Icao annex 14 volume 2 8th edition pdf

Filters Filters Shipping shipped within 3-5 days Media format Book Language English ISBN 9789292584832 Annex 14, Volume I (AN14-1), contains Standards and Recommended Practices that prescribe the physical characteristics, obstacle limitation surfaces and visual aids to be provided at aerodromes, as well as certain facilities and technical services normally provided at an aerodrome. Available in English, Arabic, Chinese, French, Russian and Spanish. AN 14-1 Aerodromes – Volume II Heliports, 4th edition€87,22 ICAO Aerodrome Design Manual. Part 5: Electrical Systems (Doc 9157P5) – 2nd Edition€164,25 Full PDF PackageDownload Full PDF PackageThis PaperA short summary of this paper20 Full PDFs related to this paperDownloadPDF Pack icao Annex 14 volume 2 Tradução conforme for digitando Qualidade mundialmente reconhecida Tradução de documentos com um simples "arrastar e soltar" Traduzir agora 1. Aerodromes Annex 14 to the Convention on International Civil Aviation International Standards and Recommended Practices Third Edition July 2009 Volume II Heliports This edition incorporates all amendments adopted by the Council prior to and supersedes, on November 200 , all previous editions of Annex 14, Volume I . For information regarding the applicability of the Standards and Recommended Practices, see Foreword and the relevant clauses in each chapter.see 5 March 2009 19 9 1 2. International Standards and Recommended Practices This edition incorporates all amendments adopted by the Council prior to 5 March 2009 and supersedes, on 19 November 2009, all previous editions of Annex 14, Volume II. For information regarding the applicability of the Standards and Recommended Practices, see Foreword and the relevant clauses in each chapter. Third Edition July 2009 International Civil Aviation Organization Aerodromes ______ Annex 14 to the Convention on International Civil Aviation Volume II Heliports 3. (ii) Published in separate English, Arabic, Chinese, French, Russian and Spanish editions by the INTERNATIONAL CIVIL AVIATION ORGANIZATION 999 University Street, Montréal, Quebec, Canada H3C 5H7 For ordering information and for a complete listing of sales agents and booksellers, please go to the ICAO website at www.icao.int First edition 1990 Second edition 1995 Third edition 2009 Annex 14, Volume II, Heliports Order Number: AN14-2 ISBN 978-92-9231-330-2 © ICAO 2009 All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, without prior permission in writing from the International Civil Aviation Organization. 4. (iii) AMENDMENTS Amendments are announced in the supplements to the Catalogue of ICAO Publications; the Catalogue and its supplements are available on the ICAO website at www.icao.int. The space below is provided to keep a record of such amendments. RECORD OF AMENDMENTS AND CORRIGENDA AMENDMENTS CORRIGENDA No. Date applicable Date entered Entered by No. Date of issue Date entered Entered by 1–4 Incorporated in this edition 5. ANNEX 14 — VOLUME II (v) 19/11/09 TABLE OF CONTENTS Page

Abbreviations and symbols; manuals .... (viii) FOREWORD.......... (ix) CHAPTER 1. General.......... 1-1 1.1 Definitions.......... 1-1 1.2 Applicability .... 1-3 1.3 Common reference systems .... 1-4 1.3.1 Horizontal reference system .... 1-4 1.3.2 Vertical reference system .... 1-4 1.3.3 Temporal reference system .... 1-4 CHAPTER 2. Heliport data .... 2-1 2.1 Aeronautical data .... 2-1 2.2 Heliport reference point .... 2-1 2.3 Heliport elevation .... 2-2 2.4 Heliport dimensions and related information .... 2-2 2.5 Declared distances .... 2-3 2.6 Coordination between aeronautical information services and heliport authorities .... 2-4 CHAPTER 3. Physical characteristics .... 3-1 3.1 Surface-level heliports .... 3-1 — Final approach and take-off areas .... 3-1 — Helicopter clearways .... 3-2 — Touchdown and lift-off areas .... 3-2 — Safety areas .... 3-2 — Helicopter ground taxiways and ground taxi-routes .... 3-4 — Helicopter air taxiways and air taxi-routes .... 3-5 — Air transit route .... 3-6 — Aprons .... 3-6 — Location of a final approach and take-off area in relation to a runway or taxiway .... 3-9 3.2 Elevated heliports .... 3-9 — Final approach and take-off areas and touchdown and lift-off areas .... 3-10 — Helicopter clearways .... 3-10 — Touchdown and lift-off areas .... 3-11 — Safety areas .... 3-11 — Helicopter ground taxiways and ground taxi-routes .... 3-12 — Helicopter air taxiways and air taxi-routes .... 3-13 — Aprons .... 3-13 6. Annex 14 — Aerodromes Volume II 19/11/09 (vi) 3.3 Helidecks .... 3-14 — Final approach and take-off areas and touchdown and lift-off areas .... 3-14 3.4 Shipboard heliports .... 3-15 — Final approach and take-off areas and touchdown and lift-off areas .... 3-15 CHAPTER 4. Obstacle restriction and removal .... 4-1 4.1 Obstacle limitation surfaces and sectors .... 4-1 — Approach surface .... 4-1 — Transitional surface .... 4-1 — Inner horizontal surface .... 4-1 — Conical surface .... 4-2 — Take-off climb surface .... 4-2 — Obstacle-free sector/surface — helidecks .... 4-3 — Limited obstacle surface — helidecks .... 4-4 4.2 Obstacle limitation requirements .... 4-4 — Surface-level heliports .... 4-4 — Elevated heliports .... 4-5 — Helidecks .... 4-5 — Shipboard heliports .... 4-6 CHAPTER 5. Visual aids .... 5-1 5.1 Indicators .... 5-1 5.1.1 Wind direction indicators .... 5-1 5.2 Markings and markers .... 5-2 5.2.1 Winching area marking .... 5-2 5.2.2 Heliport identification marking .... 5-2 5.2.3 Maximum allowable mass marking .... 5-3 5.2.4 Maximum allowable D-value marking .... 5-4 5.2.5 Final approach and take-off area marking or marker .... 5-4 5.2.6 Final approach and take-off area designation marking .... 5-6 5.2.7 Aiming point marking .... 5-6 5.2.8 Touchdown and lift-off area marking .... 5-7 5.2.9 Touchdown/positioning marking .... 5-8 5.2.10 Heliport name marking .... 5-8 5.2.11 Helideck obstacle-free sector marking .... 5-9 5.2.12 Helideck surface marking .... 5-9 5.2.13 Helideck prohibited landing sector marking .... 5-9 5.2.14 Marking for taxiways .... 5-10 5.2.15 Air taxiway markers .... 5-10 5.2.16 Air transit route markers .... 5-10 5.3 Lights .... 5-12 5.3.1 General .... 5-12 5.3.2 Heliport beacon .... 5-13 5.3.3 Approach lighting system .... 5-15 5.3.4 Visual alignment guidance system .... 5-15 5.3.5 Visual approach slope indicator .... 5-18 5.3.6 Final approach and take-off area lighting systems .... 5-22 7. Table of Contents Annex 14 — Aerodromes Volume II 19/11/09 (vii) 5.3.7 Aiming point lights .... 5-22 5.3.8 Touchdown and lift-off area lighting system .... 5-23 5.3.9 Winching area floodlighting .... 5-25 5.3.10 Taxiway lights .... 5-25 5.3.11 Visual aids for denoting obstacles .... 5-25 5.3.12 Floodlighting of obstacles .... 5-26 CHAPTER 6. Heliport services .... 6-1 6.1 Rescue and fire fighting .... 6-1 — General .... 6-1 — Level of protection to be provided .... 6-1 — Extinguishing agents .... 6-2 — Rescue equipment .... 6-3 — Response time .... 6-3 APPENDIX 1. Aeronautical data quality requirements .... APP 1-1

8. Annex 14 — Aerodromes Volume II 19/11/09 (viii) ABBREVIATIONS AND SYMBOLS (used in Annex 14, Volume II) Abbreviations cd Candela cm Centimetre D Helicopter greatest overall dimension FATO Final approach and take-off area ft Foot HAPI Helicopter approach path indicator Hz Hertz IMC Instrument meteorological conditions kg Kilogram km/h Kilometre per hour kt Knot L Litre LDAH Landing distance available l/min Litre per minute m Metre RD Diameter of the largest rotor RTODAH Rejected take-off distance available s Second TLOF Touchdown and lift-off area TODAH Take-off distance available VMC Visual meteorological conditions Symbols ° Degree = Equals % Percentage ± Plus or minus MANUALS (related to the specifications of this Annex) Aerodrome Design Manual (Doc 9157) Part 1 — Runways Part 2 — Taxiways, Aprons and Holding Bays Part 3 — Pavements Part 4 — Visual Aids Part 5 — Electrical Systems Part 6 — Frangibility Airport Planning Manual (Doc 9184) Part 1 — Master Planning Part 2 — Land Use and Environmental Control Part 3 — Guidelines for Consultant/Construction Services Airport Services Manual (Doc 9137) Part 1 — Rescue and Fire Fighting Part 2 — Pavement Surface Conditions Part 3 — Bird Control and Reduction Part 4 — Fog Dispersal (withdrawn) Part 5 — Removal of Disabled Aircraft Part 6 — Control of Obstacles Part 7 — Airport Emergency Planning Part 8 — Airport Operational Services Part 9 — Airport Maintenance Practices Heliport Manual (Doc 9261) Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476) Manual on the ICAO Bird Strike Information System (IBIS) (Doc 9332) Stolport Manual (Doc 9150) 9. ANNEX 14 — VOLUME II (ix) 19/11/09 FOREWORD Historical background Standards and Recommended Practices for aerodromes were first adopted by the Council on 29 May 1951 pursuant to the provisions of Article 37 of the Convention on International Civil Aviation (Chicago 1944) and designated as Annex 14 to the Convention. The document containing these Standards and Recommended Practices is now designated as Annex 14, Volume I, to the Convention. In general, Volume I addresses planning, design and operations of