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

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Ref.: AN 4/1.2.31-25/23 24 April 2025

Subject: Adoption of Amendment 18 to Annex 14, Volume I

Action required: a) Notify any disapproval before 4 August 2025; b) Notify any differences and compliance before 27 October 2025[1]; c) Consider the use of the Electronic Filing of Differences (EFOD) System for notification of differences and compliance

Sir/Madam,

1. I have the honour to inform you that Amendment 18 to the *International Standards and Recommended Practices, Aerodromes*, *Aerodrome Design and Operations* (Annex 14, Volume I to the Convention on International Civil Aviation) was adopted by the Council at the twelfth meeting of its 234th Session on 28 March 2025. Copies of the Amendment and the Resolution of Adoption are available as attachments to the electronic version of this State letter on the ICAO-NET.

2. When adopting the amendment, the Council prescribed 4 August 2025 as the date on which it will become effective, except for any part concerning which a majority of Contracting States have registered their disapproval before that date. In addition, the Council resolved that Amendment 18, to the extent it becomes effective, will become applicable on 27 November 2025[2] unless otherwise indicated.

3. Amendment 18 arises from recommendations of the fourth meeting of the Aerodromes Design and Operations Panel (ADOP/4) concerning aerodrome design, visual aids, ground handling and apron management service and obstacle limitation surfaces (OLS).

4. The amendment concerning aerodrome design aims to better reflect the required strip width for code number 3 runways and will erase the geometric discrepancy in the widths of runway strips between the various code numbers for non-instrument (NINST) runways.

5. The amendment related to visual aids concerns runway distance remaining signs (RDRS); harmonization of aerodrome lighting requirements for CAT II operations below 350 m; threshold marking for paved runways; and visual aids to denote temporary runway closures and any other changes to the

[1] 26 October 2026 for provisions related to ground handling and 21 October 2030 for provisions related to obstacle limitation surfaces.

[2] 26 November 2026 for provisions related to ground handling and 21 November 2030 for provisions related to obstacle limitation surfaces.

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movement area at an operational aerodrome, etc. This amendment will help improve operational safety by providing enhanced situational awareness to pilots through aerodrome visual aids. The existing discrepancies between the design of visual aids and its operational requirements have also been addressed in this amendment.

6. The amendment concerning ground handling contains basic provisions related to the safety oversight of ground handling. These provisions will help improve aviation safety through the reduction of accidents, incidents and overall occurrences to aircraft, aerodrome facilities and personnel. The amendment on apron management service will encourage apron management services to consider the requirements related to ground handling safety when manoeuvring the aircraft onto and off the stand, in order to safeguard the aircraft and ensure safety of personnel working around it.

7. The amendment concerning obstacle limitation surfaces (OLS) includes a set (or sets) of surfaces with clear purposes and characteristics ensuring that only the surfaces required are adopted, and that they are performance-based and are adaptable to the type of operations conducted at the aerodrome.

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

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

a) that before 4 August 2025, you inform me if there is any part of the adopted Standards and Recommended Practices (SARPs) amendments in Amendment 18 concerning which your Government wishes to register disapproval, using the form in Attachment B for this purpose. Please note that only statements of disapproval need be registered and if you do not reply it will be assumed that you do not disapprove of the amendment;

b) that before 27 October 2025[1] you inform me of the following, using the Electronic Filing of Differences (EFOD) System or the form in Attachment C for this purpose:

1) any differences that will exist on 27 November 2025[2] between the national regulations or practices of your Government and the provisions of the whole of Annex 14, Volume I as amended by all amendments up to and including Amendment 18 and thereafter of any further differences that may arise; and

2) the date or dates by which your Government will have complied with the provisions of the whole of Annex 14, Volume I, as amended by all amendments up to and including Amendment 18.

10. With reference to the request in paragraph 9 a) above, it should be noted that a registration of disapproval of Amendment 18 or any part of it in accordance with Article 90 of the Convention does not constitute a notification of differences under Article 38 of the Convention. To comply with the latter provision, a separate statement is necessary if any differences do exist, as requested in paragraph 9 b) 1). It is recalled in this respect that international Standards in Annexes have a conditional binding force, to the

[1] 26 October 2026 for provisions related to ground handling and 21 October 2030 for provisions related to obstacle limitation surfaces.

[2] 26 November 2026 for provisions related to ground handling and 21 November 2030 for provisions related to obstacle limitation surfaces.

extent that the State or States concerned have not notified any difference thereto under Article 38 of the Convention.

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

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

13. I would appreciate it if you would also send a copy of your notifications, referred to in paragraph 9 b) above, to the ICAO Regional Office accredited to your Government.

14. At the fifth meeting of its 204th Session, the Council requested that States, when being advised of the adoption of an Annex amendment, be provided with information on implementation and available guidance material, as well as an impact assessment. This is presented for your information in Attachments E and F, respectively. An overview of the approval process for Amendment 18 to Annex 14, Volume I, is also included for your information in Attachment G.

15. As soon as practicable after the amendment becomes effective, on 4 August 2025, replacement pages incorporating Amendment 18 will be forwarded to you.

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

Juan Carlos Salazar
Secretary General

Enclosures:

A — Amendment to the Foreword of Annex 14, Volume I
B — Form on notification of disapproval of all or part of Amendment 18 to Annex 14, Volume I
C — Form on notification of compliance with or differences from Annex 14, Volume I
D — Note on the Notification of Differences
E — Implementation task list and outline of guidance material in relation to Amendment 18 to Annex 14, Volume I
F — Impact assessment in relation to Amendment 18 to Annex 14, Volume I
G — Overview of approval process for Amendment 18 to Annex 14, Volume I

ATTACHMENT A to State letter AN 4/1.2.31-25/23

AMENDMENT TO THE FOREWORD OF ANNEX 14, VOLUME I

Add the following element at the end of Table A:

Amendment	***Source(s)***	***Subject(s)***	***Adopted/Approved*** ***Effective*** ***Applicable***
18	Fourth meeting of the Aerodrome Design and Operations Panel (ADOP/4)	a) runway strip width for code number 3 non-instrument runway; runway distance remaining signs (RDRS); harmonization of aerodrome lighting requirements for CAT II operations; main beam average intensity of lights; threshold marking; closed runway lighting; unserviceability signs; apron management service; b) ground handling as of 26 November 2026; and c) obstacle limitation surfaces as of 21 November 2030.	28 March 2025 4 August 2025 27 November 2025 26 November 2026 21 November 2030

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AMENDMENT 18

TO THE

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

AERODROMES

ANNEX 14

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

VOLUME I
AERODROME DESIGN AND OPERATIONS

The amendment to Annex 14, Volume I, contained in this document was adopted by the Council of ICAO on **28 March 2025**. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before **4 August 2025** will become effective on that date and will become applicable on **27 November 2025** for provisions related to aerodrome design, visual aids and apron management service; **26 November 2026** for provisions related to ground handling; and **21 November 2030** for provisions related to obstacle limitation surface, as specified in the Resolution of Adoption. (State letter AN 4/1.2.31-25/23 refers.)

MARCH 2025

INTERNATIONAL CIVIL AVIATION ORGANIZATION

	RUNWAY CLASSIFICATION									
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%

. . .

Insert new text as follows:

CHAPTER 4. OBSTACLE RESTRICTION AND REMOVAL

(Applicable as of 21 November 2030)

Note 1.— This chapter describes the management of obstacles within the aerodrome boundary and in its vicinity. The following specifications allow States to define the airspace around aerodromes to be maintained free from obstacles and the airspace where flexibility can be applied in managing the obstacle environment. This permits the existing and intended aeroplane operations at the aerodromes to be conducted safely and prevent the aerodromes from becoming restricted and eventually unusable by the growth of obstacles.

This is achieved by establishing obstacle limitation surfaces (OLS) consisting of obstacle free surfaces (OFS) and obstacle evaluation surfaces (OES).

Note 2.— The lateral and vertical extent of the OLS are being used in defining the requirements for the collection of terrain and obstacle data sets. Provisions on terrain and obstacle data sets are contained in Annex 15 — Aeronautical Information Services, *Chapter 5.*

Note 3.— The establishment of, and requirements for, an obstacle protection surface for visual approach slope indicator systems are specified in Chapter 5, 5.3.5.41 to 5.3.5.45.

4.1 General

4.1.1 States shall establish a process to prevent the growth of obstacles, both fixed and mobile, that may affect the safety or regularity of flight operations at an aerodrome.

Note 1.— Specifications concerning the process to be established by the State are contained in PANS-Aerodromes *(Doc 9981), Part II, Chapter 10.*

Note 2.— Taxiing aircraft, aircraft on tow and traversing vehicles are considered mobile objects whereas buildings, parked aircraft and vehicles are considered fixed objects.

4.2 Obstacle free surfaces (OFS)

Note.— The purpose of the obstacle free surfaces is to establish airspace that preserves the accessibility of the aerodrome and the safety of operations by protecting aeroplanes during approaches and go-arounds.

4.2.1 Approach surface

Note1.— The purpose of the approach surface is to establish the airspace to be maintained free from obstacles to protect an aeroplane in the visual phase of the approach-to-land manoeuvres following a standard 3.0° approach. See Figure 4-1.

4.2.1.1 *Description*. An inclined surface preceding the threshold.

4.2.1.2 *Characteristics.* The limits of the approach surface shall comprise:

a) an inner edge of specified length, horizontal and perpendicular to the extended centre line of the runway and located at a specified distance before the threshold;

b) two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the extended centre line of the runway; and

c) an outer edge parallel to the inner edge.

4.2.1.3 The surface mentioned in 4.2.1.2 shall be varied when lateral offset, angular offset or curved approaches are utilized; two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the extended centre line of the lateral offset, angular offset or curved ground track.

