Aerodromes to be listed in Asia Pacific Air Navigation Plan [Updated on 25 June 2024]

S. No. in ICAO APAC Database	S. No	Sub-region	State / Admin	ICAO Code	Name of City	Name of Aerodrome	Type	APAC ANP
1	1	SA	Afghanistan	OAHR	Herat	Herat Intl	UNK	0
4	2	SA	Afghanistan	OAMS	Mazar-e-Sharif	Mazar-e-Sharif	UNK	0
46	3	NA	China	ZBOW	Baotou		UNK	0
47	4	NA	China	ZGBH	Beihai		UNK	0
49	5	NA	China	ZBAD	Beijing	Daxing	UNK	0
50	6	NA	China	ZYCC	Changchun	Longjia	UNK	0
52	7	NA	China	ZSCG	Changzhou	Benniu	UNK	0
53	**8**	**NA**	**China**	**ZUTF**	**Chengdu**	**Tianfu**	**UNK**	**0**
57	9	NA	China	ZLDH	Dunhuang	**Mogao**	UNK	0
58	10	NA	China	ZHES	Enshi	Xujiaping	UNK	0
60	11	NA	China	ZSGZ	Ganzhou	Huangjin	UNK	0
64	12	NA	China	ZUGY	Guiyang	Longdongbao	UNK	0
65	13	NA	China	ZBLA	Hulunbeier	Hailar	UNK	0
66	14	NA	China	ZJHK	Haikou	Meilan	UNK	0
71	15	NA	China	ZWTN	Hotan **HETIAN**	**Kungang**	UNK	0
72	16	NA	China	ZSSH	Huai'an	Lianshui	UNK	0
73	17	NA	China	RCYU	Hualien	Hualien	UNK	0
74	18	NA	China	ZSTX	Huangshan	Tunxi	UNK	0
75	19	NA	China	ZYJM	Jiamusi	**Jiamusi**	UNK	0
76	20	NA	China	ZGOW	Jieyang	Chaoshan	UNK	0
81	21	NA	China	ZULS	Lhasa	Gonggar	UNK	0
82	22	NA	China	ZSLG	Lianyungang	Baitabu **Huaguosha**	UNK	0
83	23	NA	China	ZPLJ	Lijiang	Sanyi	UNK	0
84	24	NA	China	ZSLY	Linyi	Shubuling **Qiyang**	UNK	0
85	25	NA	China	ZHLY	Luoyang	Beijiao	UNK	0
86	26	NA	China	ZPMS	Dehong	Mangshi	UNK	0
87	27	NA	China	ZBMZ	Manzhouli	Xijiao	UNK	0
88	28	NA	China	ZYMD	Mudanjiang	Hailang	UNK	0
89	29	NA	China	ZSCN	Nanchang	Changbei	UNK	0
92	30	NA	China	ZSNT	Nantong	Xingdong	UNK	0
93	31	NA	China	ZSNB	Ningbo	Lishe	UNK	0
94	32	NA	China	ZBDS	Ordos	Ejin Horo	UNK	0
96	**33**	**NA**	**China**	**ZJQH**	**QIONGHA**	**Boao**	**UNK**	**0**

S. No. in ICAO APAC Database	S. No	Sub-region	State / Admin	ICAO Code	Name of City	Name of Aerodrome	Type	APAC ANP
97	34	NA	China	ZYQQ	Qiqihar	Sanjiazi	UNK	0
98	35	NA	China	ZSQZ	Quanzhou	Jinjiang	UNK	0
104	36	NA	China	ZBSJ	Shijiazhuang	Zhengding	UNK	0
107	37	NA	China	RCMQ	Taichung	Cingcyuangang	UNK	0
108	38	NA	China	RCNN	Tainan	Tainan	UNK	0
112	39	NA	China	ZSWH	Weihai	Dashuipo	UNK	0
113	40	NA	China	ZSWZ	Wenzhou	Longwan	UNK	0
115	41	NA	China	ZSWX	Wuxi	Shuofang	UNK	0
116	42	NA	China	ZSWY	Wuyishan		UNK	0
120	43	NA	China	ZLXN	Xining	Caojiabao	UNK	0
121	44	NA	China	ZPJH	Xishuangbanna	Gasa	UNK	0
122	45	NA	China	ZSXZ	Xuzhou	Guanyin	UNK	0
123	46	NA	China	ZSYN	Yancheng	Nanyang	UNK	0
124	47	NA	China	ZYYJ	Yanji	Chaoyangchuan	UNK	0
125	48	NA	China	ZSYT	Yantai	Penglai	UNK	0
126	49	NA	China	ZSYA	Yangzhou	Taizhou	UNK	0
127	50	NA	China	ZHYC	Yichang	Sanxia	UNK	0
128	51	NA	China	ZLIC	Yinchuan	Hedong	UNK	0
129	52	NA	China	ZSYW	Yiwu	**Yiwu**	UNK	0
130	53	NA	China	ZGZJ	Zhanjiang		UNK	0
131	54	NA	China	ZGDY	Zhangjiajie	Hehua	UNK	0
132	55	NA	China	ZHCC	Zhengzhou	Xinzheng	UNK	0
133	56	NA	China	ZSZS	Zhoushan	Putuoshan	UNK	0
134	57	NA	China	ZUZY	Zunyi	Xinzhou	UNK	0
147	58	SA	India	VEBS	Bhubaneswar	**Biju Patnaik Airport**	UNK	0
149	59	SA	India	VICG	Chandigarh		UNK	0
154	60	SA	India	VOGO	Goa		UNK	0
155	**61**	**SA**	**India**	**VEGK**	**GORAKHPUR**		**UNK**	**0**
157	**62**	**SA**	**India**	**VIDX**	**HINDAN**		**UNK**	**0**
159	**63**	**SA**	**India**	**VOHY**	**HYDERABAD**	**Hyderabad International Airport**	**UNK**	**0**
161	**64**	**SA**	**India**	**VIJO**	**JODHPUR**		**UNK**	**0**
162	**65**	**SA**	**India**	**VEIM**		**Imphal Airport**	**UNK**	**0**