aerodromes but is not specifically applicable to heliports. Therefore, Volume II is being introduced as a means of including provisions for heliports. Proposals for comprehensive Standards and Recommended Practices covering all aspects of heliport planning, design and operations have been developed with the assistance of the ANC Visual Aids Panel and the ANC Helicopter Operations Panel. Table A shows the origin of the provisions in this volume, together with a list of the principal subjects involved and the dates on which the Annex was adopted by the Council, when it became effective and when it became applicable. Action by Contracting States Notification of differences. The attention of Contracting States is drawn to the obligation imposed by Article 38 of the Convention by which Contracting States are required to notify the Organization of any differences between their national regulations and practices and the International Standards contained in this Annex and any amendments thereto. Contracting States are invited to extend such notification to any differences from Recommended Practices contained in this Annex and any amendments thereto, when the notification of such differences is important for the safety of air navigation. Further, Contracting States are invited to keep the Organization currently informed of any differences which may subsequently occur, or of the withdrawal of any differences previously notified. A specified request for notification of differences will be sent to Contracting States immediately after the adoption of each amendment to this Annex. The attention of States is also drawn to the provisions of Annex 15 related to the publication of differences between their national regulations and practices and the related ICAO Standards and Recommended Practices through the Aeronautical Information Service, in addition to the obligation of States under Article 38 of the Convention. Promulgation of information. The establishment and withdrawal of and changes to facilities, services and procedures affecting aircraft operations provided in accordance with the Standards and Recommended Practices specified in this Annex should be notified and take effect in accordance with the provisions of Annex 15. Status of Annex components An Annex is made up of the following component parts, not all of which, however, are necessarily found in every Annex; they have the status indicated: 1. — Material comprising the Annex proper: a) Standards and Recommended Practices adopted by the Council under the provisions of the Convention. They are defined as follows: 10. Annex 14 — Aerodromes Volume II 19/11/09 (x) Standard: Any specification for physical characteristics, configuration, matériel, performance, personnel or procedure, the uniform application of which is recognized as necessary for the safety or regularity of international air navigation and to which Contracting States will conform in accordance with the Convention; in the event of impossibility of compliance, notification to the Council is compulsory under Article 38. Recommended Practice: Any specification for physical characteristics, configuration, matériel, performance, personnel or procedure, the uniform application of which is recognized as desirable in the interest of safety, regularity or efficiency of international air navigation, and to which Contracting States will endeavour to conform in accordance with the Convention. b) Appendices comprising material grouped separately for convenience but forming part of the Standards and Recommended Practices adopted by the Council. c) Definitions of terms used in the Standards and Recommended Practices which are not self- explanatory in that they do not have accepted dictionary meanings. A definition does not have independent status but is an essential part of each Standard and Recommended Practice in which the term is used, since a change in the meaning of the term would affect the specification. d) Tables and Figures which add to or illustrate a Standard or Recommended Practice and which are referred to therein, form part of the associated Standard or Recommended Practice and have the same status. 2.— Material approved by the Council for publication in association with the Standards and Recommended Practices: a) Forewords comprising historical and explanatory material based on the action of the Council and including an explanation of the obligations of States with regard to the application of the Standards and Recommended Practices ensuing from the Convention and the Resolution of Adoption. b) Introductions comprising explanatory material introduced at the beginning of parts, chapters or sections of the Annex to assist in the understanding of the application of the text. c) Notes included in the text, where appropriate, to give factual information or references bearing on the Standards or Recommended Practices in question, but not constituting part of the Standards or Recommended Practices. d) Attachments comprising material supplementary to the Standards and Recommended Practices, or included as a guide to their application. Selection of language This Annex has been adopted in six languages — English, Arabic, Chinese, French, Russian and Spanish. Each Contracting State is requested to select one of those texts for the purpose of national implementation and for other effects provided for in the Convention, either through direct use or through translation into its own national language, and to notify the Organization accordingly. Editorial practices The following practice has been adhered to in order to indicate at a glance the status of each statement: Standards have been printed in light face roman; Recommended Practices have been printed in light face italics, the status being indicated by the prefix Recommendation; Notes have been printed in light face italics, the status being indicated by the prefix Note. 11. Foreword Annex 14 — Aerodromes (xi) 19/11/09 The following editorial practice has been followed in the writing of specifications: for Standards the operative verb "shall" is used, and for Recommended Practices the operative verb "should'' is used. The units of measurement used in this document are in accordance with the International System of Units (SI) as specified in Annex 5 to the Convention on International Civil Aviation. Where Annex 5 permits the use of non-SI alternative units these are shown in parentheses following the basic units. Where two sets of units are quoted it must not be assumed that the pairs of values are equal and interchangeable. It may, however, be inferred that an equivalent level of safety is achieved when either set of units is used exclusively. Any reference to a portion of this document, which is identified by a number and/or title, includes all subdivisions of that portion. Table A. Amendments to Annex 14, Volume II Amendment Source(s) Subject(s) Adopted Effective Applicable 1st Edition Fourth Meeting of the ANC Helicopter Operations Panel; Eleventh Meeting of the ANC Visual Aids Panel and Secretariat Physical characteristics; obstacle limitation surfaces; visual aids for visual meteorological conditions; rescue and fire fighting services. 19 March 1990 30 July 1990 15 November 1990 1 (2nd Edition) Twelfth Meeting of the ANC Visual Aids Panel and Secretariat Standard geodetic reference system (WGS-84); frangibility; visual aids for helicopter non-precision approaches; and visual alignment guidance system. 13 March 1995 24 July 1995 19 November 1995 2 Air Navigation Commission Aeronautical databases and vertical component of the World Geodetic System — 1984 (WGS-84). 21 March 1997 21 July 1997 16 November 1997 3 Fourteenth Meeting of the ANC Visual Aids Panel and Secretariat Definitions of calendar, datum, Gregorian calendar and obstacle; common reference systems; heliport dimensions and related information; touchdown and lift-off area lighting system; Appendix 1 — Aeronautical Data Quality Requirements. 27 February 2004 12 July 2004 25 November 2004 4 (3rd Edition) First Meeting of the Aerodromes Panel Introductory note; definitions of air transit route, declared distances, dynamic load-bearing surface, final approach and take-off area, helicopter air taxiway, helicopter clearway, helicopter ground taxiway, helicopter stand, helideck, obstacle, protection area, rejected take-off area, shipboard heliport, static load-bearing surface, taxi-route, touchdown and lift-off area, winching area; applicability; physical characteristics for surface-level heliports, elevated heliports, helidecks, and shipboard heliports; obstacle limitation surfaces and sectors and requirements for helidecks and shipboard heliports; winching area marking; heliport identification marking; maximum allowable mass marking; maximum allowable D-value marking; touchdown and lift-off area marking; touchdown/positioning marking; helideck obstacle-free sector marking; helideck surface marking; and helideck prohibited landing sector marking. 14 March 2009 20 July 2009 19 November 2009 ____________________

