the heliport during that time.*

Extinguishing agents

6.2.3 **Recommendation.** — *The principal extinguishing agent should be a foam meeting the minimum performance level B.*

Note. — *Information on the required physical properties and fire extinguishing performance criteria needed for a foam to achieve an acceptable performance level B rating is given in the* Airport Services Manual, *Part 1 (Doc 9137).*

6.2.4 **Recommendation.** — *The amounts of water for foam production and the complementary agents to be provided should be in accordance with the heliport firefighting category determined under 6.2.1 and Table 6-2 or Table 6-3, as appropriate.*

Note. — *The amounts of water specified for elevated heliports do not have to be stored on or adjacent to the heliport if there is a suitable adjacent pressurized water main system capable of sustaining the required discharge rate.*

Table 6-2. Minimum usable amounts of extinguishing agents for surface-level heliports

	Foam meeting performance level B		Complementary agents				
Category	Water (L)	Discharge rate foam solution (L/min)	Dry chemical powders (kg)	or	Halons (kg)	or	CO_2 (kg)
(1)	(2)	(3)	(4)		(5)		(6)
H1	1 500	250	23		23		145
H2	1 000	500	45		45		190
H3	1 600	800	90		90		180

Table 6-3. Minimum usable amounts of extinguishing agents for elevated heliports

	Foam meeting performance level B		Complementary agents				
Category	Water (L)	Discharge rate foam solution (L/min)	Dry chemical powders (kg)	or	Halons (kg)	or	CO_2 (kg)
(1)	(2)	(3)	(4)		(5)		(6)
H1	2 500	250	45		45		90
H2	5 000	500	45		45		90
H3	8 000	800	45		45		90

6.2.5 **Recommendation.** — *At a surface-level heliport it is permissible to replace all or part of the amount of water for foam production by complementary agents.*

6.2.6 **Recommendation.** — *The discharge rate of the foam solution should not be less than the rates shown in Table 6-2 or Table 6-3, as appropriate. The discharge rate of complementary agents should be selected for optimum effectiveness of the agent used.*

6.2.7 **Recommendation.** — *At an elevated heliport, at least one hose spray line capable of delivering foam in a jet spray pattern at 250 L/min should be provided. Additionally at elevated heliports in categories 2 and 3, at least two monitors should be provided each having a capability of achieving the required discharge rate and positioned at different locations around the heliports so as to ensure the application of foam to any part of the heliport under any weather condition and to minimize the possibility of both monitors being impaired by a helicopter accident.*

~~***Rescue equipment***~~

~~6.2.8 **Recommendation.** — *At an elevated heliport, rescue equipment should be stored adjacent to the heliport.*~~

~~*Note.— Guidance on the rescue equipment to be provided at a heliport is given in the* Heliport Manual *(Doc 9261).*~~

~~***Response time***~~

~~6.2.9 **Recommendation.** — *At a surface-level heliport, the operational objective of the rescue and firefighting service should be to achieve response times not exceeding two minutes in optimum conditions of visibility and surface conditions.*~~

~~*Note.— Response time is considered to be the time between the initial call to the rescue and firefighting service and the time when the first responding vehicle(s) (the service) is (are) in position to apply foam at a rate of at least 50 per cent of the discharge rate specified in Table 6-2.*~~

~~6.2.10 **Recommendation.** — *At an elevated heliport, the rescue and firefighting service should be immediately available on or in the vicinity of the heliport while helicopter movements are taking place.*~~

6.2 Rescue and firefighting

Editorial Note.— Insert new text for section 6.2 to Chapter 6 as follows:

General — Introductory Notes

The content of this section has been extensively revised and updated for Amendment 9. With new concepts and terms now to consider, it is important that section 6.2 be read in conjunction with the appropriate detailed guidance on rescue and firefighting options given in the Heliport Manual *(Doc 9261).*

Provisions described in this section are intended to address incidents or accidents within the heliport response area only. No dedicated firefighting provisions are included for helicopter accidents or incidents that may occur outside the response area, such as on an adjacent roof near an elevated heliport.

Complementary agents are ideally dispensed from one or two extinguishers (although more extinguishers may be permitted where high volumes of an agent are specified, e.g. H3 operations). The discharge rate of complementary agents needs to be selected for optimum effectiveness of the agent used. When selecting dry chemical powders for use with foam, care needs to be exercised to ensure compatibility. Complementary agents need to comply with the appropriate specifications of the International Organization for Standardization (ISO).

