ANNEX 14 VOLUME I: ICAO

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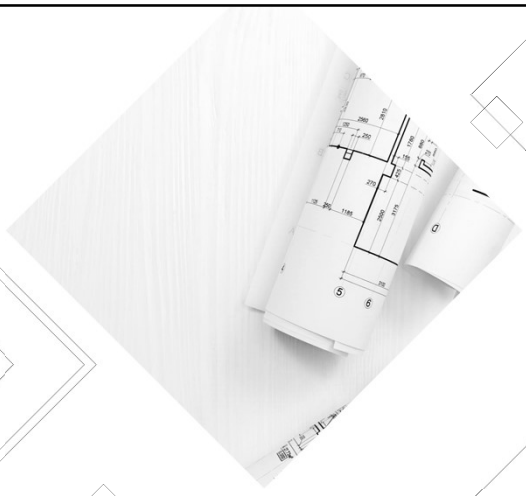
20 – 21 February 2020

1



INTRODUCTION TO ANNEX 14

2

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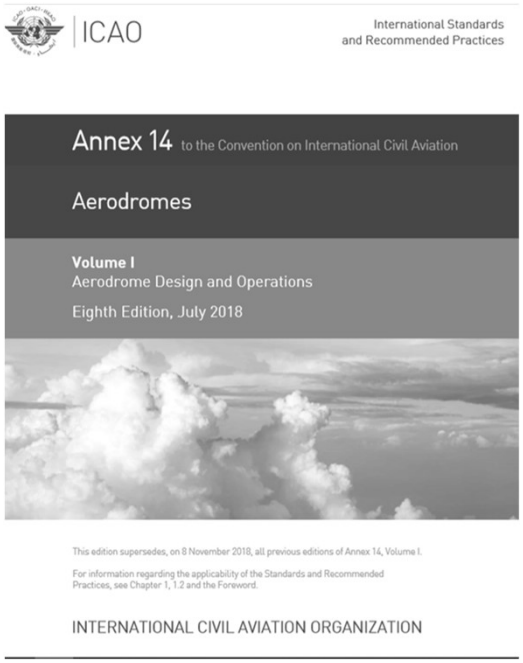

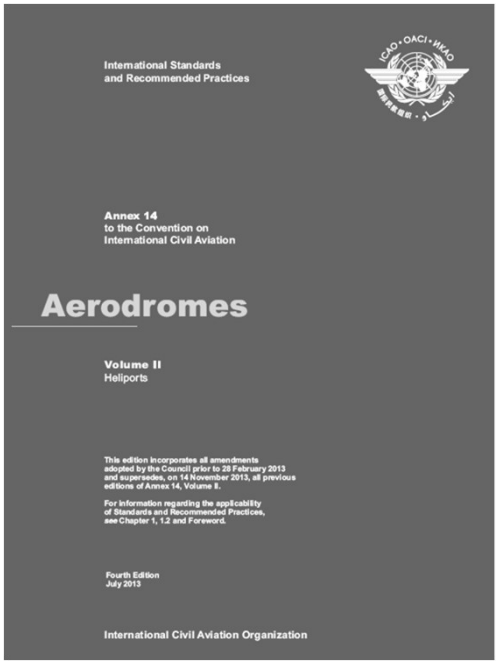

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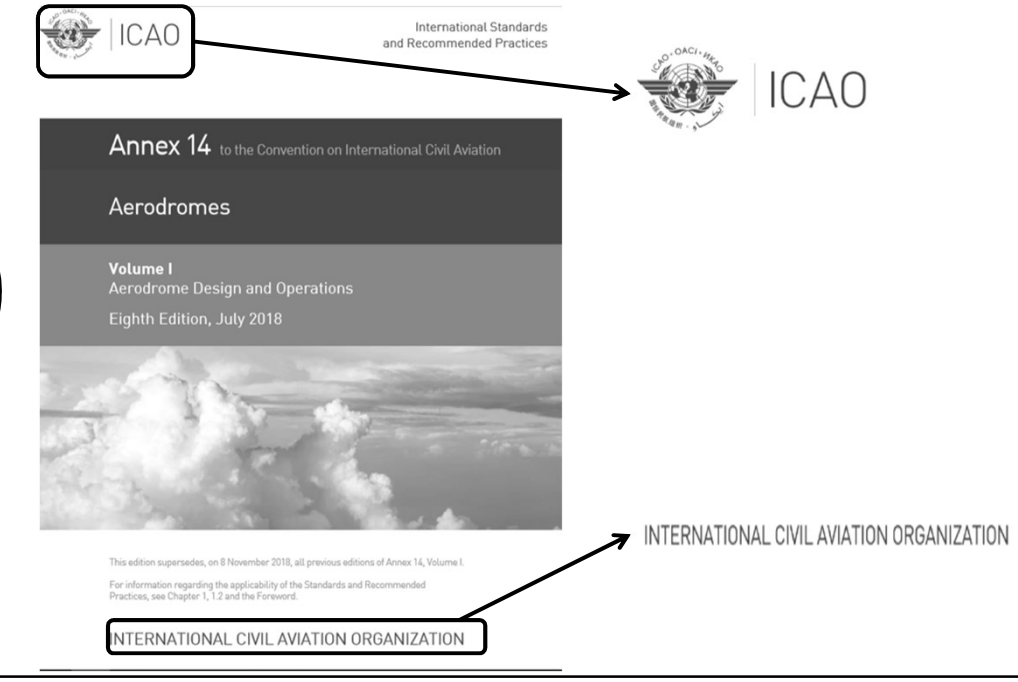

4

International Civil Aviation Organization (ICAO)

- A UN specialized agency, established in 1944 to manage the administration and governance of the Convention on International Civil Aviation (Chicago Convention)
- The Convention's 193 Member States and industry groups work to reach consensus on international civil aviation Standards and Recommended Practices (SARPs) and policies in support of a safe, efficient, secure, economically sustainable and environmentally responsible civil aviation sector

5

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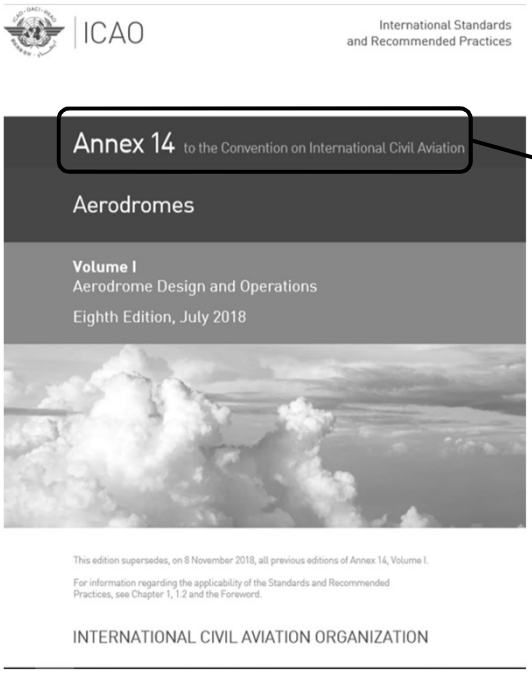

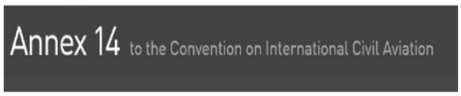

6

Convention on International Civil Aviation (Chicago Convention), 7 December 1944

- Established the International Civil Aviation Organization (ICAO),
- Establishes rules of airspace, aircraft registration and safety, security, and sustainability, and details the rights of the signatories in relation to air travel.
- Revised eight times (in 1959, 1963, 1969, 1975, 1980, 1997, 2000 and 2006)
- Supported by 19 Annexes that contain *Standards and Recommended Practices (SARPs)*
- Only applicable to civil aviation

7

Convention on International Civil Aviation (Chicago Convention) – Notable articles

- *Article 1*: Every state has complete and exclusive sovereignty over airspace above its territory.
- *Article 3 bis*: Every State must refrain from resorting to the use of weapons against civil aircraft in flight.
- *Article 5*: The aircraft of states, other than scheduled international air services, have the right to make flights across state's territories and to make stops without obtaining prior permission. However, the state may require the aircraft to make a landing.
- *Article 6*: (Scheduled air services) No scheduled international air service may be operated over or into the territory of a contracting State, except with the special permission or other authorization of that State.

8

Convention on International Civil Aviation (Chicago Convention)

- *Article 10*: (Landing at customs airports): The state can require that landing to be at a designated customs airport and similarly departure from the territory can be required to be from a designated customs airport.
- *Article 12*: Each state shall keep its own rules of the air as uniform as possible with those established under the convention, the duty to ensure compliance with these rules rests with the contracting state.
- *Article 13*: (Entry and Clearance Regulations) A state's laws and regulations regarding the admission and departure of passengers, crew or cargo from aircraft shall be complied with on arrival, upon departure and whilst within the territory of that state.
- *Article 16*: The authorities of each state shall have the right to search the aircraft of other states on landing or departure, without unreasonable delay.

9

LIST OF ANNEXES

Annex 1	Personnel Licensing
Annex 2	Rules of the Air
Annex 3	Meteorological Service for International Air Navigation
Annex 4	Aeronautical Charts
Annex 5	Units of Measurement to be Used in Air and Ground Operations
Annex 6	Operation of Aircraft
Annex 7	Aircraft Nationality and Registration Marks
Annex 8	Airworthiness of Aircraft
Annex 9	Facilitation
Annex 10	Aeronautical Telecommunications
Annex 11	Air Traffic Services
Annex 12	Search and Rescue
Annex 13	Aircraft Accident and Incident Investigation
Annex 14	Aerodromes
Annex 15	Aeronautical Information Services
Annex 16	Environmental Protection
Annex 17	Security: Safeguarding International Civil Aviation Against Acts of Unlawful Interference
Annex 18	The Safe Transport of Dangerous Goods by Air

10

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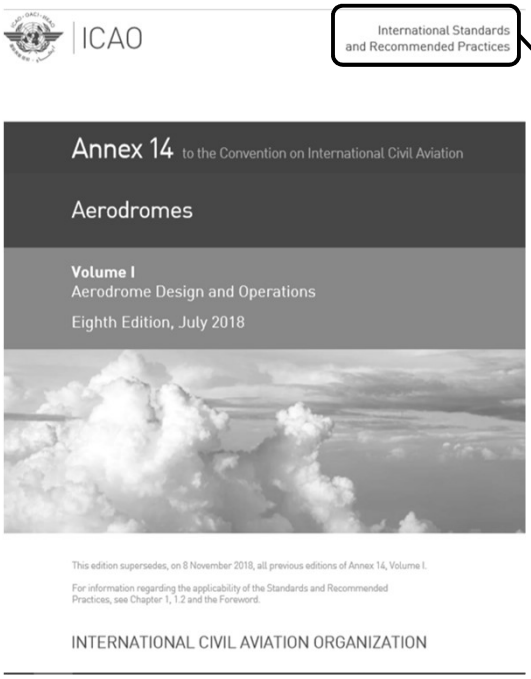

International Standards and Recommended Practices

11

International Standards & Recommended Practices (SARPs)

Spesifikasi teknikal yang digunakan ICAO berdasarkan Artikel 37 kepada Convention on International Civil Aviation untuk mencapai

"*The highest practicable degree of uniformity in regulations, standards, procedures and organization in relation to aircraft, personnel, airways and auxiliary services in all matters in which such uniformity will facilitate and improve air navigation*".