4.2.1.4 The elevation of the inner edge shall be equal to the elevation of the midpoint of the threshold.

4.2.1.5 The slope of the approach surface shall be measured:

a) when straight-in approaches are utilized — in the vertical plane containing the centre line of the runway and its extension; and

b) when lateral offset, angular offset or curved approaches are utilized — along any straight part of the approach, in the vertical plane containing the centre line of the lateral offset, angular offset or curved ground track or, along any curved part of the approach, in the vertical plane tangent with the curved ground track.

4.2.1.6 Except where the approach surface is raised to comply with approach angles greater than 3.0°, the slope of the approach surface shall not be greater than, and their other dimensions not less than, those specified in Table 4-1 for non-instrument runways and Table 4-2 for instrument runways.

4.2.1.7 **Recommendation.**— *The slope of the approach surface should not be increased to facilitate the growth of obstacles.*

Note.— The slope of the approach surface is intended to adapt to approach operations that have a slope higher than 3.0°. Specifications concerning the modification of the approach surface are contained in PANS-Aerodromes *(Doc 9981), Part II, Chapter 10.*

4.2.1.8 Where the approach angle is lower than 3.0°, the slope of the approach surface shall be decreased.

4.2.1.9 Where the slope of the obstacle protection surface of a visual approach slope indicator system is lower than that indicated in Table 4-1 and Table 4-2, the slope of the approach surface shall be decreased to match that of the obstacle protection surface.

Note.— See Chapter 5, 5.3.5 on the obstacle protection surface.

4.2.1.10 Where the slope of the approach surface is reduced, corresponding adjustment in the length of the approach surface shall be made to provide protection to a height equal to that reached with the slopes and lengths in Table 4-1 and Table 4-2.

4.2.1.11 On instrument approach runways, where the obstacle clearance height is higher than 150 m (500 ft) above the threshold, the length of the approach surface shall not be less than:

a) the value indicated in Table 4-2; or

b) that necessary to reach the obstacle clearance height;

whichever is greater.

Table 4-1. Dimensions and slopes of approach surface — Non-instrument runways

Aeroplane design group	**I**	**IIA-IIB**	**IIC**	**III**	**IV**	**V**
Distance from threshold	30 m	60 m	60 m	60 m	60 m	60 m
Length of inner edge	60 m[a b]	80 m[c d]	100 m[d]	125 m	135 m	150 m
Divergence	10 %	10 %	10 %	10 %	10 %	10 %
Length	1 600 m[e]	2 500 m[e]	2 500 m[e]	2 500 m[e]	2 500 m[e]	2 500 m[e]
Slope	5 %[f]	4 %[f]	3.33 %[f]	3.33 %[f]	3.33 %[f]	3.33 %[f]

[a] Where runway width is above 23 m and up to 30 m, the length of inner edge is increased to 80 m.
[b] Where runway width is above 30 m, the length of inner edge is increased to 100 m.
[c] Where runway width is above 30 m and up to 45 m, the length of inner edge is increased to 100 m.
[d] Where runway width is above 45 m, the length of inner edge is increased to 110 m.
[e] See 4.2.1.10.
[f] See 4.2.1.8 and 4.2.1.9.

Table 4-2. Dimensions and slopes of approach surface — Instrument runways

Aeroplane design group	I	IIA-IIB	IIC	III	IV	V
Distance from threshold	60 m	60 m	60 m	60 m	60 m	60 m
Length of inner edge	110 m [a]	125 m[b]	155 m[c]	175 m	185 m	200 m
Divergence	10%	10%	10%	10 %	10%	10%
Length	4 500 m[d]	4 500 m[d]	4 500 m[d]	4 500 m[d]	4 500 m[d]	4 500 m[d]
Slope	3.33%[e]	3.33%[e]	3.33%[e]	3.33%[e]	3.33%[e]	3.33%[e]

[a] When the runway width is above 30 m, the length of inner edge is increased to 125 m.
[b] When the runway width is above 30 m, the length of inner edge is increased to 140 m.
[c] When the runway width is 30 m or less, the length of inner edge is decreased to 140 m.
[d] See 4.2.1.10 and 4.2.1.11.
[e] See 4.2.1.8 and 4.2.1.9.

4.2.2 Transitional surfaces

Note.— The purpose of the transitional surfaces is to establish the airspace to be maintained free from fixed obstacles to protect an aeroplane in the overflight of the runway or go-around manoeuvre following a standard 3.0° approach, beyond the approach surface. See Figure 4-1.

4.2.2.1 *Description.— Transitional surfaces.* A complex surface along and at a specified distance from the runway centre line and part of the side of the approach surface that slopes upwards and outwards to a specified height.

4.2.2.2 *Characteristics.*— The limits of a transitional surface shall comprise:

a) a lower edge beginning on the side of the approach surface at the elevation of the upper edge and extending down the side of the approach surface to the inner edge of the approach surface and from there along a line extending parallel to and at a specified distance from the runway centre line and its extension, to the end of the strip; and

b) an upper edge located at 60 m above the elevation of the highest threshold of the runway.

4.2.2.3 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 runway centre line and its extension after the threshold — equal to the elevation of the nearest point on the centre line of the runway or its extension.

Note.— As a result of b) the transitional surfaces along the line parallel to the runway centre line will be curved if the runway profile is curved, or a plane if the runway profile is a straight line. The upper edge of the transitional surfaces will also be a curved or a straight line depending on the runway profile.

4.2.2.4 The slope of the transitional surfaces shall be measured in a vertical plane perpendicular to the vertical plane containing the runway centre line or its extension.

4.2.2.5 The slope of the transitional surface shall not be greater than 20 per cent.

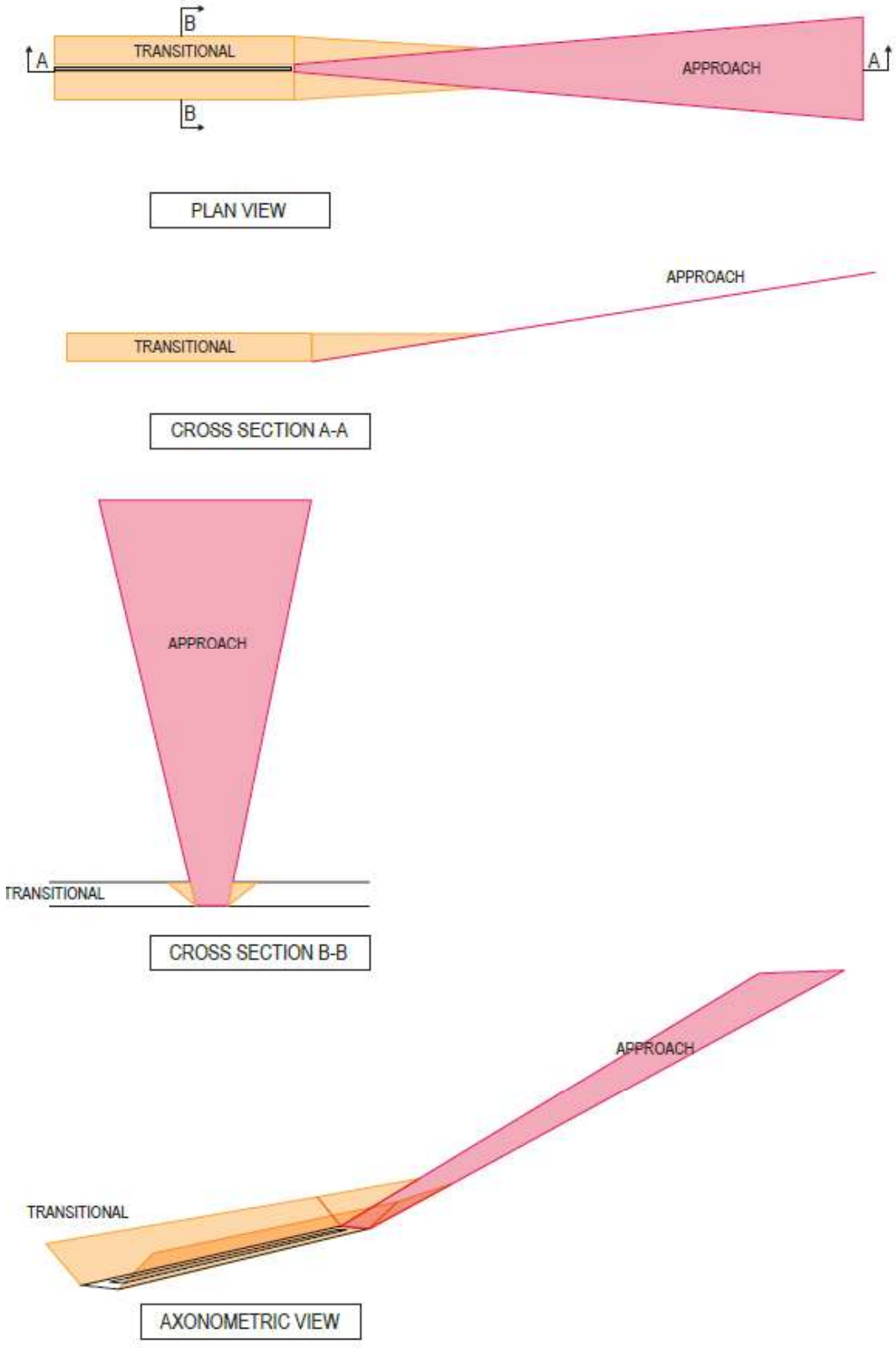

Figure 4-1. Approach surface and transitional surfaces

4.2.3 Inner approach surface

Note.— The inner approach surface protects an aeroplane against fixed and mobile obstacles before the threshold, in the descent phase of the balked landing or late go-around manoeuvres following a standard 3.0° approach. See Figure 4-2 and Figure 4-3.

4.2.3.1 *Description.— Inner approach surface.* A rectangular portion of the approach surface immediately preceding the threshold.

4.2.3.2 *Characteristics*.— The limits of the inner approach surface shall comprise:

a) an inner edge coincident with the location of the inner edge of the approach surface but of its own specified length;

b) two sides originating at the ends of the inner edge and extending parallel to the vertical plane containing the centre line of the runway; and

c) an outer edge parallel to the inner edge.