S. No. in ICAO APAC Database	S. No	Sub-region	State / Admin	ICAO Code	Name of City	Name of Aerodrome	Type	APAC ANP
163	**66**	**SA**	**India**	**VOKN**		**Kannur International Airport**	**UNK**	**0**
167	**67**	**SA**	**India**	**VOGA**		**Manohar International Airport, MOPA, GOA**	**UNK**	**0**
172	68	SA	India	VOPB	Port Blair		UNK	0
173	69	SA	India	VAPO	Pune		UNK	0
174	**70**	**SA**	**India**	**VAHS**		**Rajkot International Airport**	**UNK**	**0**
175	71	SA	India	VISR	Srinagar		UNK	0
177	**72**	**SA**	**India**	**VOTP**		**Tirupati Airport**	**UNK**	**0**
180	**73**	**SA**	**India**	**VOVZ**	**VISAKHAPATAN**		**UNK**	**0**
222	74	NA	Japan	RJAH	Hyakuri		UNK	0
227	75	NA	Japan	RJNK	Komatsu		UNK	0
244	76	NA	Japan	RJOS	Tokushima		UNK	0
248	77	NA	Japan	RJOH	Yonago	Miho	UNK	0
285	78	PAC	Micronesia	PTSA	Kosrae I.	Kosrae	UNK	0
286	79	NA	Mongolia	ZMCD	Dornod	Choibalsan	UNK	0
306	80	PAC	N. Mariana Is.	PGWT	Tinian I.	West Tinian Tinian Intl	UNK	0
341	81	PAC	Solomon Islands	AGGM	Munda		UNK	0
345	82	SA	Sri Lanka	VCCJ	Jaffna		UNK	0
363	83	PAC	Vanuatu	NVVW	Tanna	Tanna	**UNK**	0
365	84	SEA	Viet Nam	VVDL	Da Lat	Lien Khuong	**UNK**	**0**

Notes:

1) **Australia:** Need to finalize the Table AOP II -1, APAC ANP V-II.

2) **US**

(1) Tinian I./West Tinian [PGWT] for N. Mariana Is. should be added in Table AOP I – 1 of APAC ANP V - I and Table AOP II – 1 of APAC ANP V - II.

(2) JOHNSTON ATOLL/Johnston I (PJON) should be withdrawn from Table AOP I – 1 of APAC ANP V - I and Table AOP II – 1 of APAC ANP V - II as it had been permanently closed.

International Civil Aviation Organization

The Fifth Meeting of the Asia/Pacific Aerodrome Design and Operations Task Force (AP-ADO/TF/5)

Chiang Rai, Thailand, 30 January – 2 February 2024

Agenda Item 4: Planning, Design and Construction of Aerodromes

INCONSISTENCY REQUIREMENT IN ICAO ANNEX 14 VOLUME I

(Presented by Malaysia)

SUMMARY

This paper presents the inconsistency observed of requirements in ICAO Annex 14 Volume I and also collates additional information from other guidance material (ICAO Aerodrome Design Manual Part 4, ACI Handbook and FAA's safety study) and present to the meeting for discussion. This paper makes recommendations on such adoptions for the meeting's consideration.

1. INTRODUCTION

1.1. AOP-SG/7 held in June 2023 discussed the AP-ADO/TF/4 outcomes with the issues of inconsistency in ICAO Annex 14 Standards and Recommended Practice and invited members to highlight in the next AP-ADO/TF/5. Draft Conclusion AOP-SG/7-1 referred.

1.2 This paper further deliberates the issue and makes recommendations for the meeting's consideration on the inconsistency of requirements in Annex 14 Volume I with the objectives of reaching a draft conclusion to ensure uniformity in implementing SARPs and to enhance aerodrome safety and efficiency.

2. DISCUSSION

Current Requirements in Annex 14 Volume I

2.1 The inconsistency identified in Annex 14 Volume I will confuse the State in adopting the SARPs related to some requirements in Taxiway Centerline Marking, Threshold Marking, Taxiway Transverse Stripe, Pavement Edge Flushing, and Precision Approach Lighting

2.2 The following are the inconsistency identified which required deliberation:

Taxiway Centerline Marking

2.3 Annex 14 Vol 1 Clause 5.2.8.1 identified taxiway centre line shall be continuous only at runway centre line and aircraft stands.

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

Clarification is required on whether taxiway centre line markings should be interrupted or continuity is required when crossing the other three (3) runway markings i.e. aiming point marking, touchdown zone marking, and threshold marking (for taxiway centre line and turn pad marking).

Threshold Marking

2.4 There is inconsistency of Annex 14 Volume I Clause 5.2.4.4 which stated requirement of threshold marking shall commence 6 m from the threshold in comparison to Figure 5-2, indicates that the distance shall commence at a minimum of 6 m.

"5.2.4.4 The stripes of the threshold marking shall commence 6 m from the threshold."

Clarification is required to ascertain whether the requirement is minimum of 6 m or must be exactly 6 m.

Taxiway Transverse Stripe

2.5 ICAO ADM Part 4, Clause 2.2.3, stated *"transverse stripe width shall be 0.9 m and they should extend to within 1.5m of the outside edge of the stabilized paving or be 7.5 m long, whichever is shorter."*

Clarification is required because as a matter of best practices by some airports, it is recommended to adopt ACI Handbook which implies a maximum distance of 1.5 m for transverse stripes on low-strength shoulders.

Flush of Pavement Edge with strip

2.6 Annex 14 Volume I 3.4.10 specifies flush surfaces between portions of a strip that abuts a runway, shoulder or stopway which is impractical to achieve.

"3.4.10 The surface of that portion of a strip that abuts a runway, shoulder or stopway shall be flush with the surface of the runway, shoulder or stopway."

Clarification is required on the absence of flush tolerance as a safety study by FAA indicated tolerance of 3 inches is acceptable and adopted the requirement as *"The pavement edges must not exceed 3 inches difference in elevation between abutting pavement sections and between pavement and abutting areas".*

Precision of Approach Light

2.7 Annex 14 Volume I Clause 5.3.4.12 requires precision approach light Cat 1 and II with longitudinal intervals of 30 m, however the Figure A - 8 indicates that the installation tolerances.

"5.3.4.12 The lights forming the centre line shall be placed at longitudinal intervals of 30 m with the innermost light located 30 m from the threshold."

The inconsistency between the text and the figure could lead to misinterpretations in aerodrome design and operations which require clarification.