12

International Standards & Recommended Practices (SARPs)

Standard

"Any specification for physical characteristics, configuration, material, performance, personnel or procedure, the uniform application of which is recognised as necessary for the safety or regularity of international air navigation and to which Contracting States will conform in accordance with the Convention".

Standards have been printed in light face roman and the operative verb "shall" is used.

Surface of runways

3.1.22 The surface of a runway shall be constructed without irregularities that would impair the runway surface friction characteristics or otherwise adversely affect the take-off or landing of an aeroplane.

International Standards & Recommended Practices (SARPs)

Recommended Practice

"Any specification for physical characteristics, configuration, material, performance, personnel or procedure, the uniform application of which is recognised 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".

Recommended Practices have been printed in *light face italics* and the operative verb "should" is used.

Strength of runways

3.1.21 **Recommendation.**— *A runway should be capable of withstanding the traffic of aeroplanes the runway is intended to serve.*

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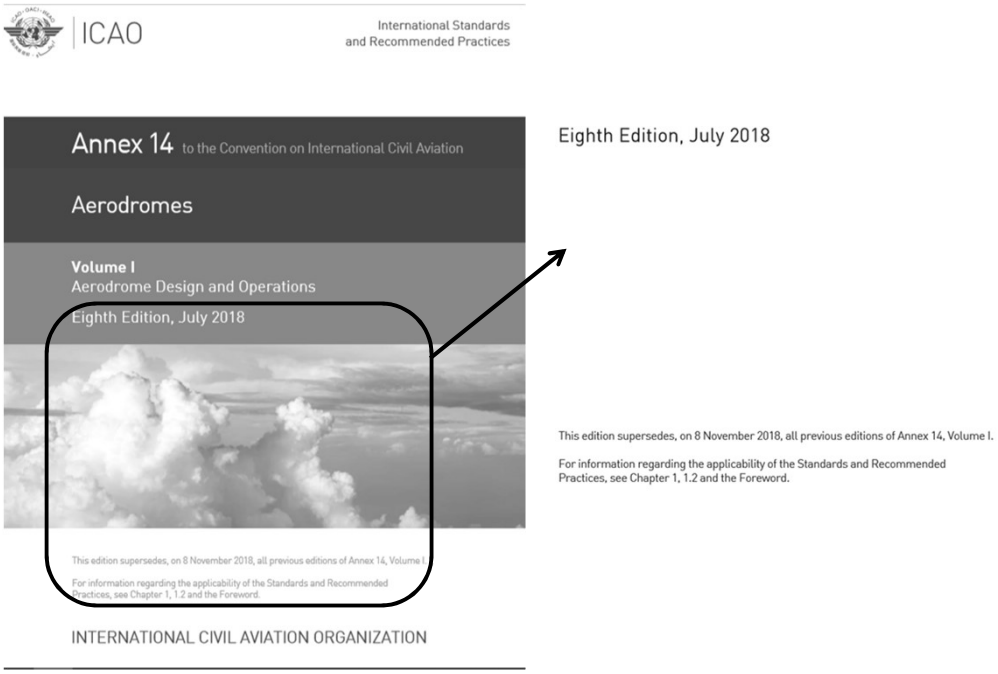
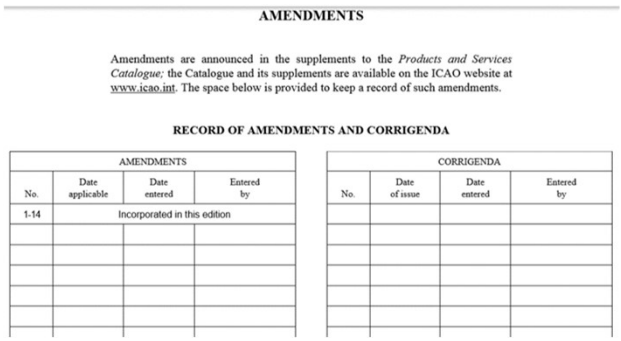


15

Amendments

The issue of amendments is announced regularly in the ICAO Journal and in the monthly Supplement to the Catalogue of ICAO Publications and Audio-visual Training Aids, which holders of this publication should consult. The space below is provided to keep a record of such amendments.



AMENDMENTS

Amendments are announced in the supplements to the *Products and Services Catalogue;* 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			
No.	Date applicable	Date entered	Entered by
1-14	Incorporated in this edition		

CORRIGENDA			
No.	Date of issue	Date entered	Entered by

16

16

Amendments

Amendment	*Source(s)*	*Subject(s)*	*Adopted/Approved Effective Applicable*
13-B	Third meeting of the Aerodromes Panel (AP/3) developed by the Friction Task Force	Enhanced global reporting format for assessing and reporting runway surface condition.	22 February 2016 11 July 2016 5 November 2020
14 (Annex 14, Volume I, 8th Edition)	Second meeting of the Aerodrome Design and Operations Panel (ADOP/2); Thirteenth meeting of the Instrument Flight Procedures Panel (IFPP/13); and Twelfth meeting of the Aeronautical Information Service (AIS) Aeronautical Information Management (AIM) Study Group (AIS-AIMSG/12).	Revised aerodrome reference code in Table 1-1; runway widths, shoulders, turn pads and strips; taxiway widths, shoulders and strips; reduced taxiway minimum separation distances; an amendment to update footnote e. in Table 4-1; and a consequential amendment, as a result of the restructuring of Annex 15 and the introduction of PANS-AIM (Doc 10066), relating to change of references, data quality requirements and performance-based data error detection requirements.	9 March 2018 16 July 2018 8 November 2018

17

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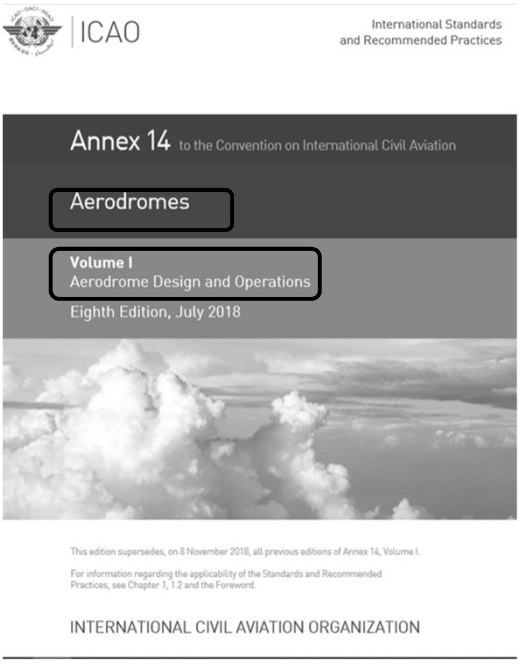
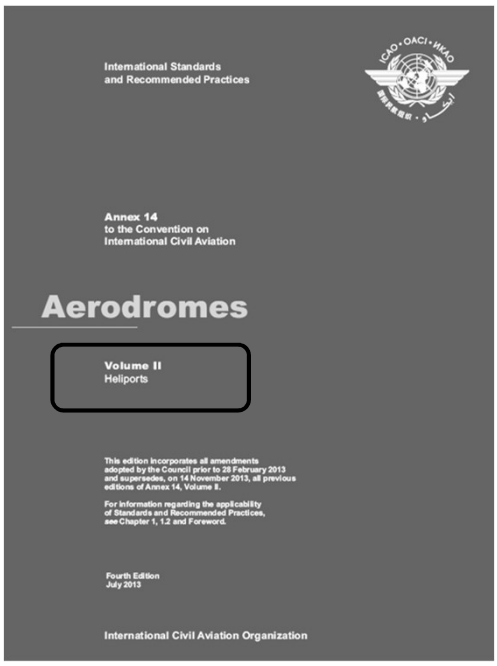




18

Aerodromes vs Heliports

Aerodromes

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

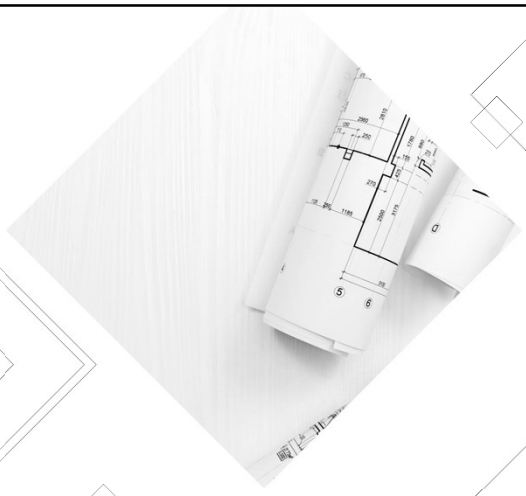
Heliport

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.

19

19

Publications Related to Annex 14



20

Related Publications

- **Aerodrome Design Manual (Doc 9157)**

  Part I - Runways

  Part 2 - Taxiways, Aprons and Holding Bays

  Part 3 - Pavements

  Part 4 - Visual Aids

  Part 5 - Electrical Systems

  Part 6 - Frangibility

21

Related Publications

- **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

22

Related Publications

- **Airport Planning Manual (Doc 9184)**

  Part I - Master Planning

  Part 2 - Land Use and Environmental Control

  Part 3 - Guidelines for Consultant/Construction Services
- **Manual on Certification of Aerodromes (Doc 9774)**
- **Safety Management Manual (SMM) (Doc 9859)**
- **Manual on the ICAO Bird Strike Information System (IBIS) (Doc 9332)**
- **Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476)**
- **Heliport Manual (Doc 9261)**

23

Related Publications

- ***Stolport Manual (Doc 9150)***
- ***World Geodetic System - 1984 (WGS-84) Manual (Doc 9674)***
- ***Aeronautical Information Services Manual (Doc 8126)***
- ***Air Traffic Services Planning Manual (Doc 9426)***
- ***Airworthiness Manual (Doc 9760)***
- ***Volume I - Organization and Procedures***
- ***Volume II - Design Certification and Continuing Airworthiness***
- ***Guidance on the Balanced Approach to Aircraft Noise Management (Doc 9829)***

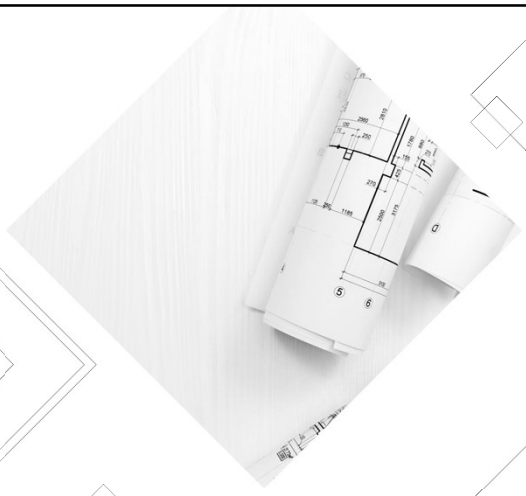
24

Related Publications

- ***Human Factors Training Manual (Doc 9683)***
- ***Manual of Aircraft Ground De-icing/Anti-icing Operations (Doc 9640)***
- ***Manual on Laser Emitters and Flight Safety (Doc 9815)***
- ***Procedures for Air Navigation Services - Aircraft Operations (PANS-OPS) (Doc 8168)***
- ***Volume I - Flight Procedures***
- ***Volume II - Construction of Visual and Instrument Flight Procedures***
- ***Procedures for Air Navigation Services - Air Traffic Management (PANS-ATM) (Doc 4444)***

25

ANNEX 14: TABLE OF CONTENTS



26

Annex 14: Table of Contents

27

Table of Contents

Appendices

Comprise of materials grouped separately for convenience but forming part of the Standards and Recommended Practices adopted by the Council.