4.2.3.3 The surface mentioned in 4.2.3.2 shall be varied when lateral offset, angular offset or curved approaches are utilized; two sides originating at the ends of the inner edge and extending parallel to the extended centre line of the lateral offset, angular offset or curved ground track.

4.2.3.4 The dimensions of the inner approach surface for non-instrument runway shall not be less than those specified in Table 4-3.

4.2.3.5 The dimensions of the inner approach surface for non-precision approach runway shall not be less than those specified in Table 4-4.

4.2.3.6 The dimensions of the inner approach surface for precision approach runway shall not be less than those specified in Table 4-5.

4.2.3.7 If the slope of the approach surface is reduced, the length of the inner approach surface shall be increased to provide protection to a height of 45 m (150 ft).

Table 4-3. Dimensions of inner approach surface — Non-instrument runways

Aeroplane design group	I	IIA-IIB	IIC	III	IV	V
Length of inner edge	60 m	80 m	100 m	110 m	120 m	120 m[a]
Length	900 m[b]	1 125 m[b]	1 350 m[b]	1 350 m[b]	1 350 m[b]	1 350 m[b]

[a] The length of inner edge is increased to 140 m on those aerodromes that accommodate a code letter F aeroplane that is not equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre.

[b] See 4.2.3.7.

Table 4-4. Dimensions of inner approach surface — Non-precision approach runways

Aeroplane design group	I	IIA-IIB	IIC	III	IV	V
Length of inner edge	80 m	80 m	120 m	120 m	120 m	120 m[a]
Length	1 350 m[b]	1 350 m[b]	1 350 m[b]	1 350 m[b]	1 350 m[b]	1 350 m[b]

[a] The length of inner edge is increased to 140 m on those aerodromes that accommodate a code letter F aeroplane that is not equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre.

[b] See 4.2.3.7.

Table 4-5. Dimensions of inner approach surface — Precision approach runways

Aeroplane design group	I	IIA-IIB	IIC	III	IV	V
Length of inner edge	90 m	90 m	120 m	120 m	120 m	120 m[a]
Length	1 350 m[b]	1 350 m[b]	1 350 m[b]	1 350 m[b]	1 350 m[b]	1 350 m[b]

[a] The length of inner edge is increased to 140 m on those aerodromes that accommodate a code letter F aeroplane that is not equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre.

[b] See 4.2.3.7.

4.2.4 Inner transitional surfaces

Note.— The inner transitional surfaces aim at establishing the airspace to be maintained free from fixed and mobile obstacles to protect an aeroplane in the climb phase of the balked landing or late go-around manoeuvres following a standard 3.0° approach, beyond the inner approach surface. See Figure 4-2 and Figure 4-3.

4.2.4.1 *Description.— Inner transitional surfaces:*

a) *Non-instrument and non-precision approach runways* — A complex surface at a specified distance from the runway centre line consisting of two successive sections: a first section that rises vertically to a given height, followed by a second inclined section that slopes upwards and outwards to a specified height; and

b) *Precision approach runways* — A surface similar to the transitional surface but closer to the runway.

4.2.4.2 *Characteristics.*— On non-instrument and non-precision approach runways:

a) the limits of the vertical section of the inner transitional surface shall comprise:

1) a lower edge beginning on the side of the inner approach surface at a specified height above the inner edge of that surface, extending down the side of the inner approach surface to its inner edge, from there along a line parallel to and at a specified distance from the runway centre line, and its extension, to a specified length after the threshold and from there, vertically to a specific height; and

2) an upper edge parallel to, and at a specified height above, the runway centre line;

b) the limits of the inclined section of the inner transitional surface shall comprise:

1) a lower edge beginning at the end of the inner approach surface and extending down the side of the inner approach surface to the upper edge of the vertical section, from there along the upper edge of the vertical section; and

2) an upper edge parallel to and at 60 m above the elevation of the highest threshold of the runway.

4.2.4.3 *Characteristics.*— On precision approach runways, the limits of the inner transitional surface shall comprise:

a) a lower edge beginning at the end of the inner approach surface and extending down the side of the inner approach surface to the inner edge of that surface, from there along a line parallel to and at a specified distance from the runway centre line and its extension to the inner edge of the balked landing surface and from there up the side of the balked landing surface to the upper edge; and

b) an upper edge located at 60 m above the elevation of the highest threshold of the runway.

4.2.4.4 On non-instrument and non-precision approach runways, the elevation of a point shall be:

a) on the lower edge of the vertical section:

1) along the side of the inner approach surface — equal to the elevation of the inner approach surface at that point; and

2) after the inner edge of the inner approach surface — equal to the elevation of the nearest point on the centre line of the runway or its extension;

b) on the upper edge of the vertical section — equal to a specific height above the nearest point on the centre line of the runway or its extension;

c) on the lower edge of the inclined section:

1) along the side of the inner approach surface — equal to the elevation of the inner approach surface at that point; and

2) along the upper edge of the lower section — equal to the elevation of the upper edge of the lower section at that point.

Note.— As a result of a), b) and c) the two sections of the inner transitional surfaces along the centre line of the runway will be curved if the runway profile is curved, or a plane if the runway profile is a straight line. The upper edges of both sections of the inner transitional surfaces will also be curved or straight lines depending on the runway profile.

4.2.4.5 On precision approach runways, the elevation of a point on the lower edge shall be:

a) along the side of the inner approach surface and balked landing surface — equal to the elevation of the particular surface at that point; and

b) along the runway centre line and its extension — equal to the elevation of the nearest point on the centre line of the runway or its extension;

Note.— As a result of b) the inner transitional surfaces along the centre line of the runway will be curved if the runway profile is curved, or a plane if the runway profile is a straight line. The upper edge of the inner transitional surfaces will also be a curved or a straight line depending on the runway profile.

4.2.4.6 The slope of the inner transitional surfaces shall be measured:

a) between the inner edges of the inner approach surface and balked landing surface: in a vertical plane perpendicular to the vertical plane containing the runway centre line and its extension;

b) before the inner edge of the inner approach surface:

1) where straight-in approaches are utilized: in a vertical plane perpendicular to the vertical plane containing the runway centre line and its extension; and

2) where lateral offset, angular offset or curved approaches are utilized: along any straight part of the approach, in a vertical plane perpendicular to the vertical plane containing the straight part of the approach or, along any curved part of the approach, in the vertical plane tangent with the curved ground track.

4.2.4.7 The slope of the inner transitional surfaces for non-instrument runway shall not be greater than, and the height of the vertical section not lower than, that specified in Table 4-6.

4.2.4.8 The slope of the inner transitional surfaces for non-precision approach runway shall not be greater than, and the height of the vertical section not lower than, that specified in Table 4-7.

4.2.4.9 The slope of the inner transitional surfaces for precision runway shall not be greater than that specified in Table 4-8.

Table 4-6. Dimensions of inner transitional surfaces — Non-instrument runways

Aeroplane design group	I	IIA-IIB	IIC	III	IV	V
Height of the vertical section	6 m	6 m	8.4 m	10 m	5 m	5 m
Slope of the inclined section	40 %	40 %	33.3%	33.3%	33.3%	33.3%
Length	a	a	1 800 m[b]	1 800 m[b]	1 800 m[b]	1 800 m[b]

[a] To the end of the strip.
[b] Or to the end of the runway, whichever is less.

Table 4-7. Dimensions of inner transitional surfaces — Non-precision approach runways

Aeroplane design group	I	IIA-IIB	IIC	III	IV	V
Height of the vertical section	6 m	6 m	5 m	5 m	5 m	5 m
Slope of the inclined section	40 %	40 %	33.3%	33.3%	33.3%	33.3%
Length	a	a	1 800 m[b]	1 800 m[b]	1 800 m[b]	1 800 m[b]

[a] To the end of the strip.
[b] Or to the end of the runway, whichever is less.

Table 4-8. Slopes of inner transitional surfaces — Precision approach runways

Aeroplane design group	I	IIA-IIB	IIC	III	IV	V
Slope	40 %	40 %	33.3%	33.3%	33.3%	33.3%
Length	a	a	a	a	a	a

[a] See 4.2.4.3.

4.2.5 Balked landing surface

Note.— The balked landing surface is intended to be implemented on precision approach runways, where the balked landing might be initiated at low height above the threshold and the climb phase of the manoeuvre is not necessarily covered by the inner transitional surfaces. The balked landing surface aims at establishing the airspace to be maintained free from fixed and mobile obstacles to protect an aeroplane in the climb phase of the balked landing or late go-around manoeuvres following a standard 3.0° approach, beyond the inner transitional surfaces. See Figure 4-3.

4.2.5.1 *Description.— Balked landing surface*. An inclined surface located at a specified distance after the threshold, extending between the inner transitional surfaces.

4.2.5.2 *Characteristics*.— The limits of the balked landing surface shall comprise:

a) an inner edge horizontal and perpendicular to the centre line of the runway and located at a specified distance after the threshold;

b) two sides 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 runway; and

c) an outer edge parallel to the inner edge and located at 60 m above the elevation of the highest threshold of the runway.

4.2.5.3 The elevation of the inner edge shall be equal to the elevation of the nearest point on the runway centre line.

4.2.5.4 The slope of the balked landing surface shall be measured in the vertical plane containing the centre line of the runway and its extension;

4.2.5.5 The slope of the balked landing surface shall not be greater than, and its other dimensions not less than, those specified in Table 4-9.

Table 4-9. Dimensions and slopes of balked landing surface

Aeroplane design group	I	IIA-IIB	IIC	III	IV	V
Distance from threshold	a	a	1 800 m[b]	1 800 m[b]	1 800 m[b]	1 800 m[b]
Length of inner edge	90 m	90 m	120 m	120 m	120 m	120 m[c]
Divergence (each side)	10%	10%	10%	10%	10%	10%
Slope	5%	4%	3.33%	3.33%	3.33%	3.33%

a. End of the strip.
b. Or end of runway whichever is less.
c. The length of inner edge is increased to 140 m on those aerodromes that accommodate a code letter F aeroplane that is not equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre.