Recommendation on the Inconsistency to ICAO SARPs

Refer to Attachment - slide presentation for details.

2.8 Item in paragraphs 2.3 and 2.5 require further deliberation and safety assessment.

2.9 It is recommended the establishment of such tolerance for item in paragraphs 2.4, 2.6 and 2.7.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) deliberate on the information contained in this paper;

b) consider and adopt the recommendations described in paragraphs 2.8 and 2.9 above; and

c) discuss any relevant matters as appropriate.

— — — — — — —

<table>
<tr><td colspan="3">Draft Conclusion/Decision AP-ADO/TF/5 – X: INCONSISTENCY REQUIREMENT IN ICAO ANNEX 14 VOLUME I</td></tr>
<tr><td colspan="2">What: The inconsistency will cause difficulty for States to establish standard and recommended practices (SARPs) since there are conflicting requirement in Annex 14 Volume I</td><td>Expected impact:
☒ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: Resolving the issues of inconsistency will enable States to establish clear standard and recommended practices (SARPs) without neglecting the safety and efficiency</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 2-Feb-24</td><td colspan="2">Status: Adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☒ICAO HQ ☐Other: XXXX</td></tr>
</table>

—END—


CAAM
Fifth Meeting of the Asia/Pacific Aerodrome Design and Operations Task Force
Conflicting Clause in ICAO Annex 14, Vol 1, Aerodrome Design and Operations.
A joint collaborative study with Malaysia Airports Holdings Berhad (MAHB)
Chiang Rai, Thailand
30th January - 2nd February 2024
CIVIL AVIATION AUTHORITY OF MALAYSIA
1


Objective of The Session
CAAM
To seek clarification and recommendation from ICAO on the following items:-
1
A Proposal for Amendments to Taxiway Centre Line Marking Standards in Aerodrome Design and Operations
2
Threshold Marking: Clarification on Commencement Distance
3
ICAO ADM Part 4 - Clarification on Transverse Stripe Placement
4
Paved Area Tolerance in ICAO Annex 14 Vol. I
5
Precision Approach Lighting System on Longitudinal Intervals
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2 Threshold Marking: Clarification on Commencement Distance

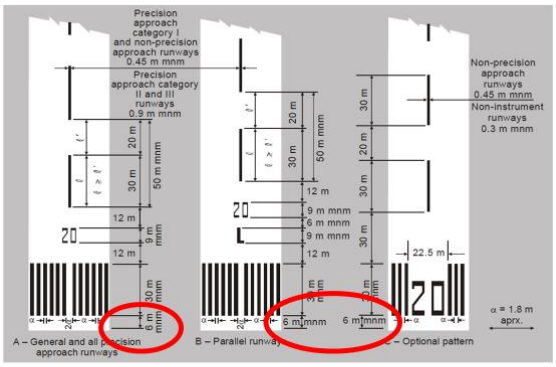


Figure 5-2. Runway designation, centre line and threshold markings

ICAO Annex 14, Volume I, Aerodrome Design and Operations

Para 5.2.4.4	Figure 5-2	Remark
The stripes of the threshold marking shall **commence 6m from the threshold**.	Indicates that the distance shall **commence at a minimum of 6 m**, not as a fixed value.	Clarification needed on the accurate interpretation of the commencement distance for threshold markings.

Clarifying whether the distance is a fixed **6m** or **a minimum value** will enhance precision and ensure uniform implementation of threshold markings across aerodromes.

3 Threshold Marking: Clarification on Commencement Distance

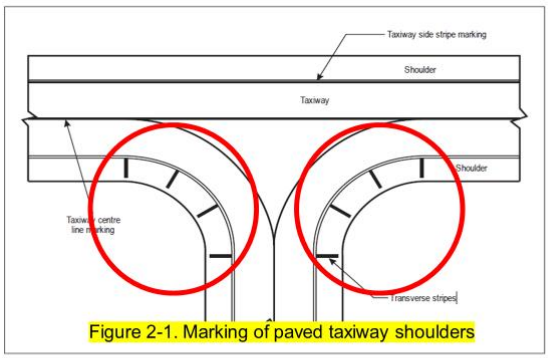


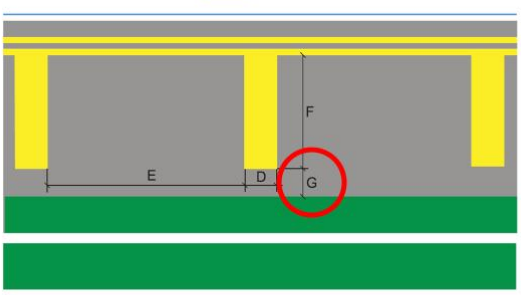
Figure 2-1. Marking of paved taxiway shoulders

ICAO ADM Part 4 Clause 2.2 Additional Marking of Paved Shoulders	ACI Apron Markings & Signs Handbook, 3rd Edition 2017 Clause 2.3	Remark
The width of the marks should be 0.9 m, and they should extend to **within 1.5 m** of the outside edge of the stabilized paving or be **7.5 m long**, whichever is shorter.	A maximum distance of **1.5m** for transverse stripes on low-strength shoulders.	Seeking clarification to harmonize these guidelines and establish a consistent standard for transverse stripe placement on paved shoulders.

3 **ICAO ADM Part 4 - Clarification on Transverse Stripe Placement**

Additionally low strength shoulders should be marked with transverse stripes (see ICAO ADM Part 4, paragraph 2.2.3).