Definitions

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.

28

28

Table of Contents

- **Tables and Figures**

  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.

Table 3-1. Taxiway minimum separation distances

Code letter	Distance between taxiway centre line and runway centre line (metres) — Instrument runways Code number 1	2	3	4	Non-instrument runways Code number 1	2	3	4	Taxiway centre line to taxiway centre line (metres)	Taxiway, other than aircraft stand taxilane, centre line to object (metres)	Aircraft stand taxilane centre line to aircraft stand taxilane centre line (metres)	Aircraft stand taxilane centre line to object (metres)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
A	77.5	77.5	–	–	37.5	47.5	–	–	23	15.5	19.5	12
B	82	82	152	–	42	52	87	–	32	20	28.5	16.5
C	88	88	158	158	48	58	93	93	44	26	40.5	22.5
D	–	–	166	166	–	–	101	101	63	37	59.5	33.5
E	–	–	172.5	172.5	–	–	107.5	107.5	76	43.5	72.5	40
F	–	–	180	180	–	–	115	115	91	51	87.5	47.5

Note 1.— The separation distances shown in columns (2) to (9) represent ordinary combinations of runways and taxiways. The basis for development of these distances is given in the Aerodrome Design Manual *(Doc 9157), Part 2.*

Note 2.— The distances in columns (2) to (9) do not guarantee sufficient clearance behind a holding aeroplane to permit the passing of another aeroplane on a parallel taxiway. See the Aerodrome Design Manual *(Doc 9157), Part 2.*

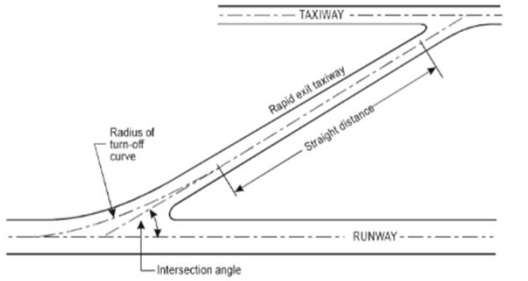


Figure 3-3. Rapid exit taxiway

29

29

CHAPTER 1:

GENERAL

30

1. GENERAL

- **Annex 14 Vol. 1 contains**

✈Standards and Recommended Practices (specifications) that prescribe the physical characteristics and obstacle limitation surfaces to be provided for at aerodromes, and

✈Certain facilities and technical services normally provided at an aerodrome.

It is not intended that these specifications limit or regulate the operation of an aircraft.

31

1. GENERAL

Annex 14 Vol. I does not contain:

✈ Specifications relating to the overall planning of aerodromes. (Information on these subjects is included in the Airport Planning Manual, Part 1)

✈ Specifications on aerodrome facilities related to aviation security (Annex 14, Vol. I contains several specifications aimed at enhancing the level of security at aerodrome.)

32

1. GENERAL

Definitions

The meanings of specialised technical terms used in Annex 14.

Precision approach runway, see ***Instrument runway.***

Primary runway(s). Runway(s) used in preference to others whenever conditions permit.

Protected flight zones. Airspace specifically designated to mitigate the hazardous effects of laser radiation.

Road. An established surface route on the movement area meant for the exclusive use of vehicles.

Road-holding position. A designated position at which vehicles may be required to hold.

Runway. A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

1. GENERAL

1.2 Applicability

- The specifications, unless otherwise indicated in a particular context, shall apply to all aerodromes open to public use in accordance with the requirements of Article 15 of the Convention.
- The specifications of Annex 14, Volume I, Chapter 3 shall apply only to land aerodromes.
- The specifications in this volume shall apply, where appropriate, to heliports but shall not apply to stolports.

1. GENERAL

1.3 Common Reference Systems

- **Horizontal reference system:**

  World Geodetic System - 1984 (WGS-84) shall be used as the horizontal (geodetic) reference system.

- **Vertical reference system**

  Mean sea level (MSL) datum shall be used as the vertical reference system.

- **Temporal reference system**

  The Gregorian calendar and Coordinated Universal Time (UTC) shall be used as the temporal reference system.

35

1. GENERAL

1.4 Certification of aerodromes

Aerodromes used for international operations are to be certified by the State responsible:

- according to Annex 14 specifications,
- through an appropriate regulatory framework, that has established certification criteria and requires a manual with pertinent aerodrome information, and
- that has a Safety Management System in operation

36

1. GENERAL

1.5 Airport Design

- Architectural and infrastructure-related requirements for the optimum implementation of international civil aviation security measures shall be integrated into the design and construction of new facilities and alterations to existing facilities at an aerodrome
- The design of aerodromes should take into account, where appropriate, land-use and environmental control measures.

37

1.6 AERODROME REFERENCE CODE

Table 1-1. Aerodrome reference code
(see 1.6.2 to 1.6.4)

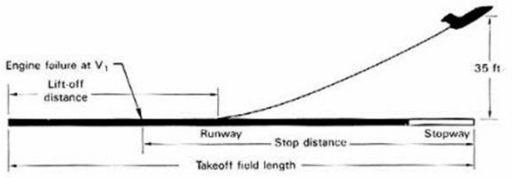
Code element 1	
Code number	Aeroplane reference field length
1	Less than 800 m
2	800 m up to but not including 1 200 m
3	1 200 m up to but not including 1 800 m
4	1 800 m and over
Code element 2	
Code letter	Wingspan
A	Up to but not including 15 m
B	15 m up to but not including 24 m
C	24 m up to but not including 36 m
D	36 m up to but not including 52 m
E	52 m up to but not including 65 m
F	65 m up to but not including 80 m

Note.— Guidance on planning for aeroplanes with wingspans greater than 80 m is given in the Aerodrome Design Manual *(Doc 9157), Parts 1 and 2.*

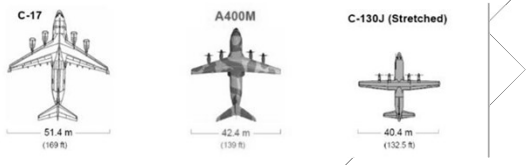
38

1.6 AERODROME REFERENCE CODE

- **Aeroplane Reference Field Length**
  - the minimum **field length** required for take-off at maximum certificated take-off mass, at sea level, in International Standard Atmosphere conditions in still air and with zero runway slope as documented in the **Aircraft Flight** Manual (AFM) or equivalent document



- **Wingspan**



39

1.6 AERODROME REFERENCE CODE

No.	Aircraft type	Code Element 1		Code 2		Aerodr. reference code
		Aeroplane reference field length, m	Code No.	Wing span, m	Code letter	
1.	DHC 6 (Twin Otter MasWing)	695		19.8		
2.	A320-200	2480		33.9		
3.	B737-800	2090		34.3		
4.	B747-400	2890		64.9		

40

40

1.6 AERODROME REFERENCE CODE

No.	Aircraft type	Code Element 1		Code 2		Aerodr. reference code
		Aeroplane reference field length, m	Code No.	Wing span, m	Code letter	
2.	Airbus A400M	980		42.4		
3.	Lockheed C130	1093		40.4		
4.	Casa CN 235	745		25.0		

41

1.6 AERODROME REFERENCE CODE

Part 1. Runways
Appendix 1. Aeroplane classification by code number and letter *A1-3*

Aircraft Make	*Model*	*Code*	*Aeroplane reference field length (m)*	*Wing span (m)*	*Outer main gear wheel span (m)*
Bombardier Aero.	CRJ 100	3B	1 470	21.2	4.0
	CRJ 100ER	3B	1 720	21.2	4.0
	CRJ 200	3B	1 440	21.2	4.0
	CRJ 200ER	3B	1 700	21.2	4.0
Dassault Aviation	Falcon 20	3B	1 463	16.3	3.7
	Falcon 200	3B	1 700	16.3	3.5
	F50/F50EX	3B	1 586	18.9	4.5
	Falcon 900	3B	1 504	19.3	4.6
	Falcon 900EX	3B	1 590	19.3	4.6
	F2000	3B	1 658	19.3	5.0
Embraer	EMB-135 LR	3B	1 745	20.0	4.1
Fokker	F28-1000	3B	1 646	23.6	5.8
	F28-2000	3B	1 646	23.6	5.8

42

CHAPTER 2:

AERODROME DATA

43

LIST OF MALAYSIA AIRPORTS

No.	City Served	State	ICAO	IATA	Airport Name
1	Alor Setar	Kedah	WMKA	AOR	Sultan Abdul Halim Airport[4] / RMAF Alor Setar
2	Bernam River	Perak	WMBR		Bernam River Airfield[5]
3	Butterworth	Penang	WMKB	BWH	RMAF Butterworth[6]
4	Bayan Lepas (away from George Town)	Penang	WMKP	PEN	Penang International Airport[7]
5	Gong Kedak	Terengganu /Kelantan	WMGK		RMAF Gong Kedak[8]
6	Ipoh	Perak	WMKI	IPH	Sultan Azlan Shah Airport[9]
7	Jendarata Estate, Teluk Intan	Perak	WMAJ		Jendarata Airport[1]
8	Kerteh	Terengganu	WMKE	KTE	Kerteh Airport[1]
9	Kluang	Johor	WMAP		Kluang Airport[10]
10	Kota Bharu	Kelantan	WMKC	KBR	Sultan Ismail Petra Airport[11] / RAF Kota Bharu
11	Kuala Terengganu	Terengganu	WMKN	TGG	Sultan Mahmud Airport[12]
12	Kuantan	Pahang	WMKD	KUA	Sultan Haji Ahmad Shah Airport[13] / RMAF Kuantan
13	Langkawi	Kedah	WMKL	LGK	Langkawi International Airport[14]
14	Batu Berendam	Malacca	WMKM	MKZ	Malacca International Airport[15]

44

LIST OF MALAYSIA AIRPORTS

No.	City Served	State	ICAO	IATA	Airport Name
15	Mersing	Johor	WMAU	MEP	Mersing Airport[1]
16	Pangkor Island (Pulau Pangkor)	Perak	WMPA	PKG	Pangkor Airport[1]
17	Redang Island (Pulau Redang)	Terengganu	WMPR	RDN	Redang Airport[16]
18	Senai (near Johor Bahru)	Johor	WMKJ	JHB	Senai International Airport[17]
19	Sepang (away from Kuala Lumpur city centre)	Selangor	WMKK	KUL	Kuala Lumpur International Airport[18]
20	Sitiawan	Perak	WMBA	SWY	Sitiawan Airport[1]
21	Subang (near Shah Alam)	Selangor	WMSA	SZB	Subang International Airport[19]
22	Sungai Besi	Kuala Lumpur	WMKF		Simpang Airport[20] / RMAF Sungai Besi/ RAF Kuala Lumpur
23	Taiping	Perak	WMBI	TPG	Taiping Airport[1] (Tekah Airport)
24	Tioman Island (Pulau Tioman)	Pahang	WMBT	TOD	Tioman Airport[21]