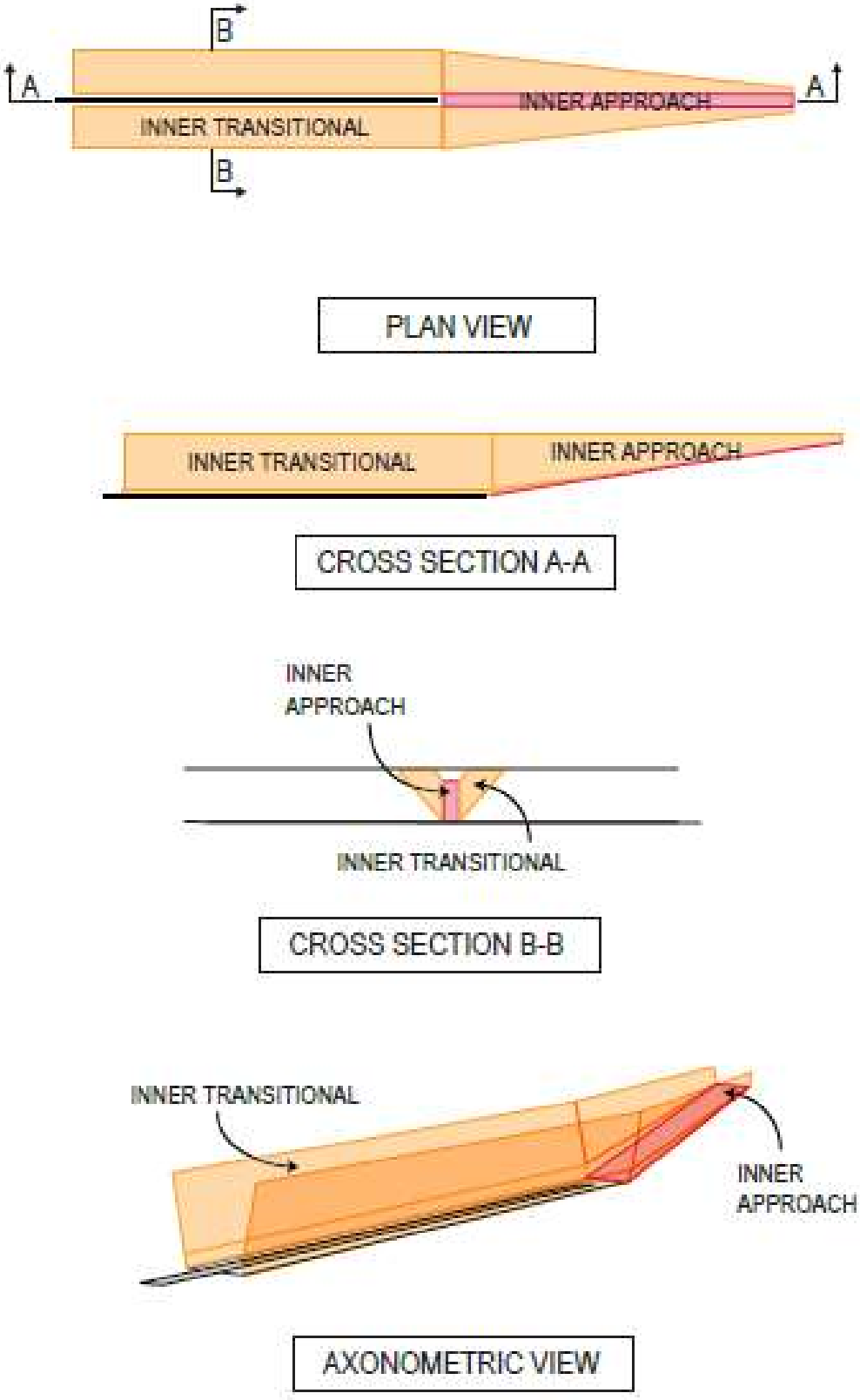

Figure 4-2 Inner approach and inner transitional surfaces on a non-precision approach runway

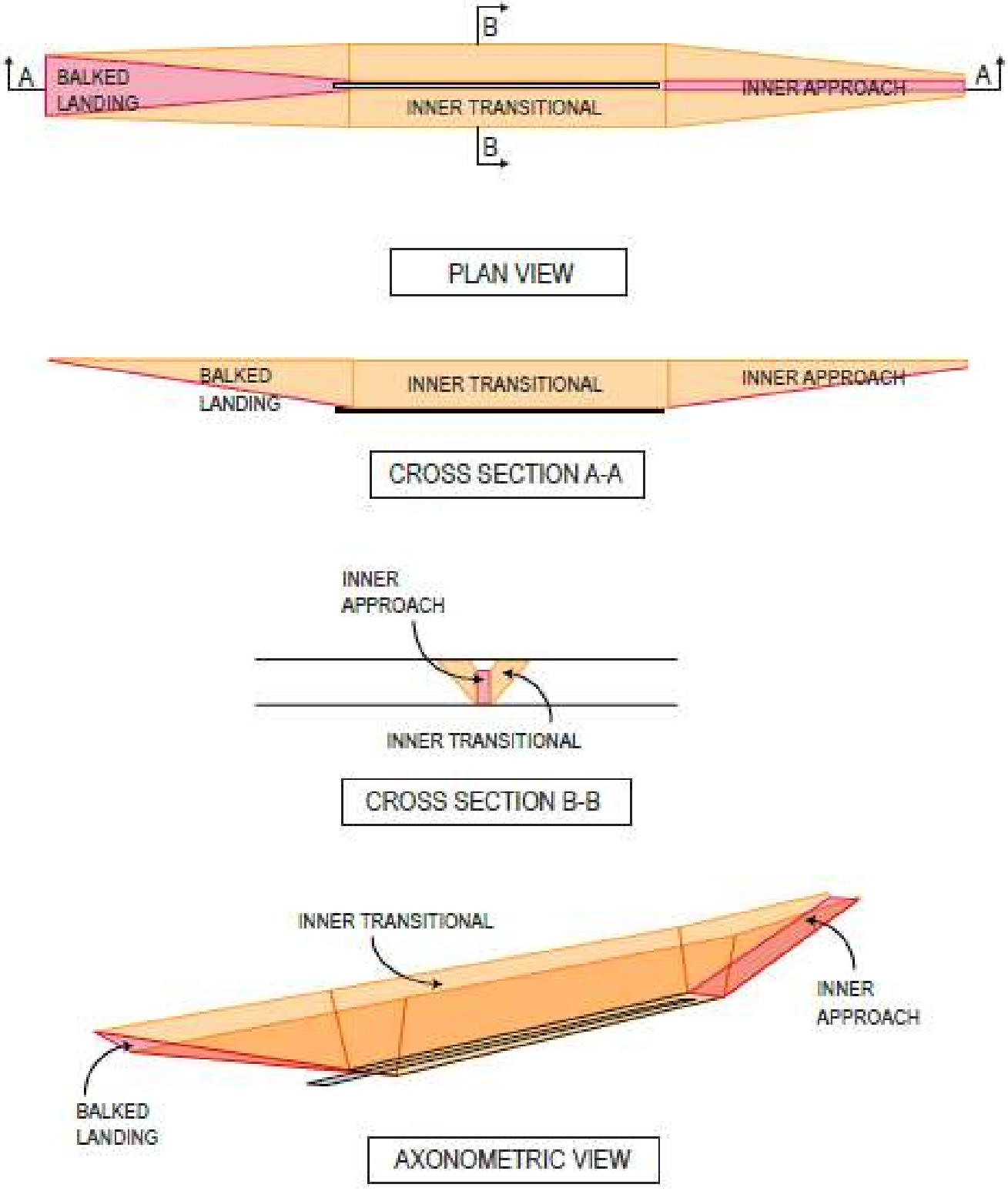

Figure 4-3 Obstacle free zone on a precision approach runway

4.3 Obstacle evaluation surfaces (OES)

Note 1.— The purpose of the obstacle evaluation surfaces is to establish the airspace necessary to determine the acceptability of obstacles by evaluating their impact on existing and/or intended aeroplane operations at an aerodrome. The impact is evaluated on safety, regularity and demand of the operations identified by States.

Note 2.— The OES detailed in the following specifications address most common flight operations and operating minima. When the flight operations differ (e.g. variance in alignment, approach slope, approach minima) specific obstacle evaluation surfaces may need to be established. Depending on the flight operations and procedures available at an aerodrome, the OES may have specifications as specified in the following provisions or may be varied to fit the operations at the aerodrome (e.g. in case of increased minima or where circling does not occur on one side of the runway). There will be instances where additional obstacle evaluation surfaces, beyond what are specified in this section, may be required as the OES or its variations do not satisfactorily cover the local aeroplane operations specific to the aerodrome.

Note 3.— Detailed specifications on the variation of the OES and their design are contained in PANS-Aerodromes *(Doc 9981).*

4.3.1 General

4.3.1.1 States shall ensure that the obstacle evaluation surfaces specified in 4.5.2 have been established to protect the existing and/or intended aeroplane operations at an aerodrome.

4.3.1.2 **Recommendation.—** *The characteristics and dimensions of the obstacle evaluation surfaces should be in accordance with the provisions contained in 4.3.2 to 4.3.6.*

4.3.1.3 **Recommendation**.— *Where it is necessary to preserve the accessibility of an aerodrome to existing and planned operations, the provisions applicable to OFS contained in 4.4.4 to 4.4.8 should apply to the identified obstacle evaluation surface.*

Note.— Detailed specifications are contained in PANS-Aerodromes (Doc 9981), Part II, Chapter 10.