Dimensions	D	E	F	G
	0.9m	max.15.0m on curves (30.0m on straight sections)	7.5m	max. 1.5m

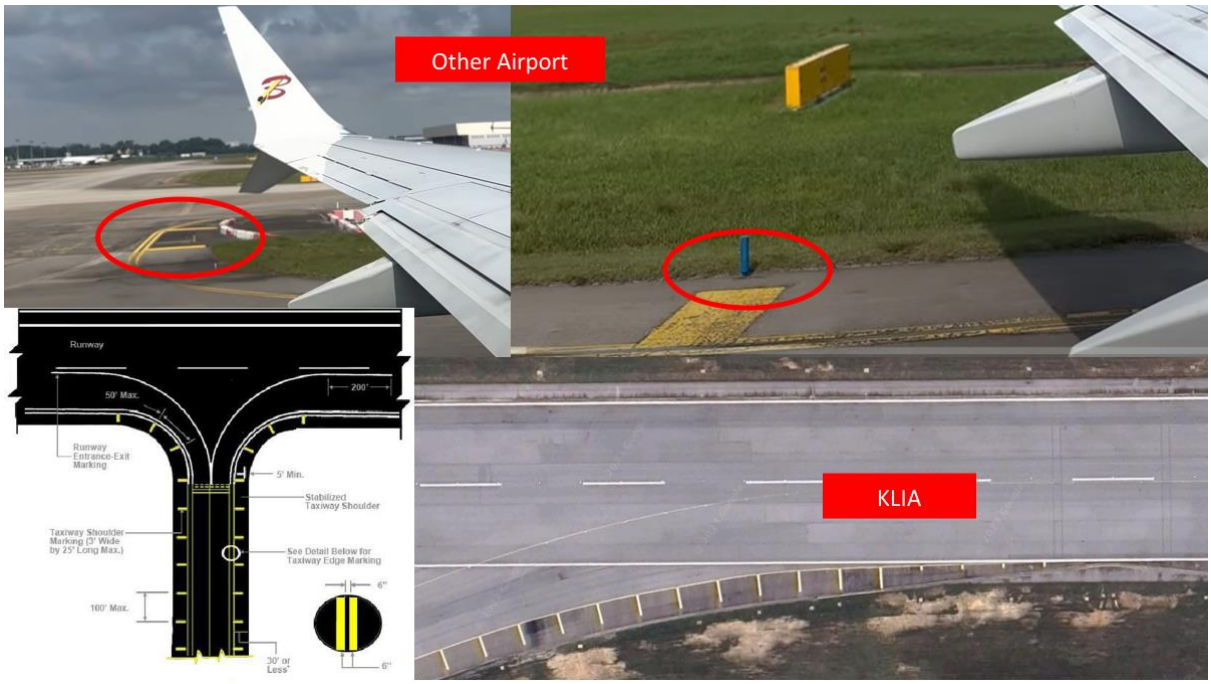


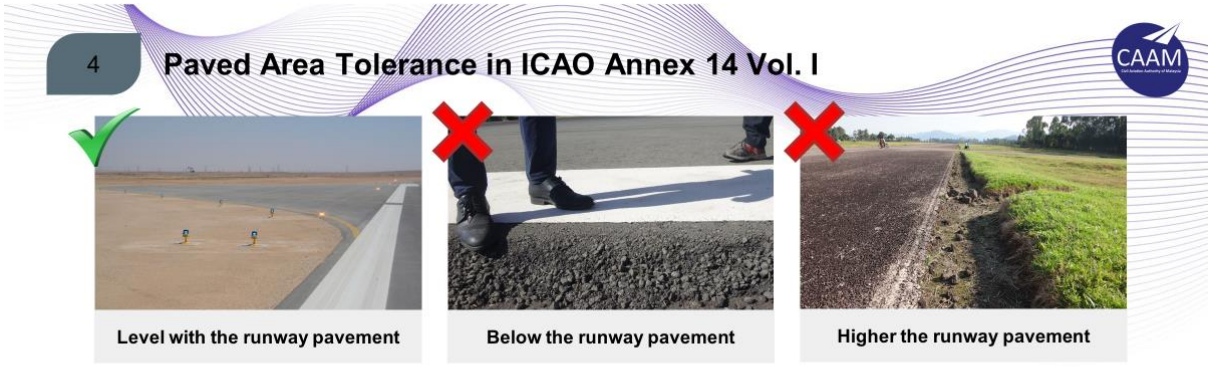
3 **ICAO ADM Part 4 - Clarification on Transverse Stripe Placement**

Before

After

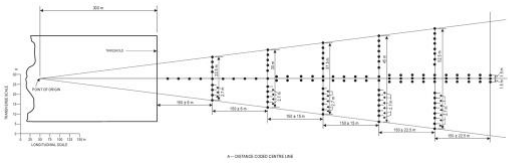
Before After

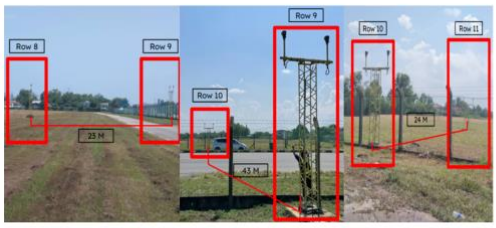




FAA Part 139, Section 305 for Paved Areas	ICAO Annex 14, Vol. I, Grading of Runway Strips Para 3.4.10	Remark
The pavement edges **must not exceed 3 inches** difference in elevation between abutting pavement sections and between pavement and abutting areas.	3.4.10 The surface of that portion of a strip that abuts a runway, shoulder or stopway **shall be flush** with the surface of the runway, shoulder or stopway	Propose ICAO clarifies and incorporates a minimum allowable tolerance for paved and unpaved areas in Annex 14 Vol. I. to provide clear guidance to member states and give harmonized approach to aerodrome design.

5 Precision Approach Lighting System on Longitudinal Intervals





ICAO Annex 14, Volume I, Aerodrome Design and Operations Para 5.3.4.12 & 5.3.4.23	ICAO Annex 14, Volume I, Aerodrome Design and Operations Figure A - 8	Remark
Precision Approach CAT I Lighting System 5.3.4.12 longitudinal intervals of 30 m with the innermost light located 30 m from the threshold. **Precision Approach CAT II & III Lighting System** 5.3.4.23 Longitudinal intervals of 30 m with the innermost lights located 30 m from the threshold.	Indicates that the installation tolerances.	This inconsistency between the text and the figure could lead to misinterpretations in aerodrome design and operations.