12. ANNEX 14 — VOLUME II 1-1 19/11/09 INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES CHAPTER 1. GENERAL Introductory Note.— Annex 14, Volume II, contains Standards and Recommended Practices (specifications) that prescribe the physical characteristics and obstacle limitation surfaces to be provided for at heliports, and certain facilities and technical services normally provided at a heliport. It is not intended that these specifications limit or regulate the operation of an aircraft. When designing a heliport, the critical design helicopter, having the largest set of dimensions and the greatest maximum take-off mass (MTOM) the heliport is intended to serve, would need to be considered. It is to be noted that provisions for helicopter flight operations are contained in Annex 6, Part III. 1.1 Definitions When the following terms are used in this volume, they have the meanings given below. Annex 14, Volume I, contains definitions for those terms which are used in both volumes. Accuracy. A degree of conformance between the estimated or measured value and the true value. Note.— For measured positional data, the accuracy is normally expressed in terms of a distance from a stated position within which there is a defined confidence of the true position falling. Air transit route. A defined route for the air transiting of helicopters. Calendar. Discrete temporal reference system that provides the basis for defining temporal position to a resolution of one day (ISO 19108*). Cyclic redundancy check (CRC). A mathematical algorithm applied to the digital expression of data that provides a level of assurance against loss or alteration of data. Data quality. A degree or level of confidence that the data provided meet the requirements of the data user in terms of accuracy, resolution and integrity. Datum. Any quantity or set of quantities that may serve as a reference or basis for the calculation of other quantities (ISO 19104**). Declared distances — heliports. a) Take-off distance available (TODAH). The length of the FATO plus the length of helicopter clearway (if provided) declared available and suitable for helicopters to complete the take-off. * ISO Standard 19108, Geographic information — Temporal schema ** ISO Standard 19104, Geographic information — Terminology 13. Annex 14 — Aerodromes Volume II 19/11/09 1-2 b) Rejected take-off distance available (RTODAH). The length of the FATO declared available and suitable for helicopters operated in performance class 1 to complete a rejected take-off. c) Landing distance available (LDAH). The length of the FATO plus any additional area declared available and suitable for helicopters to complete the landing manoeuvre from a defined height. Dynamic load-bearing surface. A surface capable of supporting the loads generated by a helicopter conducting an emergency touchdown on it. Elevated heliport. A heliport located on a raised structure on land. Ellipsoid height (Geodetic height). The height related to the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Final approach and take-off area (FATO). A defined area over which the final phase of the approach manoeuvre to hover or landing is completed and from which the take-off manoeuvre is commenced. Where the FATO is to be used by helicopters operated in performance class 1, the defined area includes the rejected take-off area available. Geodetic datum. A minimum set of parameters required to define location and orientation of the local reference system with respect to the global reference system/frame. Geoid. The equipotential surface in the gravity field of the Earth which coincides with the undisturbed mean sea level (MSL) extended continuously through the continents. Note.— The geoid is irregular in shape because of local gravitational disturbances (wind tides, salinity, current, etc.) and the direction of gravity is perpendicular to the geoid at every point. Geoid undulation. The distance of the geoid above (positive) or below (negative) the mathematical reference ellipsoid. Note.— In respect to the World Geodetic System — 1984 (WGS-84) defined ellipsoid, the difference between the WGS-84 ellipsoidal height and orthometric height represents WGS-84 geoid undulation. Gregorian calendar. Calendar in general use; first introduced in 1582 to define a year that more closely approximates the tropical year than the Julian calendar (ISO 19108***). Note.— In the Gregorian calendar, common years have 365 days and leap years 366 days divided into twelve sequential months. Helicopter air taxiway. A defined path on the surface established for the air taxiing of helicopters. Helicopter clearway. A defined area on the ground or water, selected and/or prepared as a suitable area over which a helicopter operated in performance class 1 may accelerate and achieve a specific height. Helicopter ground taxiway. A ground taxiway intended for the ground movement of wheeled undercarriage helicopters. 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. Helideck. A heliport located on an offshore structure such as an exploration or production platform used for the exploitation of oil or gas. *** ISO Standard 19108, Geographic information — Temporal schema 14. Chapter 1 Annex 14 — Aerodromes 1-3 19/11/09 Heliport. An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters. Integrity (aeronautical data). A degree of assurance that an aeronautical data and its value has not been lost nor altered since the data origination or authorized amendment. Obstacle. All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that: a) are located on an area intended for the surface movement of aircraft; or b) extend above a defined surface intended to protect aircraft in flight; or c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation. Orthometric height. Height of a point related to the geoid, generally presented as an MSL elevation. 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. Rejected take-off area. A defined area on a heliport suitable for helicopters operating in performance class 1 to complete a rejected take-off. Safety area. A defined area on a heliport surrounding the FATO which is free of obstacles, other than those required for air navigation purposes, and intended to reduce the risk of damage to helicopters accidentally diverging from the FATO. Shipboard heliport. A heliport located on a ship that may be purpose or non-purpose-built. A purpose-built shipboard heliport is one designed specifically for helicopter operations. A non-purpose-built shipboard heliport is one that utilizes an area of the ship that is capable of supporting a helicopter but not designed specifically for that task. Static load-bearing surface. A surface capable of supporting the mass of a helicopter situated upon it. Station declination. An alignment variation between the zero degree radial of a VOR and true north, determined at the time the VOR station is calibrated. Surface-level heliport. A heliport located on the ground or on the water. 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. Touchdown and lift-off area (TLOF). An area on which a helicopter may touch down or lift off. Winching area. An area provided for the transfer by helicopter of personnel or stores to or from a ship. 1.2 Applicability Note.— The dimensions discussed in this Annex are based on consideration of single-main-rotor helicopters. For tandem-rotor helicopters the heliport design will be based on a case-by-case review of the specific models using the basic requirement for a safety area and protection areas specified in this Annex. 1.2.1 The interpretation of some of the specifications in the Annex expressly requires the exercising of discretion, the taking of a decision or the performance of a function by the appropriate authority. In other specifications, the expression 15. Annex 14 — Aerodromes Volume II 19/11/09 1-4 appropriate authority does not actually appear although its inclusion is implied. In both cases, the responsibility for whatever determination or action is necessary shall rest with the State having jurisdiction over the heliport. 1.2.2 The specifications in Annex 14, Volume II, shall apply to all heliports intended to be used by helicopters in international civil aviation. They shall apply equally to areas for the exclusive use of helicopters at an aerodrome primarily meant for the use of aeroplanes. Where relevant, the provisions of Annex 14, Volume I, shall apply to the helicopter operations being conducted at such an aerodrome. 1.2.3 Unless otherwise specified, the specification for a colour referred to within this volume shall be that contained in Appendix 1 to Annex 14, Volume I. 1.3 Common reference systems 1.3.1 Horizontal reference system 1.3.1.1 World Geodetic System — 1984 (WGS-84) shall be used as the horizontal (geodetic) reference system. Reported aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum. Note.— Comprehensive guidance material concerning WGS-84 is contained in the World Geodetic System — 1984 (WGS-84) Manual (Doc 9674). 1.3.2 Vertical reference system 1.3.2.1 Mean sea level (MSL) datum, which gives the relationship of gravity-related height (elevation) to a surface known as the geoid, shall be used as the vertical reference system. Note 1.— The geoid globally most closely approximates MSL. It is defined as the equipotential surface in the gravity field of the Earth which coincides with the undisturbed MSL extended continuously through the continents. Note 2.— Gravity-related heights (elevations) are also referred to as orthometric heights while distances of points above the ellipsoid are referred to as ellipsoidal heights. 1.3.3 Temporal reference system 1.3.3.1 The Gregorian calendar and Coordinated Universal Time (UTC) shall be used as the temporal reference system. 1.3.3.2 When a different temporal reference system is used, this shall be indicated in GEN 2.1.2 of the Aeronautical Information Publication (AIP). ____________________