4.3.2 Horizontal surface

Note.— The purpose of the horizontal surface is to protect the airspace for circling procedures. The horizontal surface also provides some protection for visual circuits and terminal instrument flight procedures, including PBN approaches, early turning missed approaches and early turning departures. The design of the horizontal surface is consistent with the dimensions of the visual manoeuvring area provided in PANS-OPS, (Doc 8168, Volume II, Part 1, Section 4, Chapter 7).

4.3.2.1 *Description.— Horizontal surface*. A surface, or a combination of surfaces, located in a horizontal plane, or in a series of horizontal planes, above an aerodrome and its environs.

4.3.2.2 *Characteristics.*— The outer limits of the horizontal surface should be circular arcs centred on runway thresholds joined tangentially by straight lines.

4.3.2.3 The height of the horizontal surface shall be measured above the aerodrome elevation.

4.3.2.4 **Recommendation.—** *A horizontal surface should have a radius of not less than, and a height of not greater than, those specified in Table 4-10*.

Table 4-10. Dimensions of horizontal surface

Aeroplane design group	I-IIA	IIB	IIC	III	IV	V
Radius	3 350 m	5 350 m	10 750 m	10 750 m	10 750 m	10 750 m
Height	45 m	60 m	90 m	90 m	90 m	90 m

Note.— Where a runway is intended for the operations of aeroplanes of different aeroplane design groups, all the horizontal surfaces specified by the radii and heights associated with these groups are retained and the horizontal surface is composed of multiple surfaces located at different heights above the aerodrome elevation.

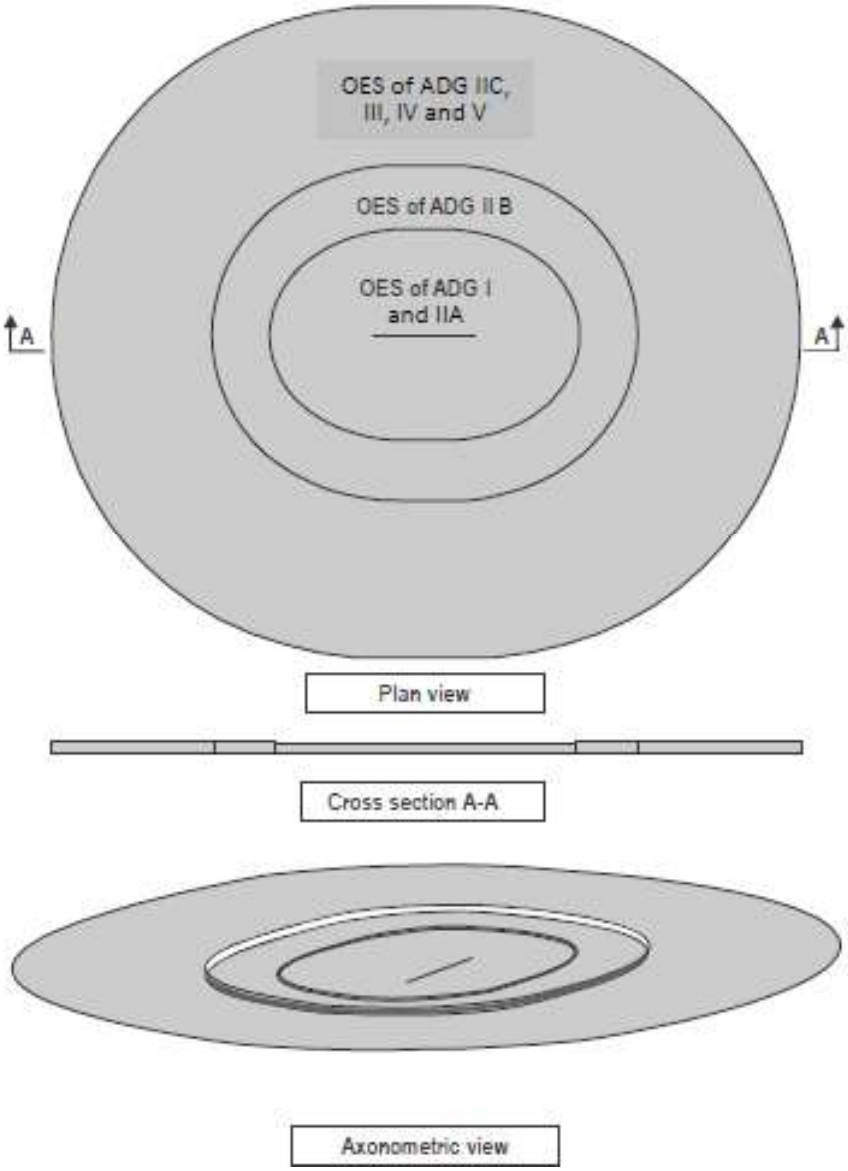

Figure 4-4. Horizontal surface

4.3.3 Surface for straight-in instrument approaches

Note.— The purpose of the surface for straight-in instrument approaches is to establish the airspace where obstacles may have an impact on straight-in instrument approaches, where the horizontal surface(s) or parts thereof are not established. As a single obstacle evaluation surface cannot address the variety of all possible instrument approach procedures, only most common straight-in instrument approaches other than precision approaches are considered. The surfaces for precision approaches are established in 4.3.4.

4.3.3.1 *Description.— Surface for straight-in instrument approaches*. A combination of surfaces, located in a series of horizontal planes above an aerodrome and its environs.

4.3.3.2 *Characteristics.*— The surface for straight-in instrument approaches should consist of:

a) a lower part corresponding to the horizontal surface applicable to ADG I;

b) an upper part corresponding to that part of the horizontal surface applicable to ADG II and III extending beyond the lateral limit of the lower section and delineated by the rectangle of following sides:

1) two shorter sides perpendicular to and centred on the runway centre line and its extension; and

2) two longer sides extending parallel to the runway centre line and its extension from a given distance before and after the thresholds of the runway.

Note.— The characteristics of the surface for straight-in instrument approaches specified in 4.3.3.2 are applicable to all ADGs.

4.3.3.3 The heights of the lower section and upper section shall be measured above the aerodrome elevation.

4.3.3.4 **Recommendation.—** *The heights of the surface for straight-in instrument approaches should not be greater than, and its other dimensions not less than, those specified in Table4-11.*

Table 4-11. Dimensions of surface for straight-in instrument approaches

	Aeroplane design group	**I to V**
Lower section	**Height**	45 m
	Length	Horizontal OES as per ADG I
Upper section	**Height**	60 m
	Length of shorter side	7 410 m
	Length of longer side from the threshold or thresholds	5 350 m

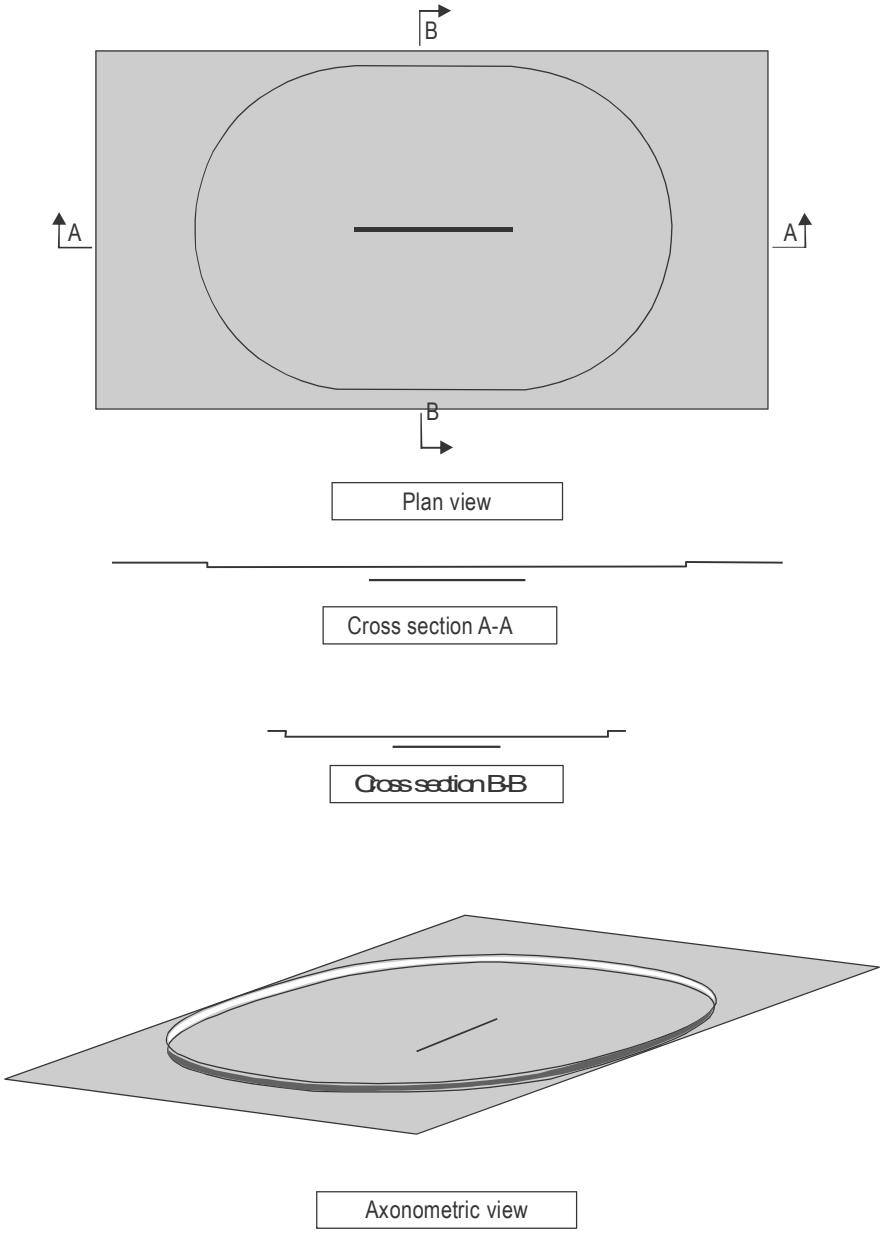

Figure 4-5. Surface for straight-in instrument approaches

4.3.4 Surface for precision approaches

Note.— The purpose of the surface for precision approaches is to establish the airspace where obstacles may have an impact on common straight-in precision approach procedures (using ILS or MLS, ground-based augmentation system *(GBAS*) *or* satellite-based augmentation system *(SBAS*) *CAT I). The design of the surface is consistent with the dimensions of the basic ILS surfaces provided in PANS-OPS (Doc 8186) Volume II, Part II, Section I, Chapter 1. Adjustments to the surface may be necessary in case of offset procedures.*

4.3.4.1 *Description.— Surface for precision approaches*. A complex surface composed of:

a) an approach component consisting of an inclined surface preceding the threshold;

b) a missed approach component consisting of an inclined surface located at a specific distance after the threshold;

c) transitional components consisting of complex surfaces at a specified distance from the runway centre line and along the approach component and missed approach component, that slopes upwards and outwards; and

d) a lower component specified by a rectangular surface within the inner edges of the above components.