Where a fixed monitor system (FMS) is installed, trained monitor operators, where provided, be positioned on at least the upwind location to ensure primary media is directed to the seat of the fire. For a ring-main system (RMS) practical testing has indicated that these solutions are only guaranteed to be fully effective for TLOFs up to 20 m diameter. If the TLOF is greater than 20 m a RMS should not be

considered unless supplemented by other means to distribute primary media (e.g. additional pop-up nozzles are installed in the centre of the TLOF).

The International Convention for the Safety of Life at Sea (SOLAS) sets forth provisions on rescue and firefighting (RFF) arrangements for purpose-built and non-purpose-built shipboard heliports, in SOLAS regulations II-2/18, II-2-Helicopter Facilities, and the SOLAS Fire Safety Systems Code.

It may therefore be assumed that this chapter does not include RFF arrangements for purpose-built or non-purpose-built shipboard heliports or for winching areas.

6.2.1 Applicability

6.2.1.1 The following specifications shall apply to new builds or replacement of existing systems or part thereof from 1 January 2023: 6.2.2.1, 6.2.3.3, 6.2.3.4, 6.2.3.6, 6.2.3.7, 6.2.3.9, 6.2.3.10, 6.2.3.12, 6.2.3.13 and 6.2.4.2.

Note.— For areas for the exclusive use of helicopters at aerodromes primarily for the use of aeroplanes, distribution of extinguishing agents, response time, rescue equipment and personnel have not been considered in this section; see Annex 14, Volume I, Chapter 9.

6.2.1.2 Rescue and firefighting equipment and services shall be provided at helidecks and at elevated heliports located above occupied structures.

6.2.1.3 **Recommendation.**— *A safety risk assessment should be performed to determine the need for rescue and firefighting equipment and services at surface level heliports and elevated heliports located above unoccupied structures.*

Note.— Further guidance on factors to inform the safety risk assessment, including staffing models for heliports with only occasional movements and examples of unoccupied areas that may be located beneath elevated heliports, are given in the Heliport Manual *(Doc 9261).*

6.2.2 Level of protection provided

6.2.2.1 For the application of primary media the discharge rate (in litres/minute) applied over the assumed practical critical area (in m^2) shall be predicated on a requirement to bring any fire which may occur on the heliport under control within one minute, measured from activation of the system at the appropriate discharge rate.

Practical critical area calculation where primary media is applied as a solid stream

Note.— This section is not applicable to helidecks regardless of how primary media is being delivered.

6.2.2.2 **Recommendation.**— *The practical critical area should be calculated by multiplying the helicopter fuselage length (m) by the helicopter fuselage width (m) plus an additional width factor (W1) of 4 m. Categorization from H0 to H3 should be determined on the basis of the fuselage dimensions in Table 6-1 below.*

Table 6-1. Heliport firefighting category

Category (1)	Maximum fuselage length (2)	Maximum fuselage width (3)
H0	up to but not including 8 m	1.5 m
H1	from 8 m up to but not including 12 m	2 m
H2	from 12 m up to but not including 16 m	2.5 m
H3	from 16 m up to 20 m	3 m

Note 1.— For helicopters which exceed one or both of the dimensions for a category H3 heliport, it will be necessary to recalculate the level of protection using practical critical area assumptions based on the actual fuselage length and the actual fuselage width of the helicopter plus an additional width factor (W_1) of 6 m.

Note 2.— The practical critical area may be considered on a helicopter type-specific basis by using the formula in 6.2.2.2. Guidance on practical critical area in relation to the heliport firefighting category is given in the Heliport Manual *(Doc 9261) where a discretionary 10 per cent tolerance on fuselage dimension "upper limits" is applied.*

Practical critical area calculation where primary media is applied in a dispersed pattern

6.2.2.3 **Recommendation**.— *For heliports, except helidecks, the practical critical area should be based on an area contained within the heliport perimeter, which always includes the TLOF, and to the extent that it is load-bearing, the FATO.*

6.2.2.4 **Recommendation.—** *For helidecks the practical critical area should be based on the largest circle capable of being accommodated within the TLOF perimeter.*

Note.— Recommendation 6.2.2.4, is applied for the practical critical area calculation for helidecks regardless of how primary media is being delivered.