16. ANNEX 14 — VOLUME II 2-1 19/11/09 CHAPTER 2. HELIPORT DATA 2.1 Aeronautical data 2.1.1 Determination and reporting of heliport-related aeronautical data shall be in accordance with the accuracy and integrity requirements set forth in Tables A1-1 to A1-5 contained in Appendix 1 while taking into account the established quality system procedures. Accuracy requirements for aeronautical data are based upon a 95 per cent confidence level and in that respect, three types of positional data shall be identified: surveyed points (e.g. FATO threshold), calculated points (mathematical calculations from the known surveyed points of points in space, fixes) and declared points (e.g. flight information region boundary points). Note. — Specifications governing the quality system are given in Annex 15, Chapter 3. 2.1.2 Contracting States shall ensure that integrity of aeronautical data is maintained throughout the data process from survey/origin to the next intended user. Aeronautical data integrity requirements shall be based upon the potential risk resulting from the corruption of data and upon the use to which the data item is put. Consequently, the following classifications and data integrity levels shall apply: a) critical data, integrity level 1×10^{-8} : there is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe; b) essential data, integrity level 1×10^{-5} : there is a low probability when using corrupted essential data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe; and c) routine data, integrity level 1×10^{-3} : there is a very low probability when using corrupted routine data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe. 2.1.3 Protection of electronic aeronautical data while stored or in transit shall be totally monitored by the cyclic redundancy check (CRC). To achieve protection of the integrity level of critical and essential aeronautical data as classified in 2.1.2, a 32- or 24-bit CRC algorithm shall apply respectively. 2.1.4 Recommendation.— To achieve protection of the integrity level of routine aeronautical data as classified in 2.1.2, a 16-bit CRC algorithm should apply. Note.— Guidance material on the aeronautical data quality requirements (accuracy, resolution, integrity, protection and traceability) is contained in the World Geodetic System — 1984 (WGS-84) Manual (Doc 9674). Supporting material in respect of the provisions of Appendix 1 related to accuracy and integrity of aeronautical data is contained in RTCA Document DO-201A and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-77 — Industry Requirements for Aeronautical Information. 2.1.5 Geographical coordinates indicating latitude and longitude shall be determined and reported to the aeronautical information services authority in terms of the World Geodetic System — 1984 (WGS-84) geodetic reference datum, identifying those geographical coordinates which have been transformed into WGS-84 coordinates by mathematical means and whose accuracy of original field work does not meet the requirements in Appendix 1, Table A1-1. 2.1.6 The order of accuracy of the field work shall be such that the resulting operational navigation data for the phases of flight will be within the maximum deviations, with respect to an appropriate reference frame, as indicated in the tables contained in Appendix 1. 17. Annex 14 — Aerodromes Volume II 19/11/09 2-2 2.1.7 In addition to the elevation (referenced to mean sea level) of the specific surveyed ground positions at heliports, geoid undulation (referenced to the WGS-84 ellipsoid) for those positions as indicated in Appendix 1 shall be determined and reported to the aeronautical information services authority. Note 1.— An appropriate reference frame is that which enables WGS-84 to be realized on a given heliport and with respect to which all coordinate data are related. Note 2.— Specifications governing the publication of WGS-84 coordinates are given in Annex 4, Chapter 2, and Annex 15, Chapter 3. 2.2 Heliport reference point 2.2.1 A heliport reference point shall be established for a heliport not collocated with an aerodrome. Note.— When the heliport is collocated with an aerodrome, the established aerodrome reference point serves both aerodrome and heliport. 2.2.2 The heliport reference point shall be located near the initial or planned geometric centre of the heliport and shall normally remain where first established. 2.2.3 The position of the heliport reference point shall be measured and reported to the aeronautical information services authority in degrees, minutes and seconds. 2.3 Heliport elevation 2.3.1 The heliport elevation and geoid undulation at the heliport elevation position shall be measured and reported to the aeronautical information services authority to the accuracy of one-half metre or foot. 2.3.2 For a heliport used by international civil aviation, the elevation of the TLOF and/or the elevation and geoid undulation of each threshold of the FATO (where appropriate) shall be measured and reported to the aeronautical information services authority to the accuracy of: a) one-half metre or foot for non-precision approaches; and b) one-quarter metre or foot for precision approaches. Note.— Geoid undulation must be measured in accordance with the appropriate system of coordinates. 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: a) heliport type — surface-level, elevated or helideck; b) TLOF — dimensions to the nearest metre or foot, slope, surface type, bearing strength in tonnes (1 000 kg); c) final approach and take-off area — type of FATO, true bearing to one-hundredth of a degree, designation number (where appropriate), length, width to the nearest metre or foot, slope, surface type; 18. Chapter 2 Annex 14 — Aerodromes 2-3 19/11/09 d) safety area — length, width and surface type; e) helicopter ground taxiway, air taxiway and air transit route — designation, width, surface type; f) apron — surface type, helicopter stands; g) clearway — length, ground profile; h) visual aids for approach procedures, marking and lighting of FATO, TLOF, taxiways and aprons; and i) distances to the nearest metre or foot of localizer and glide path elements comprising an instrument landing system (ILS) or azimuth and elevation antenna of a microwave landing system (MLS) in relation to the associated TLOF or FATO extremities. 2.4.2 The geographical coordinates of the geometric centre of the TLOF and/or of each threshold of the FATO (where appropriate) shall be measured and reported to the aeronautical information services authority in degrees, minutes, seconds and hundredths of seconds. 2.4.3 The geographical coordinates of appropriate centre line points of helicopter ground taxiways, air taxiways and air transit routes shall be measured and reported to the aeronautical information services authority in degrees, minutes, seconds and hundredths of seconds. 2.4.4 The geographical coordinates of each helicopter stand shall be measured and reported to the aeronautical information services authority in degrees, minutes, seconds and hundredths of seconds. 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 services authority in degrees, minutes, seconds and tenths of seconds. In addition, the top elevation, type, marking and lighting (if any) of obstacles shall be reported to the aeronautical information services authority. Note 1.— See Annex 15, Appendix 8, for graphical illustrations of obstacle data collection surfaces and criteria used to identify obstacles in Areas 2 and 3. Note 2.— Appendix 1 to this Annex provides requirements for obstacle data determination in Areas 2 and 3. Note 3.— Implementation of Annex 15, provision 10.6.1.2, concerning the availability, as of 18 November 2010, of obstacle data according to Area 2 and Area 3 specifications would be facilitated by appropriate advance planning for the collection and processing of such data. 2.5 Declared distances The following distances to the nearest metre or foot shall be declared, where relevant, for a heliport: a) take-off distance available; b) rejected take-off distance available; and c) landing distance available. 19. Annex 14 — Aerodromes Volume II 19/11/09 2-4 2.6 Coordination between aeronautical information services and heliport authorities 2.6.1 To ensure that aeronautical information services units obtain information to enable them to provide up-to-date pre-flight information and to meet the need for in-flight information, arrangements shall be made between aeronautical information services and heliport authorities responsible for heliport services to report to the responsible aeronautical information services unit, with a minimum of delay: a) information on heliport conditions; b) the operational status of associated facilities, services and navigation aids within their area of responsibility; c) any other information considered to be of operational significance. 