Note.— The transitional components consist of a pair of surfaces, located on either side of the runway centre line. Each surface of this pair is called a transitional component.

4.3.4.2 *Characteristics.*— The limits of the approach component of the surface for precision approaches should comprise:

a) an inner edge of specified length, horizontal and perpendicular to the extended centre line of the runway and located at a specified distance before the threshold;

b) two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the extended centre line of the runway to a specified distance and diverging uniformly thereafter at another specified rate for the remainder of the length of the approach component; and

c) an outer edge parallel to the inner edge.

4.3.4.3 The elevation of the inner edge of the approach component shall be equal to the elevation of the midpoint of the threshold.

4.3.4.4 **Recommendation.—** *The slope of the approach component should be measured in the vertical plane containing the centre line of the runway and its extension.*

4.3.4.5 *Characteristics.*— The limits of the missed approach component of surface for precision approaches should comprise:

a) an inner edge of specified length, horizontal and perpendicular to the extended centre line of the runway and located at a specified distance after the threshold;

b) two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the extended centre line of the runway to a specified distance and diverging uniformly thereafter at another specified rate for the remainder of the length of the missed approach component; and

c) an outer edge parallel to the inner edge.

4.3.4.6 The elevation of the inner edge of the missed approach component shall be equal to the elevation of the midpoint of the threshold.

Note.— In some cases, the inner edge of the missed approach component may be below the elevation of the midpoint of the threshold, for example where runways slope upward.

4.3.4.7 **Recommendation.—** *The slope of the missed approach component should be measured in the vertical plane containing the centre line of the runway and its extension*.

4.3.4.8 *Characteristics.*— The limits of the transitional component of the surface for precision approaches should comprise:

a) a lower edge beginning on the side of the approach component at the elevation of the upper edge and extending down the side of the approach component to the inner edge of the approach component, from there along a line extending horizontally to the inner edge of the missed approach component, and from there extending up the side of the missed approach component to the upper edge; and

b) an upper edge located at 300 m above the threshold elevation.

4.3.4.9 The elevation of a point on the lower edge of the transitional component shall be:

a) along the side of the approach component and missed approach component — equal to the elevation of the particular surface at that point; and

b) between the inner edges of the approach component and missed approach component — equal to the elevation of the midpoint of the threshold.

Note.— In some cases, the lower edge of the transitional component may be below the elevation of the midpoint of the threshold, for example where runways slope upward.

4.3.4.10 **Recommendation.—** *The slope of the transitional component should be measured in the vertical plane perpendicular to the centre line of the runway and its extension.*

4.3.4.11 *Characteristics.*— The limits of the lower component of the surface for precision approaches should comprise:

a) two shorter sides corresponding with the inner edge of the approach component and missed approach component; and

b) two longer sides corresponding with the inner edges of the transitional components.

4.3.4.12 The elevation of a point on the lower component shall be equal to the elevation of the midpoint of the threshold.

4.3.4.13 **Recommendation.—** *The slopes of the different components of the surface for precision approach runways should not be greater than, and their other dimensions not less than, those specified in Table 4-12.*

Table 4-12. Dimensions of surface for precision approaches

Aeroplane design group			**I to V**
Approach component		**Distance from threshold**	60 m
		Length of inner edge	300 m
	1st section	**Length**	3 000 m
		Divergence (each side)	15 %
		Slope	2 %
	2nd section	**Length**	9 600 m
		Divergence (each side)	15 %
		Slope	2.5 %
Missed approach component		**Distance after threshold**	900 m
		Length of inner edge	300 m

Aeroplane design group			I to V
	1st section	**Length**	1 800 m
		Divergence (each side)	17.48 %
		Slope	2.5 %
	2nd section	**Length**	10 200 m
		Divergence (each side)	25 %
		Slope	2.5 %
Transitional component		**Slope**	14.3 %

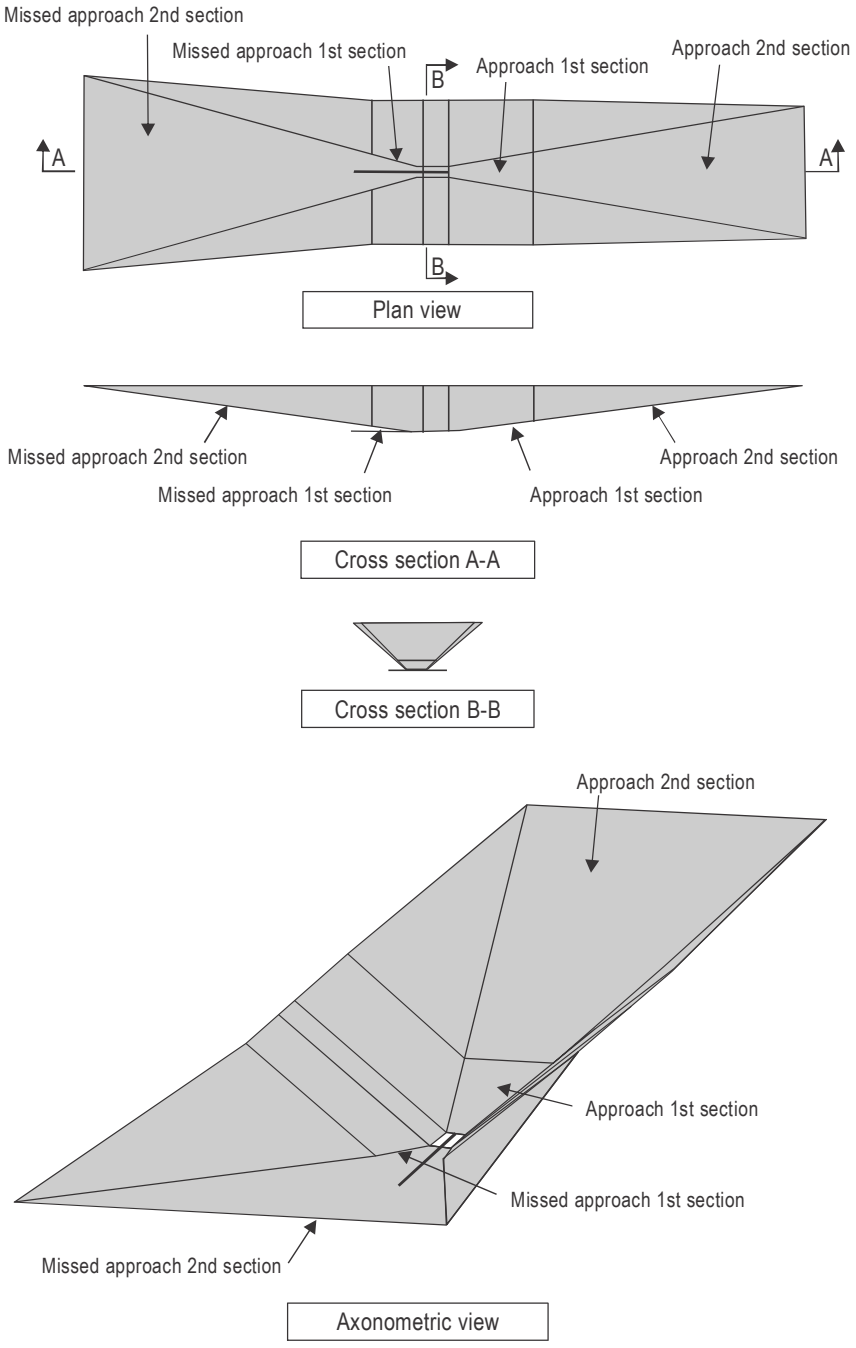

Figure 4-6. Surface for precision approaches

4.3.5 Instrument departure surface

Note.— The purpose of the instrument departure surface is to establish the airspace where obstacles may have an impact on aircraft following an omnidirectional instrument departure procedure. The design of the instrument departure surface is consistent with the dimensions provided in PANS-OPS (Doc 8168, Volume II, Part I, Section 3, Chapter 4).

4.3.5.1 *Description.— Instrument departure surface.* An inclined surface, along the runway centre line and its extension after the end of the take-off distance available.

4.3.5.2 *Characteristics*.— The limits of the instrument departure surface should comprise:

a) an inner edge of specified length, horizontal and perpendicular to the centre line of the runway and located at the end of the take-off distance available;

b) two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the extended centre line of the runway to a specified distance and diverging uniformly thereafter at another specified rate for the remainder of the length of the instrument departure surface; and

c) an outer edge parallel to the inner edge.

4.3.5.3 The elevation of the inner edge shall be 5 m above the elevation of the runway centre line and its extension at the end of the take-off distance available.

4.3.5.4 The slope of the instrument departure surface shall be measured in the vertical plane containing the centre line of the runway and its extension.