Conclusion

We seek clarification from the ICAO on the conflicting clause in ICAO Annex 14, Vol 1, Aerodrome Design and Operations on the above issues for continuous enhancement level of safety and efficiency of aerodrome operations

International Civil Aviation Organization

The Fifth Meeting of the Asia/Pacific Aerodrome Design and Operations Task Force (AP-ADO/TF/5)

Chiang Rai, Thailand, 30 January – 2 February 2024

Agenda Item 4: Planning, Design and Construction of Aerodromes

REVIEW ON THE COLOR SHIFT CHARACTERISTICS IN RELATION TO THE PHOTOMETRIC TESTING REQUIREMENTS PERTAINING TO THE AERONAUTICAL GROUND LIGHTING SYSTEMS USING SOLID STATE LIGHTING (LED'S)

(Presented by India)

SUMMARY

This paper presents the study on the importance of the colour aspects of the Aeronautical Ground Lighting system. With the evolution of LED technology several aspects of operational and maintenance have undergone a change. With the long-life span of the LED lighting the operational intervention reduced considerably. The chromaticity diagram for solid-state lighting with change in the boundaries in the colour has been introduced. The paper discusses the additional aspects of photometric testing which need to be taken care of and monitored to ensure compliance of the AGL system.

The paper is going to speak about the information on the importance of measuring the colour shift especially in the LED - AGL systems, the probable reasons for the colour shift, the regulatory standards on measuring the photometric performance of the different AGL systems and the proposal for further review.

1. INTRODUCTION

1.1 The four C's of the AGL system are colour, candela, coverage, and configuration. In the initial days the required colour for the specific AGL system is being achieved through the colour filters. With the technological evolution of LED's, the colour is being produced by compound semiconductor materials such as gallium arsenide, gallium phosphide and indium phosphide and junctions made from these materials are used to emit light. These compounds are selected and used to produce the required chosen colours. When the colour filters are utilized along with the usage of halogen lamps, although the colour filters are mostly reliable the colour stability is affected due to the degradation of the lamp performance over time. Also, when halogen lamps are used, the variable white issues exist i.e., at lower intensities especially with the runway lights, the white lights are perceived to be drifted into the yellow zone. Based on these properties, the white colour boundaries for halogens are determined accordingly (refer Fig A1-1a -ICAO Annex 14 SARPS). This happens because of the default correlated colour temperature of the halogen lamps.

The CCT or Correlated Color Temperature is a specification of the color appearance of the light emitted by a light source, relating its color to the color of light from a reference source when heated to a particular temperature, measured in degrees Kelvin (K).(Correlated Color Temperature (CCT) (nextgenerationled.be)

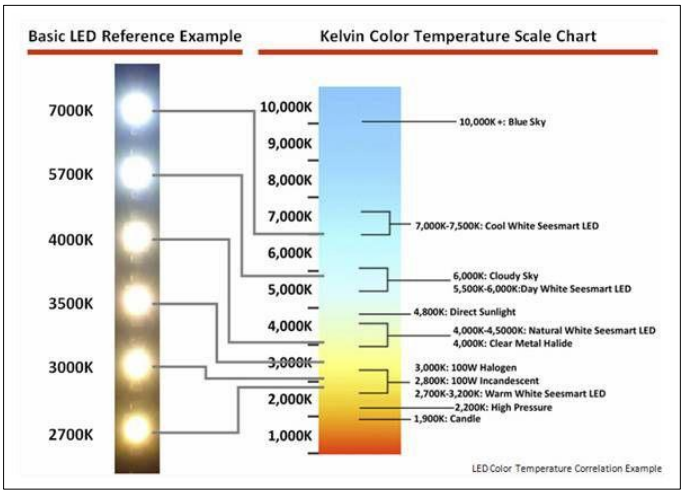


Fig 1: Colour temperature chart (387) Pinterest

1.2 The above concern is resolved with the use of solid-state lighting. In the LED lighting, with the change in the intensities the colour parameter remains constant with better saturation. Due to longer life span of the LED's, which is about 50,000 hours, it takes at least ten years for the lumen depreciation to drop considerably subjected to the design, quality of the products, designed vs actual operating range of driving current and temperature. With LEDs when installed in the luminaire, the degradation / lumen depreciation is usually due to the high temperatures, voltage fluctuation, driver or electrical component issues and degradation of the semiconductor components. However, along with the lumen depreciation, the colour stability also could be affected in the LED lighting system due to operation at higher temperatures, higher driving currents with time and several other reasons which would be discussed in the below paragraphs. Also, the regulatory standards referred to colour form ICAO Annex 14 Vol 1 and ADM part-4 – Visual Aids would be discussed in the guidance provided.

Fig 2. Typical color shift symptoms observed in runway centreline lighting (source: Anonymous)

2. REGULATORY REFERENCES AND STANDARDS

2.1 As per ICAO Annex 14- SARPS

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

1. General

Introductory Note.— The following specifications define the chromaticity limits of colours to be used for aeronautical ground lights, markings, signs, and panels. The specifications are in accord with the 1983 specifications of the International Commission on Illumination (CIE), except for the colour orange in Figure A1-2.

It is not possible to establish specifications for colours such that there is no possibility of confusion. For reasonably certain recognition, it is important that the eye illumination be well above the threshold of perception, that the colour not be greatly modified by selective atmospheric attenuations and that the observer's colour vision be adequate. There is also a risk of confusion of colour at an extremely high level of eye illumination, such as may be obtained from a high-intensity source at very close range. Experience indicates that satisfactory recognition can be achieved if due attention is given to these factors.

*The Chromaticities are expressed in terms of the standard observer and coordinate system adopted by the International Commission on Illumination (CIE) at its Eighth Session at Cambridge, England, in 1931. **

The Chromaticities for solid state lighting (e.g., LED) are based upon the boundaries given in the standard S004/E-2001 of the International Commission on Illumination (CIE), except for the blue boundary of white.

Note.— Guidance on chromaticity changes resulting from the effect of temperature on filtering elements is given in the Aerodrome Design Manual *(Doc 9157), Part 4.*

2.4 Colour measurement for filament-type and solid state-type light sources

2.4.1 The colour of aeronautical ground lights shall be verified as being within the boundaries specified in Figure A1-1a or A1-1b, as appropriate, by measurement at five points within the area limited by the innermost isocandela curve (isocandela diagrams in Appendix 2 refer), with operation at rated current or voltage. In the case of elliptical or circular isocandela curves, the colour measurements shall be taken at the centre and at the horizontal and vertical limits. In the case of rectangular isocandela curves, the colour measurements shall be taken at the centre and the limits of the diagonals (corners). In addition, the colour of the light shall be checked at the outermost isocandela curve to ensure that there is no colour shift that might cause signal confusion to the pilot.