45

LIST OF MALAYSIA AIRPORTS

No.	City Served	State	ICAO	IATA	Airport Name
1	Ba'kelalan	Sarawak	WBGQ	BKM	**Ba'kelalan Airport[1]**
2	Bario	Sarawak	WBGZ	BBN	**Bario Airport[1]**
3	Belaga	Sarawak	WBGC	BLG	Belaga Airport[1]
4	Bintulu	Sarawak	WBGB	BTU	**Bintulu Airport[22]**
5	Kapit	Sarawak	WBGP	KPI	Kapit Airport[1]
6	Keningau	Sabah	WBKG	KGU	**Keningau Airport[1]**
7	Kota Kinabalu	Sabah	WBKK	BKI	**Kota Kinabalu International Airport[23]**
8	Kuching	Sarawak	WBGG	KCH	**Kuching International Airport[24] / RMAF Kuching**
9	Kudat	Sabah	WBKT	KUD	**Kudat Airport[1]**
10	Labuan	Labuan Federal Territory	WBKL	LBU	**Labuan Airport[25] / RMAF Labuan**
11	Lahad Datu	Sabah	WBKD	LDU	**Lahad Datu Airport[26]**
12	Lawas	Sarawak	WBGW	LWY	**Lawas Airport[1]**
13	Layang Layang Atoll	Sabah		LAC	Layang Layang Airport
14	Limbang	Sarawak	WBGJ	LMN	**Limbang Airport[27]**

46

LIST OF MALAYSIA AIRPORTS

No.	City Served	State	ICAO	IATA	Airport Name
15	Long Akah	Sarawak	WBGL	LKH	**Long Akah Airport**[1]
16	Long Banga	Sarawak|		LBP	**Long Banga Airport**[1]
17	Long Geng	Sarawak	WBGE		Long Geng Airport[28]
18	Long Lellang	Sarawak	WBGF	LGL	**Long Lellang Airport**[1]
19	Long Pasia	Sabah	WBKN	GSA	Long Pasia Airport[1]
20	Long Semado	Sarawak	WBGD	LSM	Long Semado Airport[1]
21	Long Seridan	Sarawak	WBGI	ODN	**Long Seridan Airport**[1]
22	Long Sukang	Sarawak	WBGU	LSU	Long Sukang Airport[29]
23	Marudi	Sarawak	WBGM	MUR	**Marudi Airport**[1]
24	Miri	Sarawak	WBGR	MYY	**Miri Airport**[30]
25	Mukah	Sarawak	WBGK	MKM	**Mukah Airport**[1]
26	Mulu	Sarawak	WBMU	MZV	**Mulu Airport**[1]
27	Pamol	Sabah	WBKP	PAY	Hutan Bakau Pamol Airport
28	Ranau	Sabah	WBKR	RNU	Ranau Airport

47

LIST OF MALAYSIA AIRPORTS

No.	City Served	State	ICAO	IATA	Airport Name
29	Sahabat	Sabah	WBKH	SXS	Sahabat Airport
30	Sandakan	Sabah	WBKS	SDK	**Sandakan Airport**[31]
31	Sematan	Sarawak	WBGN	BSE	Sematan Airport[32]
32	Semporna	Sabah	WBKA	SMM	Semporna Airport[1]
33	Sepulot	Sabah	WBKO	SPE	Sepulot Airport
34	Sibu	Sarawak	WBGS	SBW	**Sibu Airport**[33]
35	Sri Aman	Sarawak	WBGY	SGG	Simanggang Airport
36	Tanjung Manis, Mukah	Sarawak	WBGT		**Tanjung Manis Airport**[1]
37	Tawau	Sabah	WBKW	TWU	**Tawau Airport**[34]
38	Tommanggong	Sabah	WBKM	TMG	Tommanggong Airport[35]

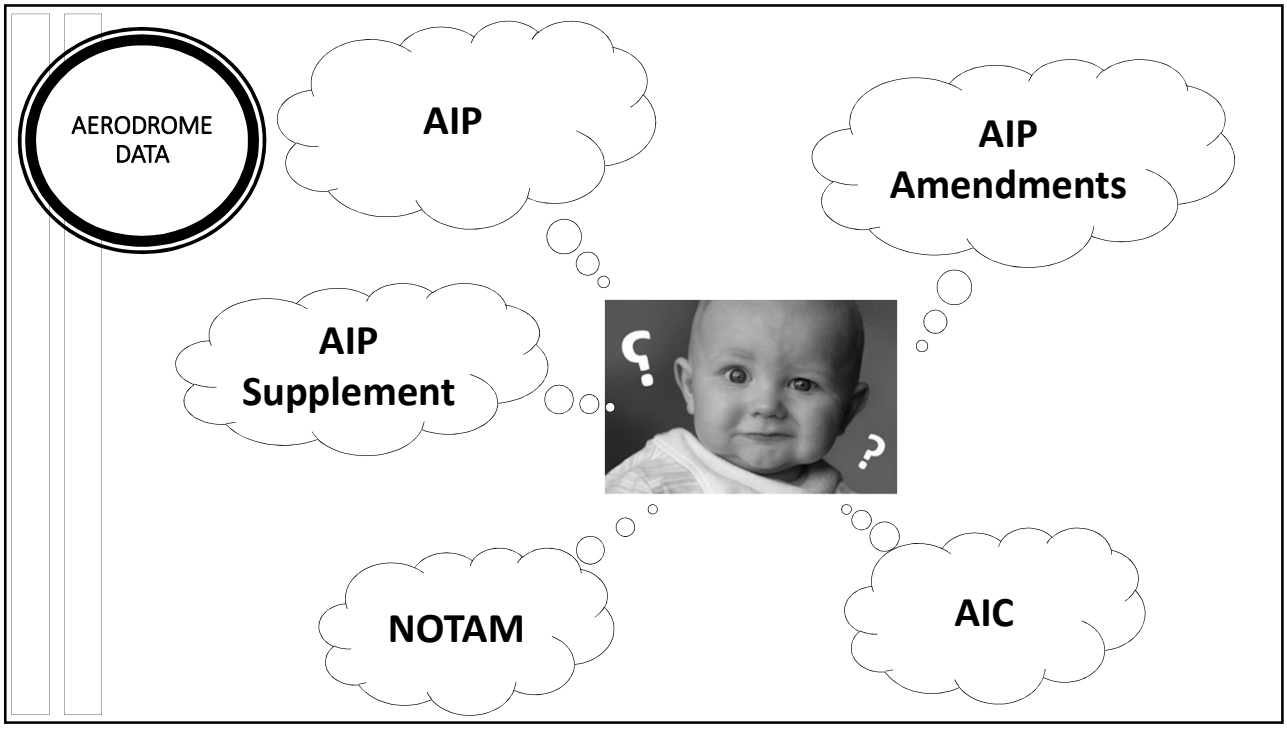
48

2. AERODROME DATA

Governing Documents

- Annex 15 : Aeronautical Information System
- ICAO Doc 8126 : Aeronautical Information Services Manual
- Annex 4 : Aeronautical Charts

49



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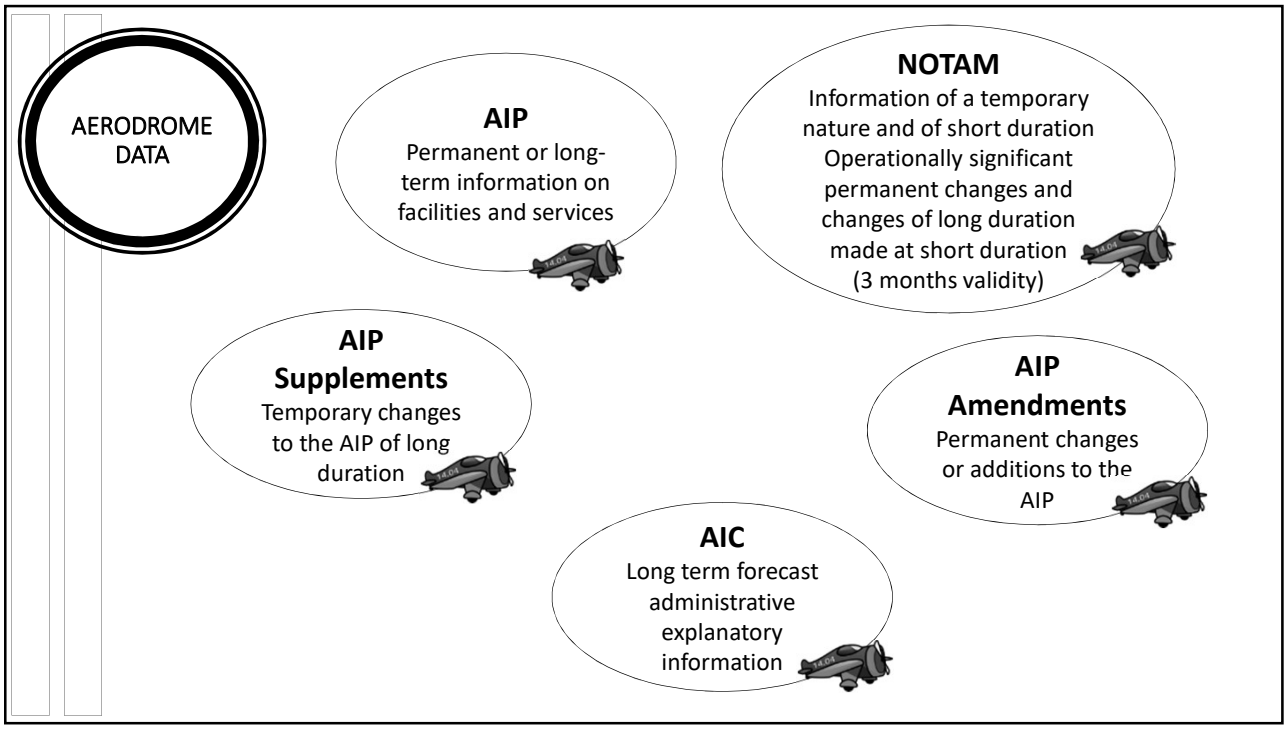
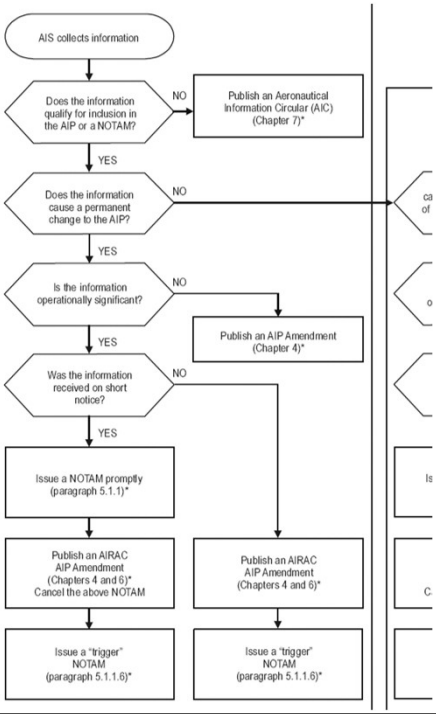