4.3.5.5 **Recommendation.—** *The slope of the instrument departure surface should not be greater than, and its other dimensions not less than, those specified in Table4-13.*

Table 4-13. Dimensions of instrument departure surface

	Aeroplane design group	**I to V**
	Length of inner edge	300 m
	Slope	2.5 %
First section	**Length**	3 500 m
	Divergence	26.8 %
Second section	**Length**	8 300 m
	Divergence	57.8 %

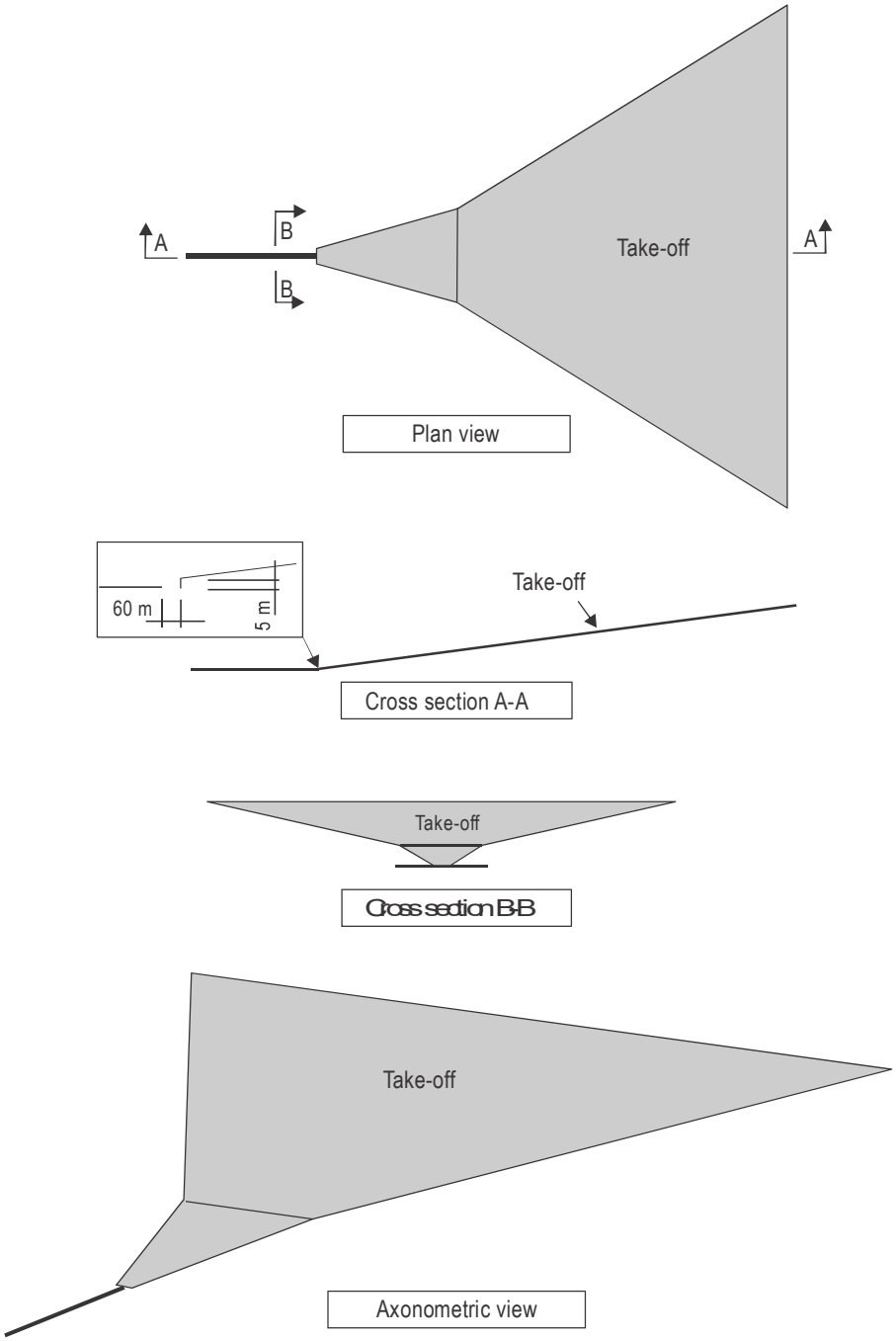

Figure 4-7. Instrument departure surface

4.3.6 Take-off climb surface

Note 1.— The purpose of the take-off climb surface is to establish the airspace where obstacles may have an impact on aircraft operating limitations during take-off under non-critical operating conditions. The design of the take-off climb surface is consistent with the take-off obstacle clearance limitations provided in the Aeroplane Performance Manual *(Doc 10064, Chapter 3), and Annex 6, Part I.*

Note 2.— Obstacles that have no impact on aircraft operating limitations during take-off under

non-critical operating conditions could have an impact in case of engine failure or abnormal (e.g. extreme weather conditions) and emergency situations (e.g. system failure).

4.3.6.1 *Description.— Take-off climb surface.* An inclined surface beyond the end of the take-off distance available.

4.3.6.2 *Characteristics*.— The limits of the take-off climb surface should comprise:

a) an inner edge horizontal and perpendicular to the centre line of the runway and located at a specified distance beyond the end of the runway or at the end of the take-off distance available;

b) two sides originating at the ends of the inner edge, diverging uniformly at a specified rate from the take-off ground track to a specified final width and continuing thereafter at that width for the remainder of the length of the take-off climb surface; and

c) an outer edge horizontal and perpendicular to the specified take-off track.

4.3.6.3 **Recommendation.—** *The above surface should vary when take-off flight paths involving turns are utilized; two sides originating at the end of the inner edge and diverging uniformly at a specified rate from the extended centre line of the take-off ground track to a specified final width, and extending thereafter parallel to the take-off ground track for the remainder of the length of the take-off climb surface.*

4.3.6.4 The elevation of the inner edge shall be equal to the highest point on the extended runway centre line between the end of the take-off run available and the inner edge of the take-off climb surface.

4.3.6.5 The slope of the take-off climb surface shall be measured:

a) in the vertical plane containing the centre line of the runway and its extension where straight take-off flight path are utilized;

b) along any straight part of the take-off flight path, in the vertical plane containing the centre line of the take-off flight path or, along any curved part of the take-off flight path, in the vertical plane tangent with the take-off flight path where take-off flight paths involving turns are utilized.

4.3.6.6 **Recommendation.—** *On runways intended for operations of aeroplanes with a maximum certificated take-off mass up to 5 700 kg, the slope of the take-off climb surface should not be greater than, and its other dimensions not less than, those specified in Table4-14, except that:*

a) a lesser length should be adopted for the take-off climb surface where such lesser length would be consistent with procedural measures adopted to govern the outward flight of aeroplanes; and

b) a higher slope should be adopted for the take-off climb surface where such slope would be consistent with the operational characteristics of the critical aeroplane operating out of the runway and the local conditions.

4.3.6.7 **Recommendation.—** *On runways intended for operations of aeroplanes with a maximum certificated take-off mass greater than 5 700 kg, the slope of the take-off climb surface should not be greater than, and its other dimensions not less than, those specified in Table 4-15, except that:*

a) a lesser length should be adopted for the take-off climb surface where such lesser length would be consistent with procedural measures adopted to govern the outward flight of aeroplanes; and

b) a higher slope should be adopted for the take-off climb surface where such slope would be consistent with the operational characteristics of the critical aeroplane operating out of the runway and the local conditions.

4.3.6.8 **Recommendation.**— *The slope of the take-off climb surface should not be increased to facilitate the growth of obstacles.*

Note.— The slope of the take-off climb surface is intended to adapt to the operations of aeroplanes whose climb performances on take-off climb are such that a slope of 2 per cent is not necessary. However, this slope is not intended to be increased to enable the growth of obstacles. Specifications concerning the increase of the slope of the take-off climb surface are contained in PANS-Aerodromes *(Doc 9981), Part II, Chapter 10.*

4.3.6.9 **Recommendation.—** *The operational characteristics of aeroplanes for which the runway is intended should be examined to see if it is desirable to reduce the slope specified in Table 4-14 and Table 4-15 to 1.6 per cent when critical operating conditions are to be catered to. If the specified slope is reduced, corresponding adjustment in the length of the take-off climb surface should be made so as to provide protection to a height equal to that reached with the slopes and lengths in Table 4-14 and 4-15.*

Table 4-14. Dimensions of take-off climb surface – runways with operations of aeroplanes with a mass up to 5 700 kg

Aeroplane design group	I	IIA-IIB	IIC[a]	III[a]	IV[a]	V[a]
Distance from runway end[b]	30 m	60 m	-	-	-	-
Length of inner edge	60 m	80 m	-	-	-	-
Divergence (each side)	10%	10%	-	-	-	-
Final width	380 m	580 m	-	-	-	-
Length	1 600 m	2 500 m	-	-	-	-
Slope	5%	4%	-	-	-	-

a. Aeroplanes with a mass up to but not including 5 700 kg generally belong to aeroplane design groups I, IIA and IIB.
b. The take-off climb surface starts at the end of the clearway if the clearway length exceeds the specified distance.

Table 4-15. Dimensions of take-off climb surface – runways with operations of aeroplanes with a mass above 5 700 kg

Aeroplane design group	I	IIA-IIB	IIC	III	IV	V
Distance from TODA	-	-	-	-	-	-
Length of inner edge	144 m	156 m	156 m	172 m	180 m	180 m
Divergence (each side)	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
Final width	1 800 m[a]	1 800 m[a]	1 800 m[a]	1 800 m[a]	1 800 m[a]	1 800 m[a]
Length	10 000 m	10 000 m	10 000 m	10 000 m	10 000 m	10 000 m
Slope	5%	4%	2%	2%	2%	2%

[a] Where given operational conditions and performances are met, the final width can be decreased. Specifications concerning this reduction are contained in the *Airport Services Manual* (Doc 9137), Part 6.