Note 1.— For the outermost isocandela curve, a measurement of colour coordinates should be made and recorded for review and judgement of acceptability by the State.

Note 2.— Certain light units may have application so that they may be viewed and used by pilots from directions beyond that of the outermost isocandela curve (e.g. stop bar lights at significantly wide runway-holding positions). In such instances, the State should assess the actual application and if necessary, require a check of colour shift at angular ranges beyond the outermost curve.

10.5.3 **Recommendation.—** *The system of preventive maintenance employed for a precision approach runway category II or III should include at least the following checks:*

a) visual inspection and in-field measurement of ***the intensity, beam spread and orientation of lights*** *included in the approach and runway lighting systems;*

b) control and measurement of the electrical characteristics of each circuitry included in the approach and runway lighting systems; and

c) control of the correct functioning of light intensity settings used by air traffic control.

10.5.4 **Recommendation.—** *In-field measurement of* ***intensity, beam spread and orientation of lights*** *included in approach and runway lighting systems for a precision approach runway category II or III should be undertaken by measuring all lights, as far as practicable, to ensure conformance with the applicable specification of Appendix 2.*

10.5.5 **Recommendation.—** *Measurement of* ***intensity, beam spread and orientation of lights*** *included in approach and runway lighting systems for a precision approach runway category II or III should be undertaken using a mobile measuring unit of sufficient accuracy to analyse the characteristics of the individual lights.*

10.5.6 **Recommendation.—** *The frequency of measurement of lights for a precision approach runway category II or III should be based on traffic density, the local pollution level, the reliability of the installed lighting equipment and the* ***continuous assessment of the results of the in-field measurement.***

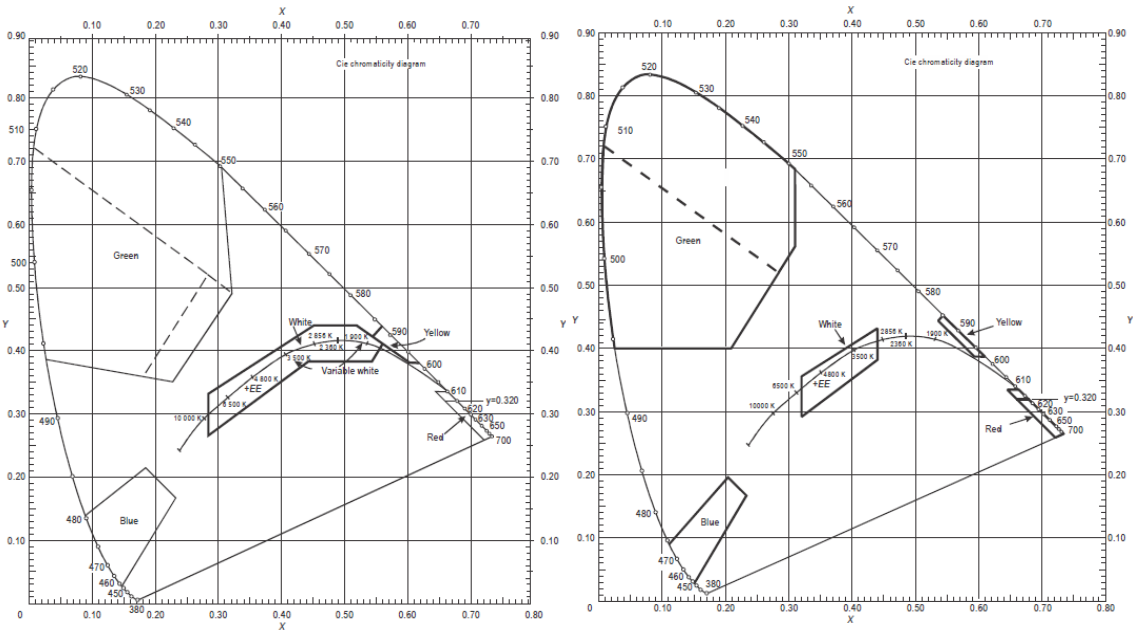


Figure A1-1a. Colours for aeronautical ground lights (filament-type lamps)

Figure A1-1b. Colours for aeronautical ground lights (solid state lighting)

Fig 3. Colors for Aeronautical ground lighting systems for Halogen and LEDs

2.2 From ADM Part 4- Visual Aids:

18.4.1 Whilst the functionality of the electrical supply and control elements of a lighting system is an important maintenance issue, it is the availability of the specified beam correctly aimed and emitting the correct colour that is often difficult to achieve. These parameters are the most common cause of substandard lighting performance. When a lighting system is installed, it should be capable of emitting intensity values shown in Annex 14, Volume I, Appendix 2, Figures A2-1 to A2-21. The maintenance

objective must be to sustain the overall performance at these levels. However, it is not practicable to maintain the specified intensities at all times for every light in the system.

18.4.5 **The test equipment should measure and record the Isocandela diagram, alignment and color of each light, the tests being made with the lighting operating at the 100 per cent power supply level**.

Colour measurement

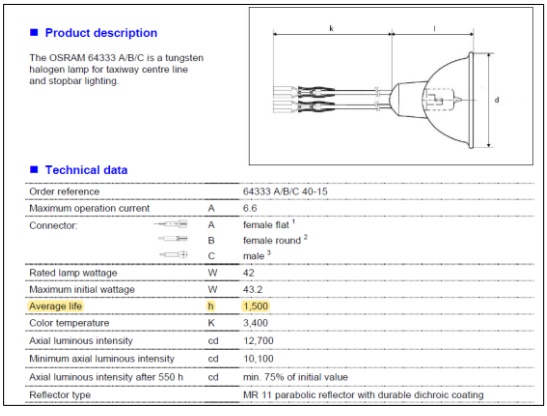
19.2.8 The colour emitted by the light unit should be verified in accordance with Annex 14, Volume I, Appendix 1, 2.4.1, when operating at rated current or voltage. It should be within the chromaticity boundaries of Annex 14, Appendix 1, FigureA1-1a or A1-1b, for the horizontal and vertical limits of the main beam (in the case of elliptical or circular Isocandela curves) or the limits of the diagonals of the main beam (in the case of rectangular Isocandela curves). Furthermore, the colour should be checked by measurement at similar limits for the outermost Isocandela curve. This latter check is to ensure that there is no unacceptable colour shift (e.g. red to yellow) at large angles of observation. Such colour shift can occur with some types of filter material depending upon the design details of the light unit. If the colour shift is outside the chromaticity boundary for that colour, the appropriate regulatory authority should be consulted for judgement of the acceptability of the amount of colour shift.