2.6.2 Before introducing changes to the air navigation system, due account shall be taken by the services responsible for such changes of the time needed by the aeronautical information service for the preparation, production and issue of relevant material for promulgation. To ensure timely provision of the information to the aeronautical information service, close coordination between those services concerned is therefore required. 2.6.3 Of a particular importance are changes to aeronautical information that affect charts and/or computer-based navigation systems which qualify to be notified by the aeronautical information regulation and control (AIRAC) system, as specified in Annex 15, Chapter 6 and Appendix 4. The predetermined, internationally agreed AIRAC effective dates in addition to 14 days postage time shall be observed by the responsible heliport services when submitting the raw information/data to aeronautical information services. 2.6.4 The heliport services responsible for the provision of raw aeronautical information/data to the aeronautical information services shall do that while taking into account accuracy and integrity requirements for aeronautical data as specified in Appendix 1 to this Annex. Note 1.— Specifications for the issue of a NOTAM and SNOWTAM are contained in Annex 15, Chapter 5, and Appendices 6 and 2, respectively. Note 2.— The AIRAC information is distributed by the AIS at least 42 days in advance of the AIRAC effective dates with the objective of reaching recipients at least 28 days in advance of the effective date. Note 3.— The schedule of the predetermined internationally agreed AIRAC common effective dates at intervals of 28 days, including 19 November 2009, and guidance for the AIRAC use are contained in the Aeronautical Information Services Manual (Doc 8126, Chapter 2, 2.6). ____________________

20. ANNEX 14 — VOLUME II 3-1 19/11/09 CHAPTER 3. PHYSICAL CHARACTERISTICS 3.1 Surface-level heliports Note 1.— The following specifications are for land-based heliports only. Where a water heliport is being considered, the appropriate authority may establish suitable criteria. Note 2.— The dimensions of the taxi-routes and helicopter stands include a protection area. Final approach and take-off areas 3.1.1 A surface-level heliport shall be provided with at least one final approach and take-off area (FATO). 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.— Where the term FATO is not used in the HFM, the minimum landing/take-off area specified in the HFM for the appropriate flight profile is used. 3.1.4 Recommendation.— Where intended to be used by helicopters operated in performance class 2 or 3 with MTOM of 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). 3.1.5 The mean slope in any direction on the FATO shall not exceed 3 per cent. No portion of a FATO shall have a local slope exceeding: a) 5 per cent where the heliport is intended to be used by 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. 21. Annex 14 — Aerodromes Volume II 19/11/09 3-2 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. Helicopter clearways 3.1.9 When a helicopter clearway is provided, it shall be located beyond the end of the rejected take-off area available. 3.1.10 Recommendation.— The width of a helicopter clearway should not be less than that of the associated safety area. 3.1.11 Recommendation.— The ground in a helicopter clearway should not project above a plane having an upward slope of 3 per cent, the lower limit of this plane being a horizontal line which is located on the periphery of the FATO. 3.1.12 Recommendation.— An object situated on a helicopter clearway which may endanger helicopters in the air should be regarded as an obstacle and should be removed. Touchdown and lift-off areas 3.1.13 At least one TLOF shall be provided at a heliport. Note 1.— The TLOF may or may not be located within the FATO. Note 2.— Additional TLOFs may be collocated with helicopter stands. 3.1.14 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. Note.— A TLOF may be any shape. 3.1.15 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. 3.1.16 Where the TLOF is within the FATO, the TLOF shall be dynamic load-bearing. 3.1.17 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. 3.1.18 Where the TLOF is within the FATO, the centre of the TLOF shall be located not less than 0.5 D from the edge of the FATO. Safety areas 3.1.19 A FATO shall be surrounded by a safety area which need not be solid. 22. Chapter 3 Annex 14 — Aerodromes 3-3 19/11/09 3.1.20 A safety area surrounding a FATO intended to be used by helicopters operated in performance class 1 in visual meteorological conditions (VMC) shall extend outwards from the periphery of the FATO for a distance of at least 3 m or 0.25 D, whichever is greater, of the largest helicopter the FATO is intended to serve and: a) each external side of the safety area shall be at least 2 D where the FATO is quadrilateral; or b) the outer diameter of the safety area shall be at least 2 D where the FATO is circular. 3.1.21 A safety area surrounding a FATO intended to be used by helicopters operated in performance class 2 or 3 in visual meteorological conditions (VMC) shall extend outwards from the periphery of the FATO for a distance of at least 3 m or 0.5 D, whichever is greater, of the largest helicopter the FATO is intended to serve and: a) each external side of the safety area shall be at least 2 D where the FATO is quadrilateral; or b) the outer diameter of the safety area shall be at least 2 D where the FATO is circular. 3.1.22 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. 3.1.23 A safety area surrounding a FATO intended to be used by helicopter operations in instrument meteorological conditions (IMC) shall extend: a) laterally to a distance of at least 45 m on each side of the centre line; and b) longitudinally to a distance of at least 60 m beyond the ends of the FATO. (See Figure 3-1.) 3.1.24 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. 3.1.25 Objects whose functions require them to be located on the safety area shall not exceed a height of 25 cm when located along the edge of the FATO nor penetrate a plane originating at a height of 25 cm above the edge of the FATO and sloping upwards and outwards from the edge of the FATO at a gradient of 5 per cent. 3.1.26 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. Figure 3-1. Safety area for instrument FATO FATO Safety area Rejected take-off areaHelicopter clearway 60 m 60 m 90 m 23. Annex 14 — Aerodromes Volume II 19/11/09 3-4 3.1.27 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. 3.1.28 Where applicable, the surface of the safety area shall be treated to prevent flying debris caused by rotor downwash. 3.1.29 The surface of the safety area abutting the FATO shall be continuous with the FATO. Helicopter ground taxiways and ground taxi-routes Note 1.— A helicopter ground taxiway is intended to permit the surface movement of a wheeled helicopter under its own power. Note 2.— The following specifications are intended for the safety of simultaneous operations during the manoeuvring of helicopters. However, the wind velocity induced by the rotor downwash might have to be considered. Note 3.— When a taxiway is intended for use by aeroplanes and helicopters, the provisions for taxiways for aeroplanes and helicopter ground taxiways will be taken into consideration and the more stringent requirements will be applied. 3.1.30 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 ground taxiway is intended to serve (see Figure 3-2). 3.1.31 The longitudinal slope of a helicopter ground taxiway shall not exceed 3 per cent. 3.1.32 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. Figure 3-2. Ground taxi-route Ground taxi-route = 1.5 × largest overall width Ground taxiway = 1.5 UCW Protection zone 24. Chapter 3 Annex 14 — Aerodromes 3-5 19/11/09 3.1.33 A helicopter ground taxiway shall be centred on a ground taxi-route. 3.1.34 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. 3.1.35 No objects shall be permitted on a helicopter ground taxi-route, except for frangible objects, which, because of their function, must be located there. 3.1.36 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. 3.1.37 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 37km/h (20 kt). 3.1.38 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 air taxiway is intended to serve (see Figure 3-3). 3.1.39 The surface of a helicopter air taxiway shall be suitable for an emergency landing. 3.1.40 Recommendation.— The surface of a helicopter air taxiway should be static load-bearing. Figure 3-3. Air taxi-route Protection zone Air taxi-route = 2 × largest overall width Air taxiway = 2 UCW 25. Annex 14 — Aerodromes Volume II 19/11/09 3-6 3.1.41 Recommendation.— The transverse slope of the surface of a helicopter air taxiway should not exceed 10 per cent and the longitudinal slope should not exceed 7 per cent. In any event, the slopes should not exceed the slope landing limitations of the helicopters the air taxiway is intended to serve. 