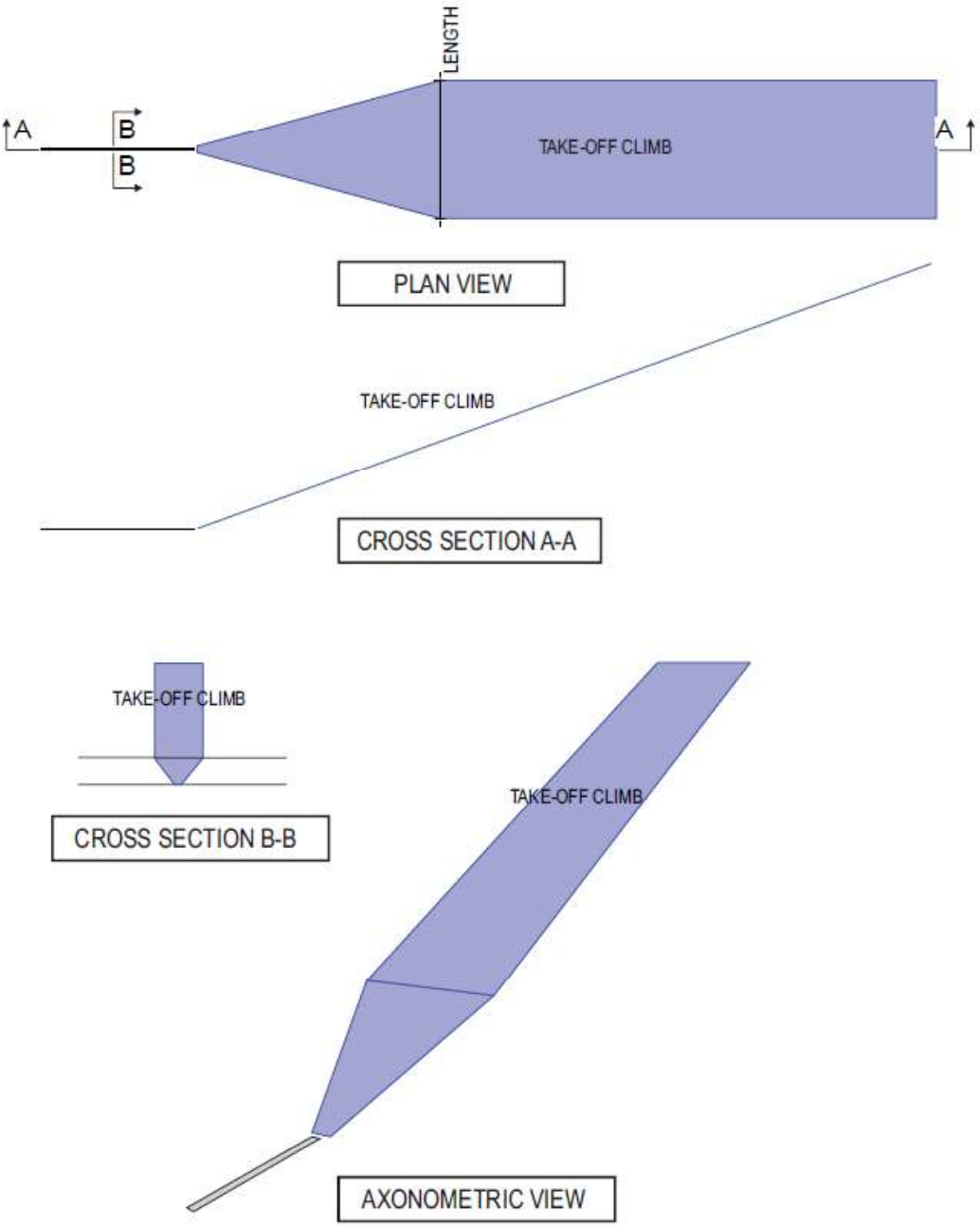

Figure 4-8 Take-off climb surface

4.4 Obstacle limitation requirements

Obstacle free surfaces

4.4.1 Fixed objects shall not be permitted above the inner approach surface, inner transitional surfaces and balked landing surface and that complex surface extending between the lower edges of the inner transitional surfaces. Visual aids required for air navigation purposes or those objects required for aircraft

safety purposes, and which must project into the airspace above the inner approach surface, inner transitional surfaces and balked landing surface or that complex surface extending between the lower edges of the inner transitional surfaces are permitted.

Note.— Specifications concerning objects required for aircraft safety purposes are provided in the Airport Services Manual *(Doc 9137), Part 6* – Control of Obstacles. *Such objects may for example consist of arresting systems, arresting cables, arresting beds, FOD detection systems, wildlife hazard equipment.*

4.4.2 Visual aids required for air navigation purposes or those fixed objects required for aircraft safety purposes and which project into the airspace above the inner approach surface, inner transitional surfaces and balked landing surface or that complex surface extending between the lower edges of the inner transitional surfaces shall be frangible and mounted as low as possible.

4.4.3 Mobile objects shall not be permitted above the inner approach surface, inner transitional surfaces, balked landing surface and that complex surface extending between the lower edges of the inner transitional surfaces during the use of the runway for landing.

4.4.4 New objects or extensions of existing objects shall not be permitted above the approach surface and transitional surfaces and the complex surface extending between the lower edges of the transitional surfaces. Equipment and installations required for air navigation or for aircraft safety purposes, and which must project into the airspace above the approach surface and transitional surfaces or that complex surface extending between the lower edges of the transitional surfaces are permitted.

4.4.5 Equipment and installations required for air navigation or for aircraft safety purposes and which must project into the airspace above the approach surface and transitional surfaces or that complex surface extending between the lower edges of the transitional surfaces shall be frangible and mounted as low as possible.

4.4.6 **Recommendation.**— *Existing obstacles above the approach surface, and transitional surfaces or that complex surface extending between the lower edges of the transitional surfaces should as far as practicable be removed.*

4.4.7 States shall ensure that existing terrain and/or obstacles that cannot be removed and penetrate the approach surface and transitional surfaces or that complex surface extending between the lower edges of the transitional surfaces are only permitted when, after aeronautical study, it is determined that the obstacles do not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

Note.— Detailed specifications concerning aeronautical study are provided in PANS-Aerodromes *(Doc 9981), Part II, Chapter 10.*

Obstacle evaluation surfaces

4.4.8 States shall ensure that obstacles penetrating the obstacle evaluation surfaces are only permitted when, after aeronautical study, it is determined that the obstacles do not adversely affect the safety or significantly affect the regularity of the existing and intended operations of aeroplanes.

Note.— Detailed specifications concerning aeronautical study is given in PANS-Aerodromes *(Doc 9981), Part II, Chapter 10.*

4.5 Obstacle limitation surfaces requirements

Note 1.— The requirements for obstacle free surfaces are specified on the basis of the intended use of a runway and are intended to be applied when such use is made of the runway.

Note 2.— The requirements for obstacle evaluation surfaces are specified on the basis of the intended use and/or intended operations on the runway. When different obstacle evaluation surfaces overlap each other, each individual surface must be considered as they have specific functions.

4.5.1 Obstacle free surfaces

4.5.1.1 The following obstacle free surfaces shall be established for a non-instrument or non-precision approach runway:

a) approach surface;

b) transitional surfaces;

c) inner approach surface; and

d) inner transitional surfaces.

4.5.1.2 The following obstacle free surfaces shall be established for a precision approach runway:

a) Approach surface;

b) transitional surfaces;

c) inner approach surface;

d) inner transitional surfaces; and

e) balked landing surface.

4.5.2 Obstacle evaluation surfaces

4.5.2.1 The following obstacle evaluation surfaces shall be established:

a) in case of circling approach and/or visual circuits — the horizontal surface specified in 4.3.2 or a specific OES;

b) in case of straight-in instrument approaches other than precision approaches, where the horizontal surface is not established — the surface for straight-in instrument approaches specified in 4.3.3 or a specific OES;

c) in case of precision approach procedure — the surface for precision approaches specified in 4.3.4 or a specific OES;

d) in case of instrument departure procedure — the instrument departure surface specified in 4.3.5 or a specific OES;

e) in case of take-off operations — the take-off climb surface specified in 4.3.6 or a specific OES; and

f) in case of operations different from the above — specific OES.

Note 1.— Operations mentioned in f) may include curved approach, VFR circuit patterns, etc.

Note 2.— Specifications and further guidance related to specific OES are contained in PANS-Aerodromes *(Doc 9981) and in the* Airport Services Manual *(Doc 9137), Part 6*—Control of Obstacles*."*

4.6 Objects outside the obstacle free surfaces and obstacle evaluation surfaces

4.6.1 **Recommendation.—** In areas beyond the limits of the obstacle limitation surfaces, at least those objects which extend to a height of 100 m or more above ground elevation should be regarded as obstacles, unless an aeronautical study indicates that they do not constitute a hazard to the operations of intended aeroplane.

End of new text.

CHAPTER 5. VISUAL AIDS FOR NAVIGATION

. . .

5.2 Markings

. . .

5.2.4 Threshold marking

Application

5.2.4.1 A threshold marking shall be provided at the threshold of a paved ~~instrument~~ runway~~, and of a paved non-instrument runway where the code number is 3 or 4 and the runway is intended for use by international commercial air transport~~.

~~5.2.4.2 **Recommendation**. — *A threshold marking should be provided at the threshold of a paved non-instrument runway where the code number is 3 or 4 and the runway is intended for use by other than international commercial air transport*.~~

Editorial Note.— Renumber subsequent paragraphs.

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5.2.16 Mandatory instruction marking

. . .

Location

5.2.16.3 The mandatory instruction marking on taxiways where the ~~code letter is A, B, C or D~~ OMGWS is up to but not including 9 m shall be located across the taxiway equally placed about the taxiway centre line and on the holding side of the runway-holding position marking as shown in Figure 5-10 (A). The distance between the nearest edge of the marking and the runway-holding position marking or the taxiway centre line marking shall be not less than 1 m.

. . .

5.2.16.4 The mandatory instruction marking on taxiways where the ~~code letter is E or F~~ OMGWS from 9 m up to but not including 15 m shall be located on both sides of the taxiway centre line marking and on the holding side of the runway-holding position marking as shown in Figure 5-10 (B). The distance