Note.— The above-mentioned check of colour coordinates may be extended at the request of the appropriate authority to cover angles outside the outermost Isocandela curve. This may be an important precaution for light units that have applicability where the angle of observation by the pilot can be outside the angles specified in the Isocandela diagram (e.g., stop bars at wide runway entrances).

3. PROPOSAL AND DISCUSSIONS

3.1 Why the measurement of colour shift in LEDs is more important when compared with Halogen?

3.1.1 The common aspects for the halogen and LED are the maintenance regime and optical components integrity which need to be taken care in all aspects as explained earlier, in halogen fixtures the colour shift mainly happens due to the lamp degradation. The average life of the halogen is about 3000-4000 hrs. (This has been mentioned, by considering that the lamp is being operated in all the 5 steps based on operational requirement. While @6.6A, generally the operating hours are about 1500 hrs.) i.e., less than 9-10 months when the lights are operated on an average of 14 hrs. per day. During the photometric tests, as per the regulatory requirements when considered to be done at least twice a year, the reason for deterioration in the colour (if any) or the photometric output mainly would be due to the lamp deterioration due to the lesser life span.



■ **Product description**

The OSRAM 64333 A/B/C is a tungsten halogen lamp for taxiway centre line and stopbar lighting.

■ **Technical data**

Order reference			64333 A/B/C 40-15
Maximum operation current		A	6.6
Connector:		A	female flat [1]
		B	female round [2]
		C	male [3]
Rated lamp wattage		W	42
Maximum initial wattage		W	43.2
Average life		h	1,500
Color temperature		K	3,400
Axial luminous intensity		cd	12,700
Minimum axial luminous intensity		cd	10,100
Axial luminous intensity after 550 h		cd	min. 75% of initial value
Reflector type			MR 11 parabolic reflector with durable dichroic coating

Fig 4. Typical average life of halogen lamp

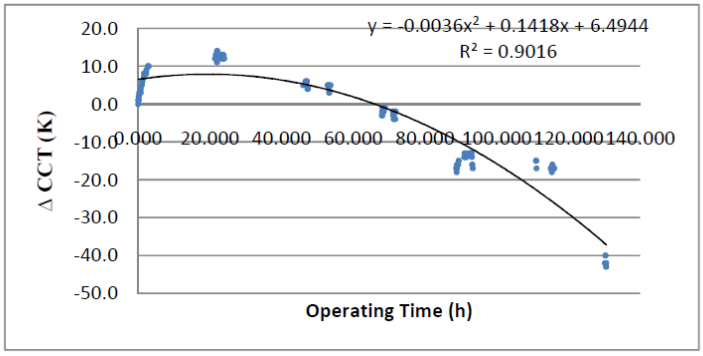


Fig 5. Change in CCT for an operating time upto 130 hrs. for a halogen lamp form the paper on *" Capability of testing the ageing behaviour of incandescent."*

From "LED luminaire reliability: Impact of color shift - Next Generation Lighting Industry Alliance, LED Systems Reliability Consortium"- *Traditional lighting technology, such as halogen, fluorescent, or metal halide technology, experiences color shifts. Frequent relamping every few years is required due to catastrophic failures or lumen depreciation, and this mitigates the impact of the color shift of these lighting technologies*.

For LEDs, the concept would change a little bit as the life is claimed to be about 50,000 hrs. i.e., more than 10 years. Hence, the installation (fixture) is used in operations for a period of about 8-10 years without replacing the LED (Luminaire) or any other optical components. So, when the system is in service for years together, the properties of the semiconductor components would vary resulting in gradual deterioration of the quality of the light output and possible colour shifts. Although the color stability is ensured in the initial years, there is need to evaluate the color shift aspects during its operational period.

From research paper, ***Advanced Materials and Materials Genome—Review - Progress in Understanding Color Maintenance in Solid-State Lighting Systems,*** *"Phosphor materials (used in all white LEDs) can degrade over time, leading to color shift. In some cases, it is not the phosphor material, but the position of the phosphor with respect to the LED that changes over time, allowing more or less blue light to be emitted. Deterioration of the binder material, which binds the phosphor to the LED die, may cause phosphor particles to detach, leading to an increase of scattering and an associated color shift."*

3.1.2 Also, in general the performance of the LEDs is analyzed for a period of 6000 hours only, after which the colour shift changes are not predicted. While, when the fixture is in actual operation, in addition to the above said challenges, this is also impacted by other stresses such as environmental and higher temperatures. At higher temperatures the colour shift happens at a faster rate as shown in Fig 9. Considering all these factors, the need to measure the photometric performances and colour shift at regular intervals is very much necessary.