3.1.42 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. 3.1.44 No objects shall be permitted on an air taxi-route, except for frangible objects, which, because of their function, must be located thereon. 3.1.45 The surface of an air taxi-route shall be resistant to the effect of rotor downwash. 3.1.46 The surface of an air taxi-route shall provide ground effect. Air transit route Note.— An air transit route is intended to permit the movement of a helicopter above the surface, normally at heights not above 30 m (100 ft) above ground level and at ground speeds exceeding 37 km/h (20 kt). 3.1.47 The width of an air transit route shall not be less than: a) 7.0 times the largest overall width of the helicopters the air transit route is intended to serve when the air transit route is intended for use by day only; and b) 10.0 times the largest overall width of the helicopters the air transit route is intended to serve when the air transit route is intended for use at night. 3.1.48 Any variation in the direction of the centre line of an air transit route shall not exceed 120 degrees and be designed so as not to necessitate a turn of radius less than 270 m. Note.— It is intended that air transit routes be selected so as to permit autorotative or one-engine-inoperative landings such that, as a minimum requirement, injury to persons on the ground or water, or damage to property are minimized. Aprons 3.1.49 The slope in any direction on a helicopter stand shall not exceed 2 per cent. 3.1.50 A helicopter stand 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. 3.1.51 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 (see Figure 3-4). 3.1.52 When a helicopter stand is used for turning, the minimum dimension of the stand and protection area shall be not less than 2 D (see Figure 3-5). 3.1.53 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. 26. Chapter 3 Annex 14 — Aerodromes 3-7 19/11/09 Figure 3-4. Helicopter stand Figure 3-5. Helicopter stand protection area Stand = 1.2 D 0.4 D Protection zone Central zone 27. Annex 14 — Aerodromes Volume II 19/11/09 3-8 3.1.54 For simultaneous operations, the protection area of helicopter stands and their associated taxi-routes shall not overlap (see Figure 3-6). Note.— Where non-simultaneous operations are envisaged, the protection area of helicopter stands and their associated taxi-routes may overlap (see Figure 3-7). 3.1.55 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 wheeled helicopters the stand is intended to serve. 3.1.56 A helicopter stand and associated protection area intended to be used for air taxiing shall provide ground effect. 3.1.57 No fixed objects shall be permitted on a helicopter stand and the associated protection area. 3.1.58 The central zone of the stand shall be capable of withstanding the traffic of helicopters that it is intended to serve and have a static load-bearing area: a) of diameter not less than 0.83 D of the largest helicopter it is intended to serve; or b) for a helicopter stand intended to be used for ground taxi-through, the same width as the ground taxiway. Note.— For a helicopter stand intended to be used for turning on the ground, the dimension of the central zone may need to be increased. Figure 3-6. Helicopter stands designed for hover turns with air taxi-routes/taxiways — simultaneous operations 2 D 2 × largest overall width 28. Chapter 3 Annex 14 — Aerodromes 3-9 19/11/09 Figure 3-7. Helicopter stands designed for hover turns with air taxi-routes/taxiways — non-simultaneous operations Location of a final approach and take-off area in relation to a runway or taxiway 3.1.59 Where a FATO is located near a runway or taxiway, and simultaneous VMC operations are planned, the separation distance between the edge of a runway or taxiway and the edge of a FATO shall not be less than the appropriate dimension in Table 3-1. 3.1.60 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. 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. 2 D 2 × largest overall width 29. Annex 14 — Aerodromes Volume II 19/11/09 3-10 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. 30. Chapter 3 Annex 14 — Aerodromes 3-11 19/11/09 Table 3-1. FATO minimum separation distance If aeroplane mass and/or helicopter mass are Distance between FATO edge and runway edge or taxiway edge up to but not including 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 3.2.13 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: 31. Annex 14 — Aerodromes Volume II 19/11/09 3-12 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. 32. Chapter 3 Annex 14 — Aerodromes 3-13 19/11/09 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. 33. Annex 14 — Aerodromes Volume II 19/11/09 3-14 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. 3.3 Helidecks Note.— The following specifications are for helidecks located on structures engaged in such activities as mineral exploitation, research or construction. See 3.4 for shipboard heliport provisions. Final approach and take-off areas and touchdown and lift-off areas Note.— On helidecks it is presumed that the FATO and the TLOF will be coincidental. Reference to FATO within the helideck section of this Annex is assumed to include the TLOF. Guidance on the effects of airflow direction and turbulence, prevailing wind velocity and high temperatures from gas turbine exhausts or flare radiated heat on the location of the FATO is given in the Heliport Manual (Doc 9261). 3.3.1 The specifications in 3.3.9 and 3.3.10 shall be applicable for helidecks completed on or after 1 January 2012. 3.3.2 A helideck shall be provided with at least one FATO. 3.3.3 A FATO may be any shape but shall be of sufficient size to contain: a) for helicopters with an MTOM of more than 3 175 kg, an area within which can be accommodated a circle of diameter not less than 1.0 D of the largest helicopter the helideck is intended to serve; and b) for helicopters with an MTOM of 3 175 kg or less, an area within which can be accommodated a circle of diameter not less than 0.83 D of the largest helicopter the helideck is intended to serve. 34. Chapter 3 Annex 14 — Aerodromes 3-15 19/11/09 3.3.4 Recommendation.— For helicopters with an MTOM of 3 175 kg or less, the FATO should be of sufficient size to contain an area within which can be accommodated a circle of diameter not less than 1.0 D of the largest helicopter the helideck is intended to serve. 3.3.5 A FATO shall be dynamic load-bearing. 3.3.6 A FATO shall provide ground effect. 3.3.7 No fixed object shall be permitted around the edge of the FATO, except for frangible objects, which, because of their function, must be located thereon. 3.3.8 Objects whose function require them to be located on the edge of the FATO shall not exceed a height of 25 cm, except that in the case of a FATO of diameter less than 1 D, the maximum height of such objects shall not exceed a height of 5 cm. 3.3.9 Objects whose function requires them to be located within the FATO (such as lighting or nets) shall not exceed a height of 2.5 cm. Such objects may be present only if they do not represent a hazard to helicopters. Note.— Examples of potential hazards include nets or raised fittings on the deck that might induce dynamic rollover for helicopters equipped with skids. 3.3.10 Safety net or safety shelves shall be located around the edge of a helideck but shall not exceed the helideck height. 3.3.11 The surface of the FATO shall be skid-resistant to both helicopters and persons and be sloped to prevent pooling of water. Note.— Guidance on rendering the surface of the FATO skid-resistant is contained in the Heliport Manual (Doc 9261). 3.4 Shipboard heliports 3.4.1 The specifications in 3.4.11 shall be applicable to shipboard heliports completed on or after 1 January 2012. 3.4.2 When helicopter operating areas are provided in the bow or stern of a ship or are purpose-built above the ship's structure, they shall be regarded as purpose-built shipboard heliports. Final approach and take-off areas and touchdown and lift-off areas Note.— On shipboard heliports, it is presumed that the FATO and the TLOF will be coincidental. Reference to FATO within the shipboard heliport section of this Annex is assumed to include the TLOF. Guidance on the effects of airflow direction and turbulence, prevailing wind velocity and high temperature from gas turbine exhausts or flare radiated heat on the location of the FATO is given in the Heliport Manual (Doc 9261). 3.4.3 Shipboard heliports shall be provided with at least one FATO. 3.4.4 The FATO of a shipboard heliport shall be dynamic load-bearing. 3.4.5 The FATO of a shipboard heliport shall provide ground effect. 3.4.6 For purpose-built shipboard heliports provided in a location other than the bow or stern, the FATO shall be of sufficient size to contain a circle with a diameter not less than 1.0 D of the largest helicopter the heliport is intended to serve. 