6.2.3 Extinguishing agents

Note.— Throughout section 6.2.3 the discharge rate of a performance level B foam is assumed to be based on an application rate of 5.5 L/min/m^2, and for a performance level C foam and for water, is assumed to be based on an application rate of 3.75 L/min/m^2. These rates may be reduced if, through practical testing, a State demonstrates that the objectives of 6.2.2.1 can be achieved for a specific foam use at a lower discharge rate (l/min).

Information on the required physical properties and fire extinguishing performance criteria needed for a foam to achieve an acceptable performance level B or C rating is given in the Airport Services Manual *(Doc 9137), Part 1.*

Surface level heliports with primary media applied as a solid stream using a portable foam application system (PFAS)

Note.— Except for a limited-sized surface level heliport, the assumption is made that foam dispensing equipment will be transported to the incident or accident location on an appropriate vehicle (a PFAS).

6.2.3.1 **Recommendation.—** *Where an RFFS is provided at a surface level heliport, the amount of primary media and complementary agents should be in accordance with Table 6-2.*

Note.— The minimum discharge duration in Table 6-2 is assumed to be two minutes. However, if the availability of back-up specialist fire services is remote from the heliport, consideration may need to be given to increasing the discharge duration from two minutes to three minutes.

Table 6-2 Minimum usable amounts of extinguishing agents for surface-level heliports

	Foam meeting performance level B		Foam meeting performance level C		Complementary agents	
Category	Water (L)	Discharge rate foam solution/minute (L)	Water (L)	Discharge rate foam solution/minute (L)	Dry chemical powder (kg)	and Gaseous media (kg)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
H 0	500	250	330	165	23	9
H 1	800	400	540	270	23	9
H 2	1 200	600	800	400	45	18
H 3	1 600	800	1 100	550	90	36

Elevated heliports with primary media applied as a solid stream using a fixed foam application system (FFAS)

Note.— The assumption is made that primary media (foam) will be delivered through a fixed foam application system such as a fixed monitor system (FMS).

6.2.3.2 **Recommendation.—** *Where an RFFS is provided at an elevated heliport, the amount of foam media and complementary agents should be in accordance with Table 6-3.*

Note.— The minimum discharge duration in Table 6-3 is assumed to be five minutes.

Table 6-3 Minimum usable amounts of extinguishing agents for elevated heliports

	Foam meeting performance level B		Foam meeting performance level C		Complementary agents	
Category	Water (L)	Discharge rate foam solution/minute (L)	Water (L)	Discharge rate foam solution/minute (L)	Dry chemical powder (kg)	and Gaseous media (kg)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
H 0	1 250	250	825	165	23	9
H 1	2 000	400	1 350	270	45	18
H 2	3 000	600	2 000	400	45	18
H 3	4 000	800	2 750	550	90	36

Note.— For guidance on the provision of additional hand-controlled foam branches for the application of aspirated foam, see the Heliport Manual *(Doc 9261).*

Elevated heliports/ limited-sized surface level heliports with primary media applied in a dispersed pattern through a fixed foam application system (FFAS) – a solid plate heliport

6.2.3.3 **Recommendation.—** *The amount of water required for foam production should be predicated on the practical critical area (m^2) multiplied by the appropriate application rate (L/min/m^2), giving a discharge rate for foam solution (in L/min). The discharge rate should be multiplied by the discharge duration to calculate the amount of water needed for foam production.*

6.2.3.4 **Recommendation.—** *The discharge duration should be at least three minutes.*

6.2.3.5 **Recommendation.—** *Complementary media should be in accordance with Table 6-3, for H2 operations.*

Note.— For helicopters with a fuselage length greater than 16 m and/or a fuselage width greater than 2.5 m, complementary media in Table 6-3 for H3 operations may be considered.

Purpose-built elevated heliports/limited-sized surface level heliport with primary media applied in a dispersed pattern through a fixed application system (FAS) – a passive fire retarding surface with water-only DIFFS

6.2.3.6 **Recommendation.—** *The amount of water required should be predicated on the practical critical area (m^2) multiplied by the appropriate application rate (3.75 L/min/m^2) giving a discharge rate for water (in L/min). The discharge rate should be multiplied by the discharge duration to determine the total amount of water needed.*

6.2.3.7 **Recommendation.—** *The discharge duration should be at least two minutes.*

6.2.3.8 **Recommendation. —** *Complementary media should be in accordance with Table 6-3, for H2 operations.*

Note.— For helicopters with a fuselage length greater than 16 m and/or a fuselage width greater than 2.5 m, complementary media for H3 operations may be considered.