51

PERMANENT CHANGES

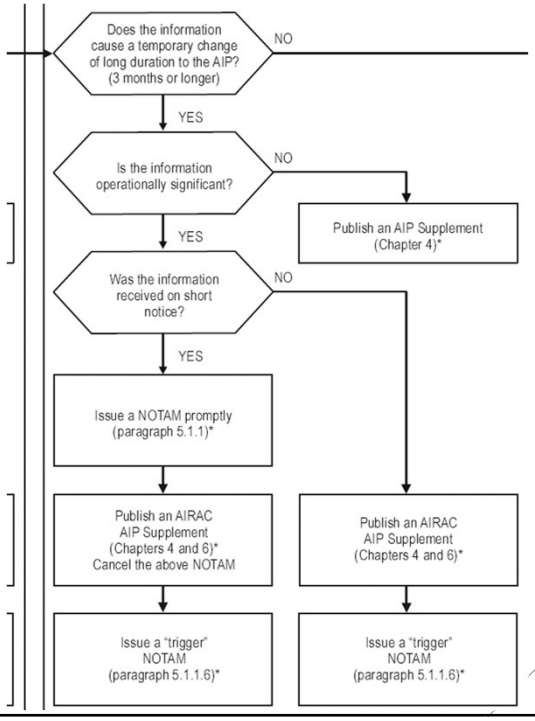
e.g. apron expansion



52

LONG DURATION

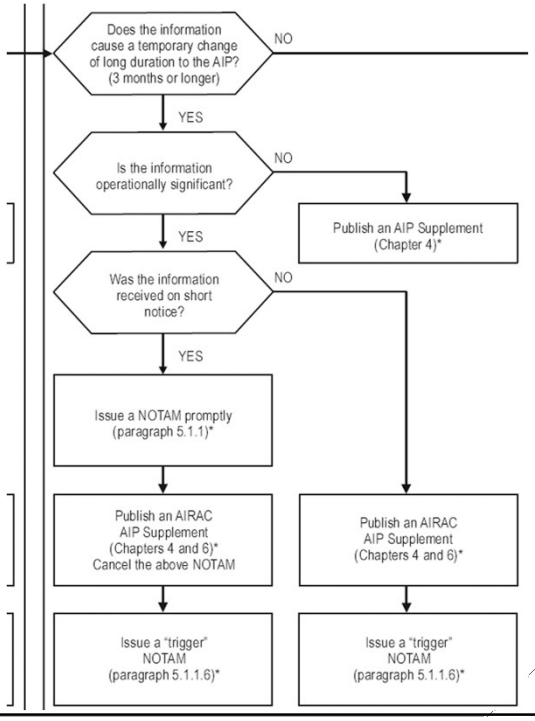
e.g. construction period



53

SHORT DURATION

e.g. twy closure due to HDD works



54

AIP SUPPLEMENT CYCLE AND AIP AMENDMENT NUMBER

AIC MALAYSIA

PHONE: 6-03-8871 4000
FAX: 6-03-8881 0530
AFTN: WMKKYAYS

AERONAUTICAL INFORMATION SERVICES
DEPARTMENT OF CIVIL AVIATION
LEVEL 1-4, PODIUM BLOCK,
NO. 27, PERSIARAN PERDANA,
PRECINCT 4,
62618 PUTRAJAYA,
MALAYSIA

03/2015
01 NOV

PUBLICATION OF
AIP SUPPLEMENTS AND AIP AMENDMENTS
TO AIP MALAYSIA FOR YEAR 2016

1. The pre-determined dates of the "Regulated System" for publication of aeronautical information applicable for 2016 are hereby notified for the information and guidance of all concerned.

2. Such publication shall be issued by AIP Supplement and identified by the acronym "AIRAC".

Cycle Number	Latest Date For Information To Reach AIS	Publication Date Of AIP Supplement	Effective Date Of Implementation
1/16	12. 11. 2015	26. 11. 2015	07. 01. 2016
2/16	10. 12. 2015	24. 12. 2015	04. 02. 2016
3/16	07. 01. 2016	21. 01. 2016	03. 03. 2016
4/16	04. 02. 2016	18. 02. 2016	31. 03. 2016
5/16	03. 03. 2016	17. 03. 2016	28. 04. 2016
6/16	31. 03. 2016	14. 04. 2016	26. 05. 2016
7/16	28. 04. 2016	12. 05. 2016	23. 06. 2016
8/16	26. 05. 2016	09. 06. 2016	21. 07. 2016
9/16	23. 06. 2016	07. 07. 2016	18. 08. 2016
10/16	21. 07. 2016	04. 08. 2016	15. 09. 2016
11/16	18. 08. 2016	01. 09. 2016	13. 10. 2016
12/16	15. 09. 2016	29. 09. 2016	10. 11. 2016
13/16	13. 10. 2016	27. 10. 2016	08. 12. 2016

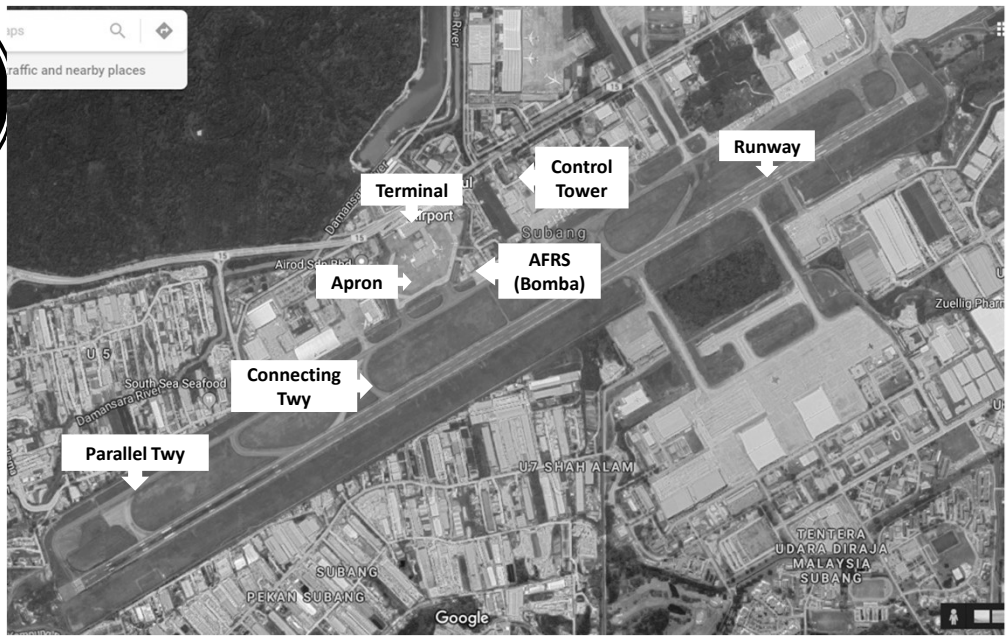
55

CHAPTER 3:

PHYSICAL CHARACTERISTICS

56

AERODROME COMPONENTS



57

RUNWAY LENGTH

- **Factors influencing runway length**

a) Performance characteristics of aircraft
b) Landing & take-off gross weight of aircraft
c) Elevation of the airport
d) Average maximum air temperature at the airport
e) Runway gradient

58

RUNWAY WIDTH

3.1.10 **Recommendation.**— *The width of a runway should be not less than the appropriate dimension specified in the following tabulation:*

Code number	Outer Main Gear Wheel Span (OMGWS)			
	Up to but not including 4.5 m	4.5 m up to but not including 6 m	6 m up to but not including 9 m	9 m up to but not including 15 m
1[a]	*18 m*	*18 m*	*23 m*	–
2[a]	*23 m*	*23 m*	*30 m*	–
3	*30 m*	*30 m*	*30 m*	*45 m*
4	–	–	*45 m*	*45 m*

a. The width of a precision approach runway should be not less than 30 m where the code number is 1 or 2.

RUNWAY CLEARANCE

3.1.12 Distance between parallel runway (CL to CL)

- 1035m for independent parallel approaches
- 915m for dependent parallel approaches
- 760m for independent parallel departures
- 760m for segregated parallel operations

RUNWAY SLOPES

3.1.13 Longitudinal slopes

- 1 % for code number 3 or 4
- 2 % for code number 1 or 2

3.1.19 Transverse slopes

- 1.5 % for code letter C,D,E or F
- 2 % for code letter A or B

61

RUNWAY SURFACE

3.1.22 Surface of Runways

- Constructed without irregularities that would result in loss in friction characteristics or otherwise adversely affect the take-off or landing of an aeroplane (Minimum Friction Level (MFL) μ is specified by local air authority. A value less than 0.34 is seen by ICAO as slippery)
- Provide good friction characteristics when the runway is wet
- Avg surface texture depth of a new surface should be NOT LESS than 1.0mm
- Runway grooves should be perpendicular to the runway centre line

62

RUNWAY SHOULDERS

3.2 Runway Shoulders

- Should be provided for a runway where the code letter is D, E or F

3.2.2 Width of Runway Shoulders

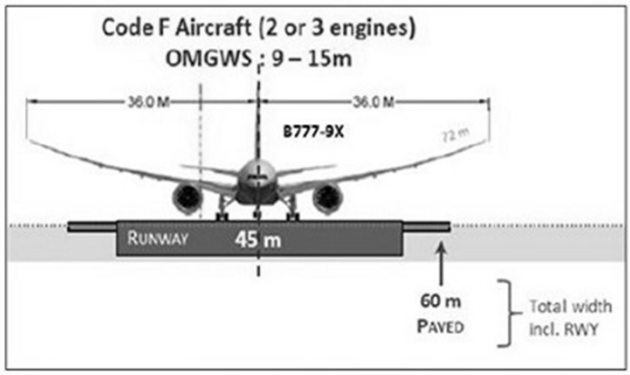
- 60m for code letter D or E (rwy+rwy shoulder)
- 60m for code letter F with two or three engine aeroplanes (rwy+rwy shoulder)
- 75m for code letter F with four or more engine aeroplanes (rwy+rwy shoulder)

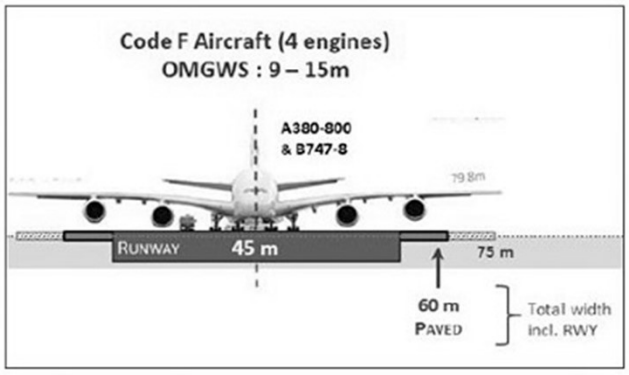
3.2.3 Slopes on Runway Shoulders

- Should not exceed 2.5%

63

RUNWAY SHOULDERS





64

RUNWAY SHOULDER

3.2.4 Strength of Runway Shoulders

- The portion of a runway shoulder between the runway edge and a distance of 30m from the runway centre line should be constructed as to be capable of supporting an aeroplane without inducing structural damage to the aeroplane and ground service equipment.