35. Annex 14 — Aerodromes Volume II 19/11/09 3-16 3.4.7 For purpose-built shipboard heliports provided in the bow or stern of a ship, the FATO shall be of sufficient size to: a) contain a circle with a diameter not less than 1 D of the largest helicopter the heliport is intended to serve; or b) for operations with limited touchdown directions, contain an area within which can be accommodated two opposing arcs of a circle with a diameter not less than 1 D in the helicopter's longitudinal direction The minimum width of the heliport shall be not less than 0.83 D (see Figure 3-8). Figure 3-8. Shipboard permitted landing headings for limited heading operations D Permitted heading landing arc 15° 15° 15° 15° BOW Arc of minimum value 1 D 0.83 D 36. Chapter 3 Annex 14 — Aerodromes 3-17 19/11/09 Note 1.— The ship will need to be manoeuvred to ensure that the relative wind is appropriate to the direction of the helicopter touchdown heading. Note 2.— The touchdown heading of the helicopter is limited to the angular distance subtended by the 1 D arc headings, minus the angular distance which corresponds to 15 degrees at each end of the arc. 3.4.8 For non-purpose-built shipboard heliports, the FATO shall be of sufficient size to contain a circle with a diameter not less than 1 D of the largest helicopter the helideck is intended to serve. 3.4.9 No fixed object shall be permitted around the edge of the FATO, except for frangible objects, which, because of their function, must be located thereon. 3.4.10 Objects whose function require them to be located on the edge of the FATO shall not exceed a height of 25 cm. 3.4.11 Objects whose function requires them to be located within the FATO (such as lighting or nets) shall not exceed a height of 2.5 cm. Such objects may be present only if they do not represent a hazard to helicopters. 3.4.12 The surface of the FATO shall be skid-resistant to both helicopters and persons. _____ 37. ANNEX 14 — VOLUME II 4-1 19/11/09 CHAPTER 4. OBSTACLE RESTRICTION AND REMOVAL Note.— The objectives of the specifications in this chapter are to define the airspace around heliports to be maintained free from obstacles so as to permit the intended helicopter operations at the heliports to be conducted safely and to prevent the heliports becoming unusable by the growth of obstacles around them. This is achieved by establishing a series of obstacle limitation surfaces that define the limits to which objects may project into the airspace. 4.1 Obstacle limitation surfaces and sectors Approach surface 4.1.1 Description. An inclined plane or a combination of planes sloping upwards from the end of the safety area and centred on a line passing through the centre of the FATO (see Figure 4-1). 4.1.2 Characteristics. The limits of an approach surface shall comprise: a) an inner edge horizontal and equal in length to the minimum specified width of the FATO plus the safety area, perpendicular to the centre line of the approach surface and located at the outer edge of the safety area; b) two side edges originating at the ends of the inner edge and: 1) for other than a precision approach FATO, diverging uniformly at a specified rate from the vertical plane containing the centre line of the FATO; 2) for a precision approach FATO, diverging uniformly at a specified rate from the vertical plane containing the centre line of the FATO, to a specified height above FATO, and then diverging uniformly at a specified rate to a specified final width and continuing thereafter at that width for the remaining length of the approach surface; and c) an outer edge horizontal and perpendicular to the centre line of the approach surface and at a specified height above the elevation of the FATO. 4.1.3 The elevation of the inner edge shall be the elevation of the safety area at the point on the inner edge that is intersected by the centre line of the approach surface. 4.1.4 The slope(s) of the approach surface shall be measured in the vertical plane containing the centre line of the surface. Note.— For heliports used by helicopters operated in performance class 2 and 3, it is intended that approach paths be selected so as to permit safe forced landing or one-engine-inoperative landings such that, as a minimum requirement, injury to persons on the ground or water or damage to property are minimized. Provisions for forced landing areas are expected to minimize risk of injury to the occupants of the helicopter. The most critical helicopter type for which the heliport is intended and the ambient conditions will be factors in determining the suitability of such areas. Transitional surface 4.1.5 Description. A complex surface along the side of the safety area and part of the side of the approach surface, that slopes upwards and outwards to the inner horizontal surface or a predetermined height (see Figure 4-1). 38. Annex 14 — Aerodromes Volume II 19/11/09 4-2 4.1.6 Characteristics. The limits of a transitional surface shall comprise: a) a lower edge beginning at the intersection of the side of the approach surface with the inner horizontal surface, or beginning at a specified height above the lower edge when an inner horizontal surface is not provided, and extending down the side of the approach surface to the inner edge of the approach surface and from there along the length of the side of the safety area parallel to the centre line of the FATO; and b) an upper edge located in the plane of the inner horizontal surface, or at a specified height above the lower edge when an inner horizontal surface is not provided. 4.1.7 The elevation of a point on the lower edge shall be: a) along the side of the approach surface — equal to the elevation of the approach surface at that point; and b) along the safety area — equal to the elevation of the centre line of the FATO opposite that point. Note.— As a result of b) the transitional surface along the safety area will be curved if the profile of the FATO is curved, or a plane if the profile is a straight line. The intersection of the transitional surface with the inner horizontal surface, or upper edge when an inner horizontal surface is not provided, will also be a curved or a straight line depending on the profile of the FATO. 4.1.8 The slope of the transitional surface shall be measured in a vertical plane at right angles to the centre line of the FATO. Inner horizontal surface Note.— The intent of the inner horizontal surface is to allow safe visual manoeuvring. 4.1.9 Description. A circular surface located in a horizontal plane above a FATO and its environs (see Figure 4-1). 4.1.10 Characteristics. The radius of the inner horizontal surface shall be measured from the midpoint of the FATO. 4.1.11 The height of the inner horizontal surface shall be measured above an elevation datum established for such purpose. Note.— Guidance on determining the elevation datum is contained in the Heliport Manual (Doc 9261). Conical surface 4.1.12 Description. A surface sloping upwards and outwards from the periphery of the inner horizontal surface, or from the outer limit of the transitional surface if an inner horizontal surface is not provided (see Figure 4-1). 4.1.13 Characteristics. The limits of the conical surface shall comprise: a) a lower edge coincident with the periphery of the inner horizontal surface, or outer limit of the transitional surface if an inner horizontal surface is not provided; and b) an upper edge located at a specified height above the inner horizontal surface, or above the elevation of the lowest end of the FATO if an inner horizontal surface is not provided. 39. Chapter 4 Annex 14 — Aerodromes 4-3 19/11/09 4.1.14 The slope of the conical surface shall be measured above the horizontal. Take-off climb surface 4.1.15 Description. An inclined plane, a combination of planes or, when a turn is involved, a complex surface sloping upwards from the end of the safety area and centred on a line passing through the centre of the FATO (see Figure 4-1). 4.1.16 Characteristics. The limits of a take-off climb surface shall comprise: a) an inner edge horizontal and equal in length to the minimum specified width of the FATO plus the safety area, perpendicular to the centre line of the take-off climb surface and located at the outer edge of the safety area or clearway; b) two side edges originating at the ends of the inner edge and diverging uniformly at a specified rate from the vertical plane containing the centre line of the FATO; and c) an outer edge horizontal and perpendicular to the centre line of the take-off climb surface and at a specified height above the elevation of the FATO. 4.1.17 The elevation of the inner edge shall be the elevation of the safety area at the point on the inner edge that is intersected by the centre line of the take-off climb surface, except that when a clearway is provided, the elevation shall be equal to the highest point on the ground on the centre line of the clearway. 4.1.18 In the case of a straight take-off climb surface, the slope shall be measured in the vertical plane containing the centre line of the surface. 4.1.19 In the case of a take-off climb surface involving a turn, the surface shall be a complex surface containing the horizontal normals to its centre line, and the slope of the centre line shall be the same as that for a straight take-off climb surface. That portion of the surface between the inner edge and 30 m above the inner edge shall be straight. 