Purpose-built helidecks with primary media applied in a solid stream or a dispersed pattern through a fixed foam application system (FFAS) – a solid plate heliport

6.2.3.9 **Recommendation.—** *The amount of water required for foam media production should be predicated on the practical critical area (m^2) multiplied by the application rate (L/min/m^2) giving a discharge rate for foam solution (in L/min). The discharge rate should be multiplied by the discharge duration to calculate the amount of water needed for foam production.*

6.2.3.10 **Recommendation.—** *The discharge duration should be at least five minutes.*

6.2.3.11 **Recommendation.—** *Complementary media should be in accordance with Table 6-3, H0 levels for helidecks up to and including 16.0 m and to H1/H2 levels for helidecks greater than 16.0 m. Helidecks greater than 24 m should adopt H3 levels.*

Note.— For guidance on the provision of additional hand-controlled foam branches for the application of aspirated foam, see the Heliport Manual *(Doc 9261)*.

Purpose-built helidecks with primary media applied in a dispersed pattern through a fixed application system (FAS) – a passive fire-retarding surface with water-only DIFFS

6.2.3.12 **Recommendation.—** *The amount of water required should be predicated on the practical critical area (m^2) multiplied by the application rate (3.75 L/min/m^2) giving a discharge rate for water (in L/min). The discharge rate should be multiplied by the discharge duration to calculate the amount of water needed.*

Note.— Sea-water may be used.

6.2.3.13 **Recommendation.—** *The discharge duration should be at least three minutes.*

6.2.3.14 **Recommendation.—** *Complementary media should be in accordance with Table 6-3, to H0 levels for helidecks up to and including 16.0 m and to H1/H2 levels for helidecks greater than 16.0 m. Helidecks greater than 24 m should adopt H3 levels.*

6.2.4 Response time

6.2.4.1 **Recommendation.—** *At surface level heliports, the operational objective of the rescue and firefighting response should be to achieve response times not exceeding two minutes in optimum conditions of visibility and surface conditions.*

Note.— Response time is considered to be the time between the initial call to the rescue and firefighting service and the time when the first responding vehicle(s) (the service) is (are) in position to apply foam at a rate of at least 50 per cent of the discharge rate specified in Table 6-2.

6.2.4.2 **Recommendation.—** *At elevated heliports, limited-sized surface level heliports and helidecks, the response time for the discharge of primary media at the required application rate should be 15 seconds measured from system activation. If rescue and firefighting personnel are needed, they should be immediately available on or in the vicinity of the heliport while helicopter movements are taking place.*

6.2.5 Rescue arrangements

6.2.5.1 **Recommendation.—** *Rescue arrangements commensurate with the overall risk of the helicopter operation should be provided at the heliport.*

Note.— Guidance on the rescue arrangements, e.g. options for rescue and for personal protective equipment to be provided at a heliport, is given in the Heliport Manual *(Doc 9261).*

6.2.6 Communication and alerting system

6.2.6.1 **Recommendation.—** *A suitable alerting and/or communication system should be provided in accordance with the emergency response plan.*

6.2.7 Personnel

Note.— The provision of rescue and firefighting personnel may be determined by use of a task/resource analysis. Guidance is given in the Heliport Manual *(Doc 9261).*

6.2.7.1 Where provided, the number of rescue and firefighting personnel shall be sufficient for the required task.

6.2.7.2 Where provided, rescue and firefighting personnel shall be trained to perform their duties, and maintain their competence.

6.2.7.3 Rescue and firefighting personnel shall be provided with protective equipment.

6.2.8 Means of escape

6.2.8.1 Elevated heliports and helidecks shall be provided with a main access and at least one additional means of escape.

6.2.8.2 **Recommendation.**— *Access points should be located as far apart from each other as is practicable.*

Note.— The provision of an alternative means of escape is necessary for evacuation and for access by rescue and firefighting personnel. The size of an emergency access/egress route may require consideration of the number of passengers and of special operations like Helicopter Emergency Medical Services (HEMS) that require passengers to be carried on stretchers or trolleys.

_____

End of new text.

— — — — — — —

— END —