65

RUNWAY STRIPS

3.4 Runway Strips

- An object situated on a runway which may endanger aeroplanes should be regarded as an obstacle and should, as far as practicle, be removed.

3.4.3 Width of Runway Strips

- 140m for code number 3 or 4 (from rwy centerline)
- 70m for code number 1 or 2 (from rwy centerline)

66

RUNWAY STRIPS

3.4.8 Grading of Runway Strips (Instrument Rwy)

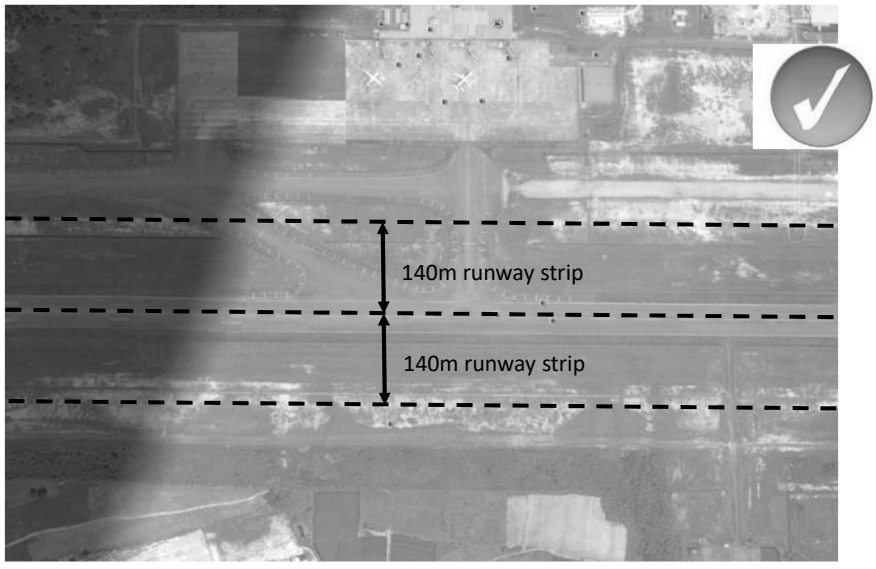
- 75 m for code number 3 or 4 (from rwy centerline)
- 40m for code number 1 or 2 (from rwy centerline)

3.4.15 Transverse Slopes Runway Strips

- 2.5% for code number 3 or 4
- 3% for code number 1 or 2

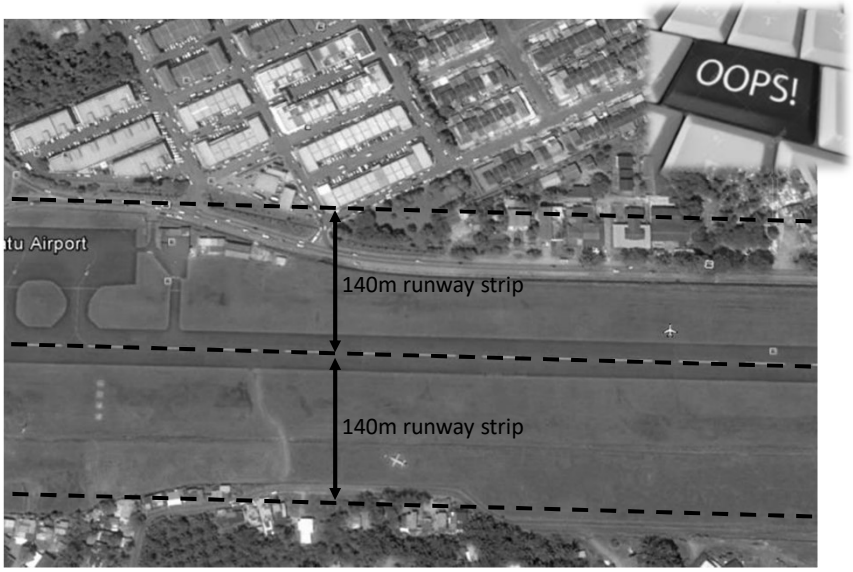
67

RUNWAY STRIPS



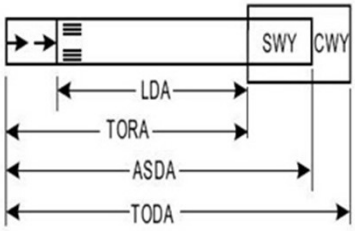
68

RUNWAY STRIPS



69

RUNWAY DECLARED DISTANCES



- **LDA : Landing Distance Available**
  - length of the runway which is declared **available** by the appropriate Authority and is suitable for the ground run of an aeroplane **landing**
- **CWY: Clearway**
  - area beyond the runway not less than 152m wide centrally located about the extended centerline of the runway and under the control of airport authorities
- **SWY: Stopway**
  - area at the end of take-off runway no less wide than the runway and centered upon extended centerline of runway and able to support the aeroplane during an aborted take-off without causing structural damage to the aeroplane
- **TORA (Take off Run Available)**
  - length of runway suitable for normal operations
- **TODA (Take off Distance Available)**
  - length of runway plus any clearway if available. TODA includes ground as well as air segments.
- **ASDA (Accelerate-Stop Distance Available)**
  - In case take off is aborted the aircraft can be brought to a stop either on the runway or on Stopway.

70

TAXIWAY WIDTH

3.9.4 Width of Taxiway

3.9.4 **Recommendation.**— *A straight portion of a taxiway should have a width of not less than that given by the following tabulation:*

	OMGWS			
	Up to but not including 4.5 m	4.5 m up to but not including 6 m	6 m up to but not including 9 m	9 m up to but not including 15 m
Taxiway width	7.5 m	10.5 m	15 m	23 m

Note.— Guidance on width of taxiways is given in the Aerodrome Design Manual *(Doc 9157), Part 2.*

71

TAXIWAY MINIMUM SEPARATION DISTANCES

Table 3-1. Taxiway minimum separation distances

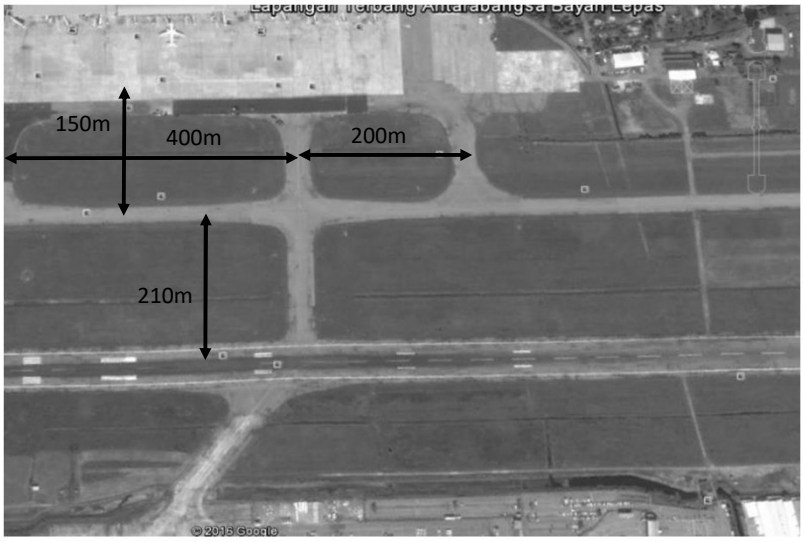
Code letter	Distance between taxiway centre line and runway centre line (metres) — Instrument runways Code number 1	2	3	4	Non-instrument runways Code number 1	2	3	4	Taxiway centre line to taxiway centre line (metres)	Taxiway, other than aircraft stand taxilane, centre line to object (metres)	Aircraft stand taxilane centre line to aircraft stand taxilane centre line (metres)	Aircraft stand taxilane centre line to object (metres)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
A	77.5	77.5	–	–	37.5	47.5	–	–	23	15.5	19.5	12
B	82	82	152	–	42	52	87	–	32	20	28.5	16.5
C	88	88	158	158	48	58	93	93	44	26	40.5	22.5
D	–	–	166	166	–	–	101	101	63	37	59.5	33.5
E	–	–	172.5	172.5	–	–	107.5	107.5	76	43.5	72.5	40
F	–	–	180	180	–	–	115	115	91	51	87.5	47.5

Note 1.— The separation distances shown in columns (2) to (9) represent ordinary combinations of runways and taxiways. The basis for development of these distances is given in the Aerodrome Design Manual *(Doc 9157), Part 2.*

Note 2.— The distances in columns (2) to (9) do not guarantee sufficient clearance behind a holding aeroplane to permit the passing of another aeroplane on a parallel taxiway. See the Aerodrome Design Manual *(Doc 9157), Part 2.*

72

TAXIWAY MINIMUM SEPARATION DISTANCES



73

TAXIWAY SLOPES AND SURFACE

3.9.11 Transverse Slopes

- 1.5% for code letter C,D,E or F
- 2% for code letter A or B

3.9.13 Surface of Taxiway

- Should not have irregularities that can cause damage to aeroplane structures
- Should be so constructed as to provide good friction characteristics when the taxiway is wet

74

74

TAXIWAY SHOULDER

3.10 Taxiway Shoulder

- 44m for code letter F (twy+twy shoulder)
- 38m for code letter E (twy+twy shoulder)
- 34m for code letter D (twy+twy shoulder)
- 25m for code letter C (twy+twy shoulder)

75

TAXIWAY STRIPS

Code letter	Taxiway, other than aircraft stand taxilane, centre line to object (metres)
(1)	(11)
A	15.5
B	20
C	26
D	37
E	43.5
F	51

3.11 Taxiway Strips

- The taxiway strip should provide an area clear of objects which may endanger taxiing aeroplanes

3.11.2 Width of Taxiway Strips

- A taxiway strip should extend symmetrically on each side of the centre line of the taxiway throughout the length of the taxiway to at least the distance from the centre line given in Table 3-1, column 11.

76

TAXIWAY STRIPS AND SLOPES

3.11.4 Grading of Taxiway Strips (from twy centerline)

- 10.25m for OMGWS < 4.5m
- 11.0m for 4.5m ≤ OMGWS <6m
- 12.5m for 6m ≤ OMGWS <9m
- 18.5m for 9m ≤ OMGWS <15m ; Code letter D
- 19.0m for 9m ≤ OMGWS <15m ; Code letter E
- 22.0m for 9m ≤ OMGWS <15m ; Code letter F

3.11.5 Transverse Slopes

- 2.5% for code letter C,D,E or F
- 3% for code letter A or B
- 5% beyond taxiway strip

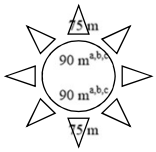
77

77

HOLDING POSITIONS

Table 3-2. Minimum distance from the runway centre line to a holding bay, runway-holding position or road-holding position

Type of runway	Code number 1	2	3	4
Non-instrument	30 m	40 m	75 m	75 m
Non-precision approach	40 m	40 m	75 m	75 m
Precision approach category I	60 m[b]	60 m[b]	90 m[a,b]	90 m[a,b,c]
Precision approach categories II and III	—	—	90 m[a,b]	90 m[a,b,c]
Take-off runway	30 m	40 m	75 m	75 m



a. If a holding bay, runway-holding position or road-holding position is at a lower elevation compared to the threshold, the distance may be decreased 5 m for every metre the bay or holding position is lower than the threshold, contingent upon not infringing the inner transitional surface.

b. This distance may need to be increased to avoid interference with radio navigation aids, particularly the glide path and localizer facilities. Information on critical and sensitive areas of ILS and MLS is contained in Annex 10, Volume I, Attachments C and G, respectively (see also 3.12.6).