4.1.20 Any variation in the direction of the centre line of a take-off climb surface shall be designed so as not to necessitate a turn of radius less than 270 m. Note.— For heliports used by helicopters operated in performance class 2 and 3, it is intended that departure paths be selected so as to permit safe forced landings or one-engine-inoperative landings such that, as a minimum requirement, injury to persons on the ground or water or damage to property are minimized. Provisions for forced landing areas are expected to minimize risk of injury to the occupants of the helicopter. The most critical helicopter type for which the heliport is intended and the ambient conditions will be factors in determining the suitability of such areas. Obstacle-free sector/surface — helidecks 4.1.21 Description. A complex surface originating at and extending from a reference point on the edge of the FATO of a helideck. In the case of a FATO of less than 1 D, the reference point shall be located not less than 0.5 D from the centre of the FATO. 4.1.22 Characteristics. An obstacle-free sector/surface shall subtend an arc of specified angle. 4.1.23 A helideck obstacle-free sector shall comprise two components, one above and one below helideck level (see Figure 4-2): 40. Annex 14 — Aerodromes Volume II 19/11/09 4-4 a) Above helideck level. The surface shall be a horizontal plane level with the elevation of the helideck surface that subtends an arc of at least 210 degrees with the apex located on the periphery of the D reference circle extending outwards to a distance that will allow for an unobstructed departure path appropriate to the helicopter the helideck is intended to serve. b) Below helideck level. Within the (minimum) 210-degree arc, the surface shall additionally extend downward from the edge of the FATO below the elevation of the helideck to water level for an arc of not less than 180 degrees that passes through the centre of the FATO and outwards to a distance that will allow for safe clearance from the obstacles below the helideck in the event of an engine failure for the type of helicopter the helideck is intended to serve. Note.— For both the above obstacle-free sectors for helicopters operated in performance class 1 or 2, the horizontal extent of these distances from the helideck will be compatible with the one-engine-inoperative capability of the helicopter type to be used. Limited obstacle sector/surface — helidecks Note.— Where obstacles are necessarily located on the structure, a helideck may have a limited obstacle sector. 4.1.24 Description. A complex surface originating at the reference point for the obstacle-free sector and extending over the arc not covered by the obstacle-free sector within which the height of obstacles above the level of the FATO will be prescribed. 4.1.25 Characteristics. A limited obstacle sector shall not subtend an arc greater than 150 degrees. Its dimensions and location shall be as indicated in Figure 4-3. 4.2 Obstacle limitation requirements Note.— The requirements for obstacle limitation surfaces are specified on the basis of the intended use of a FATO, i.e. approach manoeuvre to hover or landing, or take-off manoeuvre and type of approach, and are intended to be applied when such use is made of the FATO. In cases where operations are conducted to or from both directions of a FATO, then the function of certain surfaces may be nullified because of more stringent requirements of another lower surface. Surface-level heliports 4.2.1 The following obstacle limitation surfaces shall be established for a precision approach FATO: a) take-off climb surface; b) approach surface; c) transitional surfaces; and d) conical surface. 4.2.2 The following obstacle limitation surfaces shall be established for a non-precision approach FATO: a) take-off climb surface; b) approach surface; 41. Chapter 4 Annex 14 — Aerodromes 4-5 19/11/09 c) transitional surfaces; and d) conical surface if an inner horizontal surface is not provided. 4.2.3 The following obstacle limitation surfaces shall be established for a non-instrument FATO: a) take-off climb surface; and b) approach surface. 4.2.4 Recommendation.— The following obstacle limitation surfaces should be established for a non-precision approach FATO: a) inner horizontal surface; and b) conical surface. Note.— An inner horizontal surface may not be required if a straight-in non-precision approach is provided at both ends. 4.2.5 The slopes of the surfaces shall not be greater than, and their other dimensions not less than those specified in Tables 4-1 to 4-4 and shall be located as shown in Figures 4-4 to 4-8. 4.2.6 New objects or extensions of existing objects shall not be permitted above any of the surfaces in 4.2.1 to 4.2.4 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). 4.2.7 Recommendation.— Existing objects above any of the surfaces in 4.2.1 to 4.2.4 should, as far as practicable, 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 or significantly affect the regularity of operations of helicopters. Note.— The application of curved take-off climb surfaces as specified in 4.1.19 may alleviate the problems created by objects infringing these surfaces. 4.2.8 A surface-level heliport shall have at least two take-off climb and approach surfaces, separated by not less than 150 degrees. 4.2.9 Recommendation.— The number and orientation of take-off climb and approach surfaces should be such that the usability factor of a heliport is not less than 95 per cent for the helicopters the heliport is intended to serve. Elevated heliports 4.2.10 The obstacle limitation requirements for elevated heliports shall conform to the requirements for surface-level heliports specified in 4.2.1 to 4.2.7. 4.2.11 An elevated heliport shall have at least two take-off climb and approach surfaces separated by not less than 150 degrees. 42. Annex 14 — Aerodromes Volume II 19/11/09 4-6 Helidecks Note.— The following specifications are for helidecks located on a structure and engaged in such activities as mineral exploitation, research, or construction, but excluding heliports on ships. 4.2.12 A helideck shall have an obstacle-free sector. Note.— A helideck may have a limited obstacle sector (see 4.1.25). 4.2.13 There shall be no fixed obstacles within the obstacle-free sector above the obstacle-free surface. 4.2.14 In the immediate vicinity of the helideck, obstacle protection for helicopters shall be provided below the heliport level. This protection shall extend over an arc of at least 180 degrees with the origin at the centre of the FATO, with a descending gradient having a ratio of one unit horizontally to five units vertically from the edges of the FATO within the 180-degree sector. This descending gradient may be reduced to a ratio of one unit horizontally to three within the 180-degree sector for multi-engine helicopters operated in performance class 1 or 2 (see Figure 4-2). 4.2.15 Where a mobile obstacle or combination of obstacles within the obstacle-free sector is essential for the operation of the installation, the obstacle(s) shall not subtend an arc exceeding 30 degrees, as measured from the centre of the FATO. 4.2.16 Within the 150-degree limited obstacle surface/sector out to a distance of 0.62 D, measured from the centre of the FATO, objects shall not exceed a height of 0.05 D above the FATO. Beyond that arc, out to an overall distance of 0.83 D the limited obstacle surface rises at a rate of one unit vertically for each two units horizontally (see Figure 4-3). Shipboard heliports Purpose-built heliports located forward or aft 4.2.17 The specifications in 4.2.20 and 4.2.22 shall be applicable for shipboard heliports completed on or after 1 January 2012. 4.2.18 When helicopter operating areas are provided in the bow or stern of a ship, they shall apply the obstacle criteria given in 4.2.12, 4.2.14 and 4.2.16. Amidships location 4.2.19 Forward and aft of the FATO shall be two symmetrically located sectors, each covering an arc of 150 degrees, with their apexes on the periphery of the FATO D reference circle. Within the area enclosed by these two sectors, there shall be no objects rising above the level of the FATO, except those aids essential for the safe operation of a helicopter and then only up to a maximum height of 25 cm. 4.2.20 Objects whose function requires them to be located within the FATO (such as lighting or nets) shall not exceed a height of 2.5 cm. Such objects may be present only if they do not represent a hazard to helicopters. Note.— Examples of potential hazards include nets or raised fittings on the deck that might induce dynamic rollover for helicopters equipped with skids. 4.2.21 To provide further protection from obstacles fore and aft of the FATO, rising surfaces with gradients of one unit vertically to five units horizontally shall extend from the entire length of the edges of the two 150-degree sectors. These surfaces shall extend for a horizontal distance equal to at least 1 D of the largest helicopter the FATO is intended to serve and shall not be penetrated by any obstacle (see Figure 4-9).

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