Note 1.— The distance of 90 m for code number 3 or 4 is based on an aircraft with a tail height of 20 m, a distance from the nose to the highest part of the tail of 52.7 m and a nose height of 10 m holding at an angle of 45° or more with respect to the runway centre line, being clear of the obstacle free zone and not accountable for the calculation of OCA/H.

Note 2.— The distance of 60 m for code number 2 is based on an aircraft with a tail height of 8 m, a distance from the nose to the highest part of the tail of 24.6 m and a nose height of 5.2 m holding at an angle of 45° or more with respect to the runway centre line, being clear of the obstacle free zone.

c. Where the code letter is F, this distance should be 107.5 m.

Note.— The distance of 107.5 m for code number 4 where the code letter is F is based on an aircraft with a tail height of 24 m, a distance from the nose to the highest part of the tail of 62.2 m and a nose height of 10 m holding at an angle of 45° or more with respect to the runway centre line, being clear of the obstacle free zone.

78

APRONS

3.13 Aprons

- Aprons should be provided where necessary to permit the on- and off-loading of passenger, cargo or mail as well as the servicing of aircraft without interfering with the aerodrome traffic
- Permit expeditious handling of the aerodrome traffic at its maximum anticipated density

3.13.4 Slopes on apron

- SHOULD NOT EXCEED 1%

79

79

APRONS

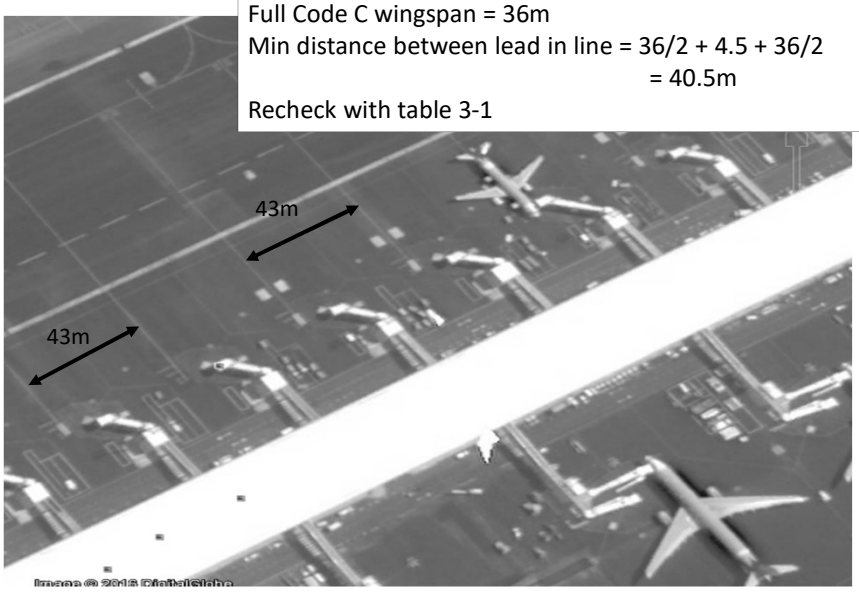
3.13.6 Clearance distances on aircraft stands

Code letter	Clearance
A	3m
B	3m
C	4.5m
D	7.5m
E	7.5m
F	7.5m

80

80

APRONS



Full Code C wingspan = 36m
Min distance between lead in line = 36/2 + 4.5 + 36/2
= 40.5m
Recheck with table 3-1

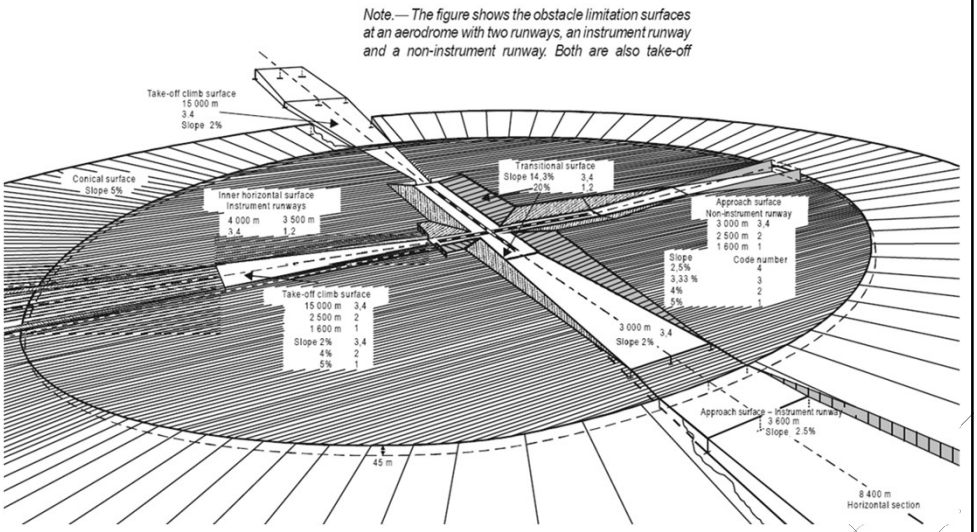
81

CHAPTER 4:

OBSTACLE RESTRICTION AND REMOVAL

82

OBSTACLE LIMITATION SURFACE



83

OBSTACLE LIMITATION SURFACE

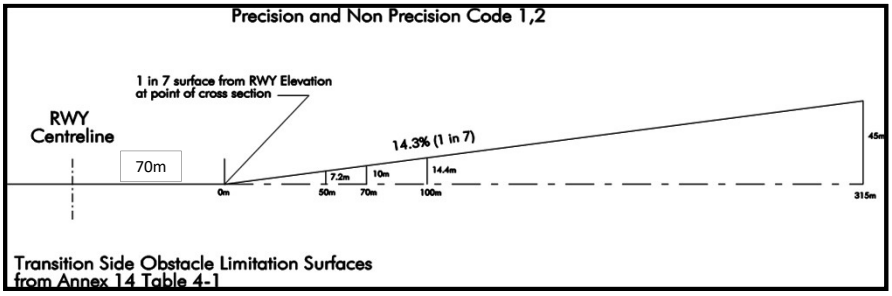
Table 4-1. Dimensions and slopes of obstacle limitation surfaces — Approach runways

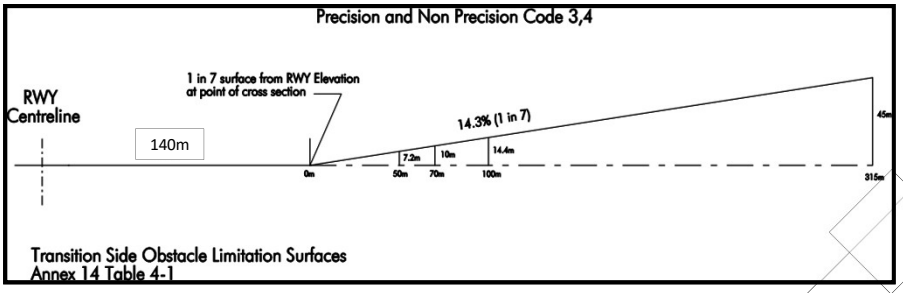
APPROACH RUNWAYS

	RUNWAY CLASSIFICATION									
	Non-instrument Code number				Non-precision approach Code number			Precision approach category I Code number		II or III Code number
Surface and dimensions[a]	1	2	3	4	1,2	3	4	1,2	3,4	3,4
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CONICAL										
Slope	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Height	35 m	55 m	75 m	100 m	60 m	75 m	100 m	60 m	100 m	100 m
INNER HORIZONTAL										
Height	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m
Radius	2 000 m	2 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m
INNER APPROACH										
Width	—	—	—	—	—	—	—	90 m	120 m[e]	120 m[e]
Distance from threshold	—	—	—	—	—	—	—	60 m	60 m	60 m
Length	—	—	—	—	—	—	—	900 m	900 m	900 m
Slope								2.5%	2%	2%
APPROACH										
Length of inner edge	60 m	80 m	150 m	150 m	140 m	280 m	280 m	140 m	280 m	280 m
Distance from threshold	30 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m
Divergence (each side)	10%	10%	10%	10%	15%	15%	15%	15%	15%	15%
First section										
Length	1 600 m	2 500 m	3 000 m	3 000 m	2 500 m	3 000 m	3 000 m	3 000 m	3 000 m	3 000 m
Slope	5%	4%	3.33%	2.5%	3.33%	2%	2%	2.5%	2%	2%
Second section										
Length	—	—	—	—	—	3 600 m[b]	3 600 m[b]	12 000 m	3 600 m[b]	3 600 m[b]
Slope	—	—	—	—	—	2.5%	2.5%	3%	2.5%	2.5%
Horizontal section										
Length	—	—	—	—	—	8 400 m[b]	8 400 m[b]	—	8 400 m[b]	8 400 m[b]
Total length	—	—	—	—	—	15 000 m	15 000 m	15 000 m	15 000 m	15 000 m
TRANSITIONAL										
Slope	20%	20%	14.3%	14.3%	20%	14.3%	14.3%	14.3%	14.3%	14.3%
INNER TRANSITIONAL										
Slope	—	—	—	—	—	—	—	40%	33.3%	33.3%
BALKED LANDING SURFACE										
Length of inner edge	—	—	—	—	—	—	—	90 m	120 m[e]	120 m[e]
Distance from threshold	—	—	—	—	—	—	—	c	1 800 m[d]	1 800 m[d]
Divergence (each side)	—	—	—	—	—	—	—	10%	10%	10%
Slope	—	—	—	—	—	—	—	4%	3.33%	3.33%

84

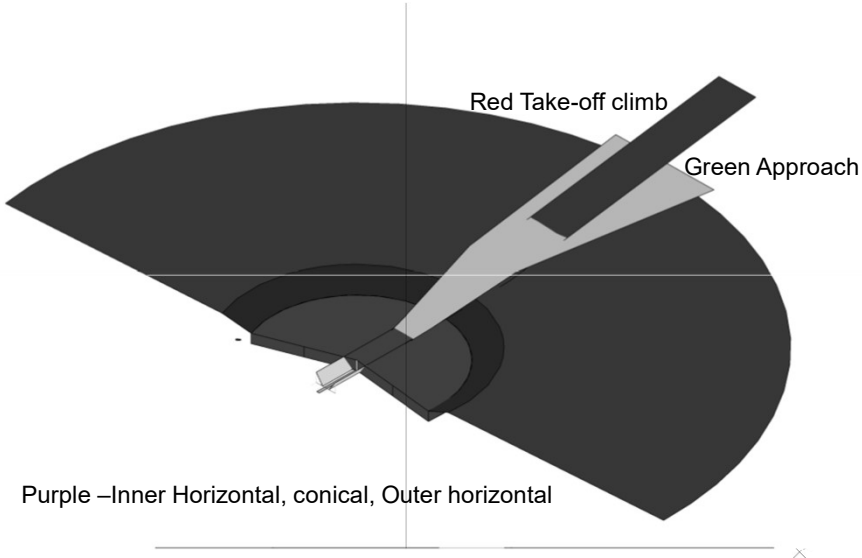
TRANSITION SLOPE





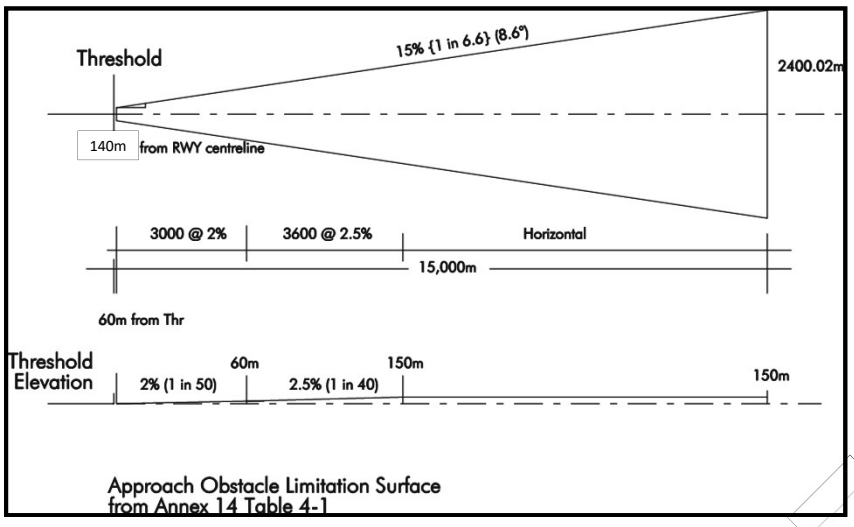
85

OBSTACLE LIMITATION SURFACES



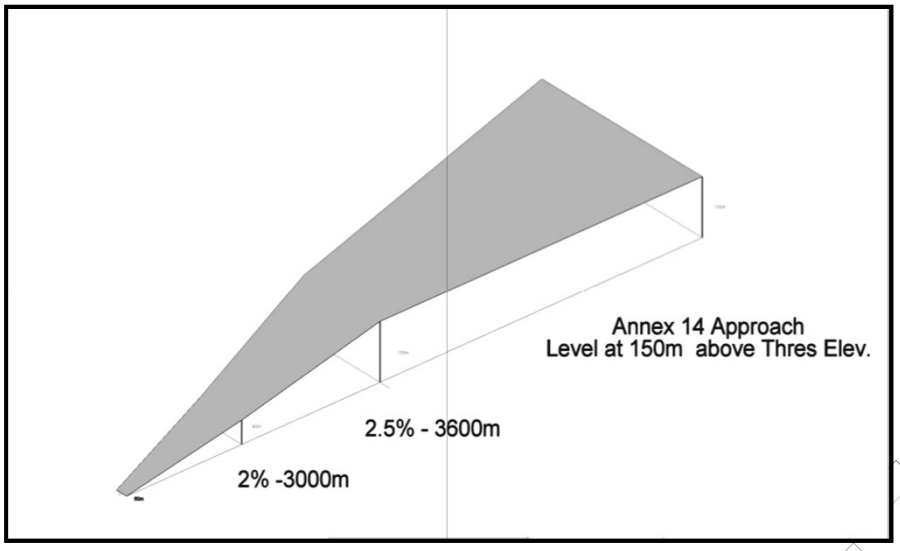
86

APPROACH SLOPE



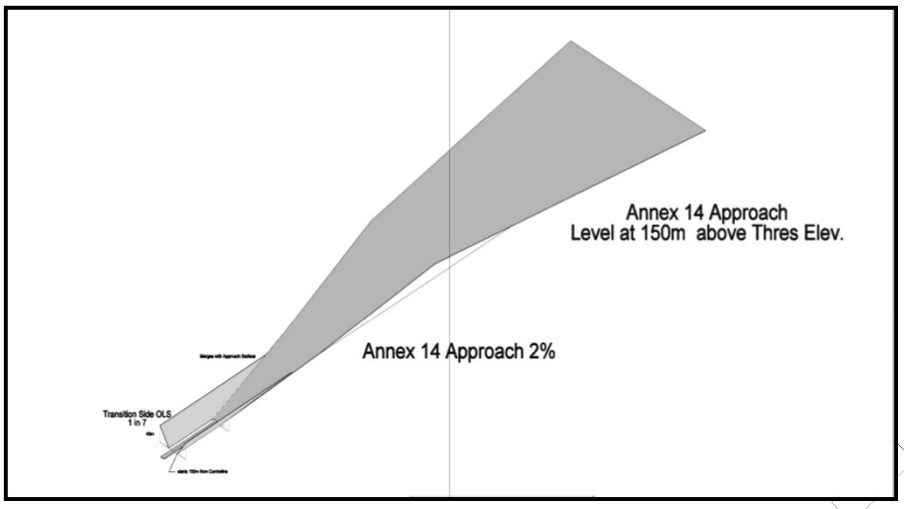
87

APPROACH SLOPE



88

TRANSITION & APPROACH SLOPES



89

TAKE OFF SLOPE

Table 4-2. Dimensions and slopes of obstacle limitation surfaces

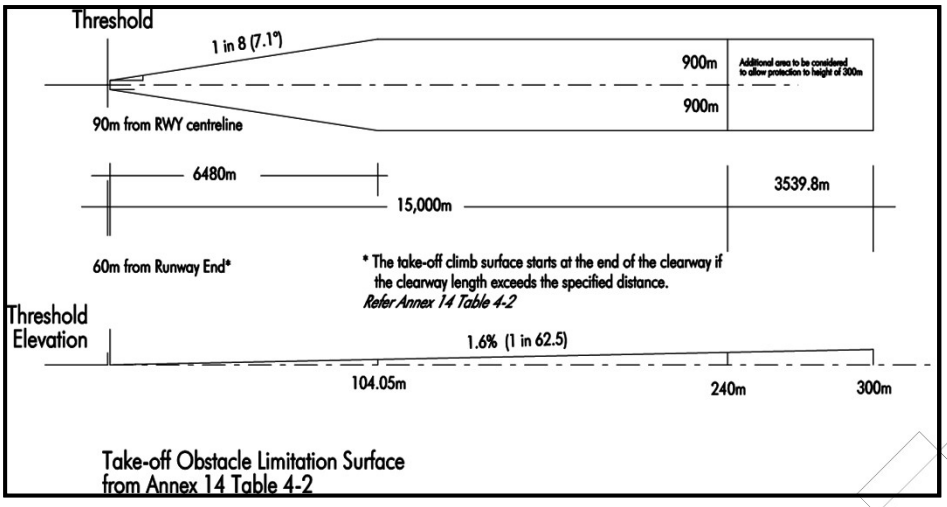
RUNWAYS MEANT FOR TAKE-OFF

Surface and dimensions[a] (1)	Code number 1 (2)	2 (3)	3 or 4 (4)
TAKE-OFF CLIMB			
Length of inner edge	60 m	80 m	180 m
Distance from runway end[b]	30 m	60 m	60 m
Divergence (each side)	10%	10%	12.5%
Final width	380 m	580 m	1 200 m 1 800 m[c]
Length	1 600 m	2 500 m	15 000 m
Slope	5%	4%	2%[d]

d. If no object reaches the 2 per cent (1:50) take-off climb surface, new objects should be limited to preserve the existing obstacle free surface or a surface down to a slope of 1.6 per cent (1:62.5).

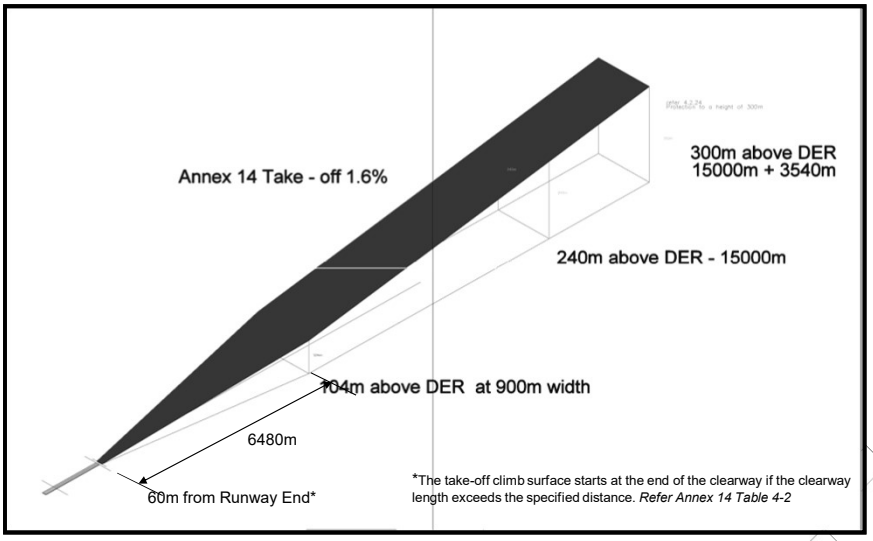
90

TAKE OFF SLOPE



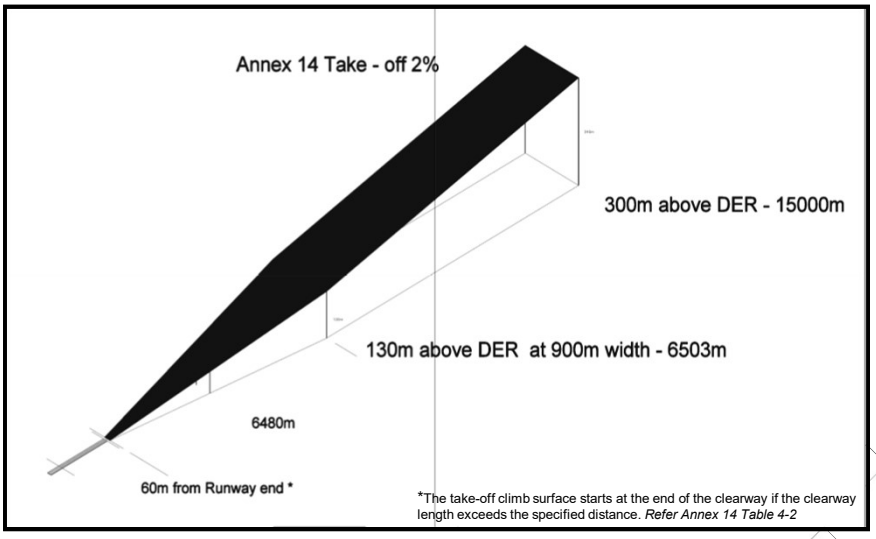
91

TAKE OFF SLOPE



92

TAKE OFF SLOPE



93