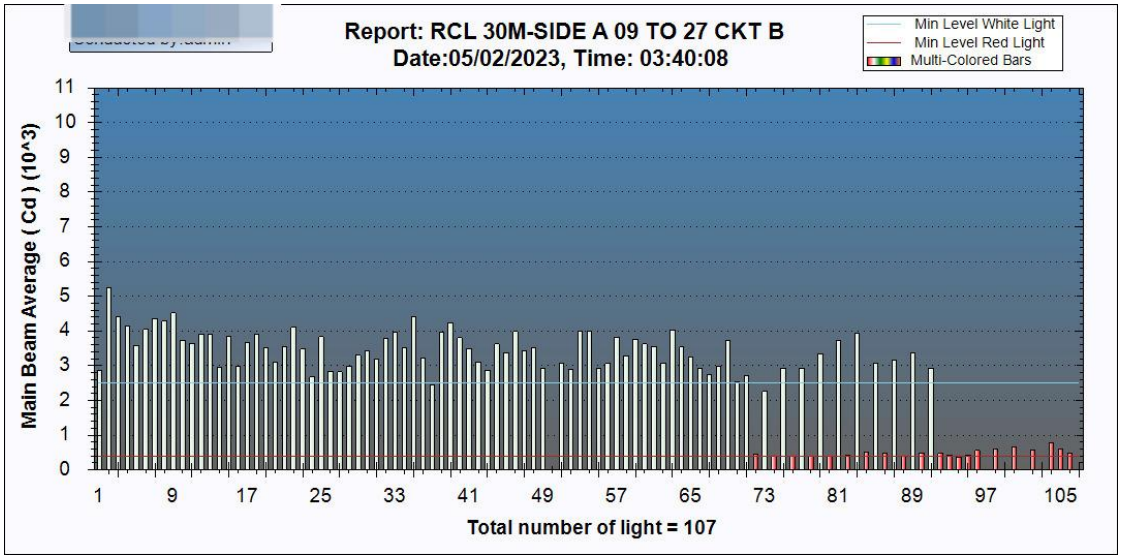


Fig 6. Bar chart of the photometric performance of the halogen fixtures of RCL

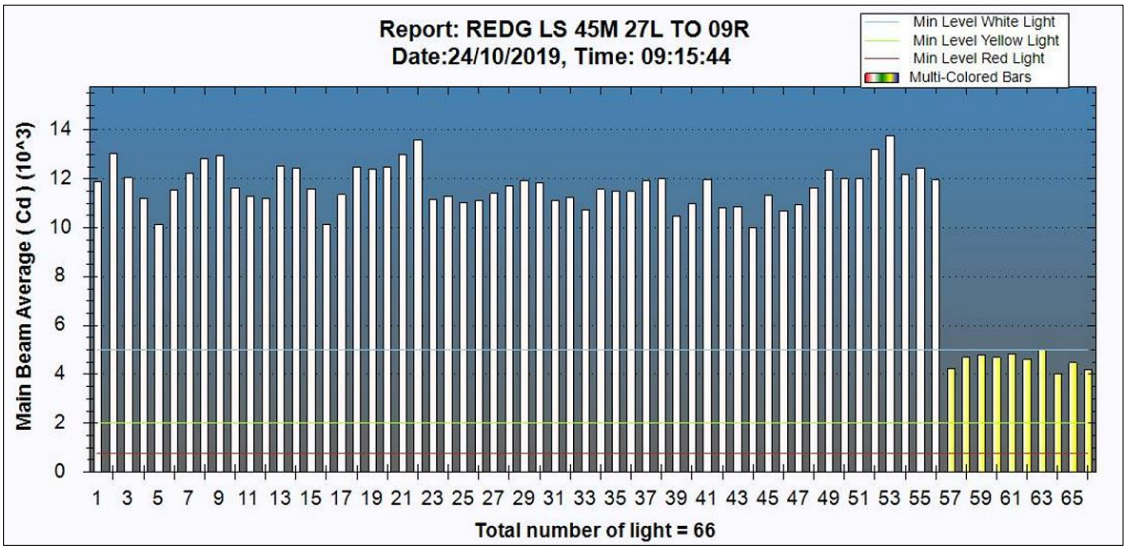


Fig 7. Bar chart of the photometric performance of the LED fixtures of runway edge

3.1.3 When we analyze the bar charts above, we see that in the halogen (Fig 6.), when the serviceability levels are more than 95% and each light fixture intensity levels are meeting the intensity requirement. As the intensity is to the requirement and the colour filters are more consistent in delivering the required colours, the colour shift issues usually wouldn't occur. While, with the LED the same is not always true. In the second bar chart (Fig 7.), the LED runway edge photometric intensities are complaint and serviceability levels are more than 95%.

While the photometric performances are still good, there is still a need to measure the colour shift. Because there is always a chance that the intensity is good and due to change in the properties of the semiconductors and other reasons that too after certain years, there are all chances of color shifts.

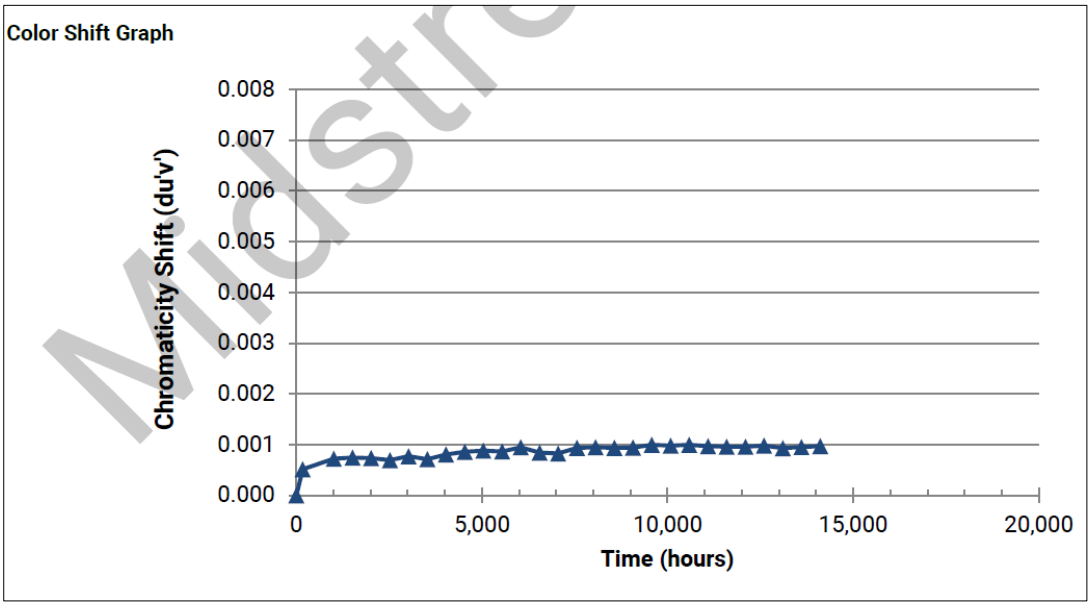


Fig 8. Typical colour shift graph from the LM 80 report.

We can see from the LM 80 report a typical graph of the color shift, where there is a very minor shift in the ideal conditions, while the conditions in the airfield scenario changes abruptly. The working temperatures, the operating currents etc., could vary, impacting the color shift. Also, we can notice that the prediction cannot be provided for the entire operating life of the LED's.

In addition to this, the below graph represents that the color shift would be impacted greatly due to the changes in the operating temperatures.

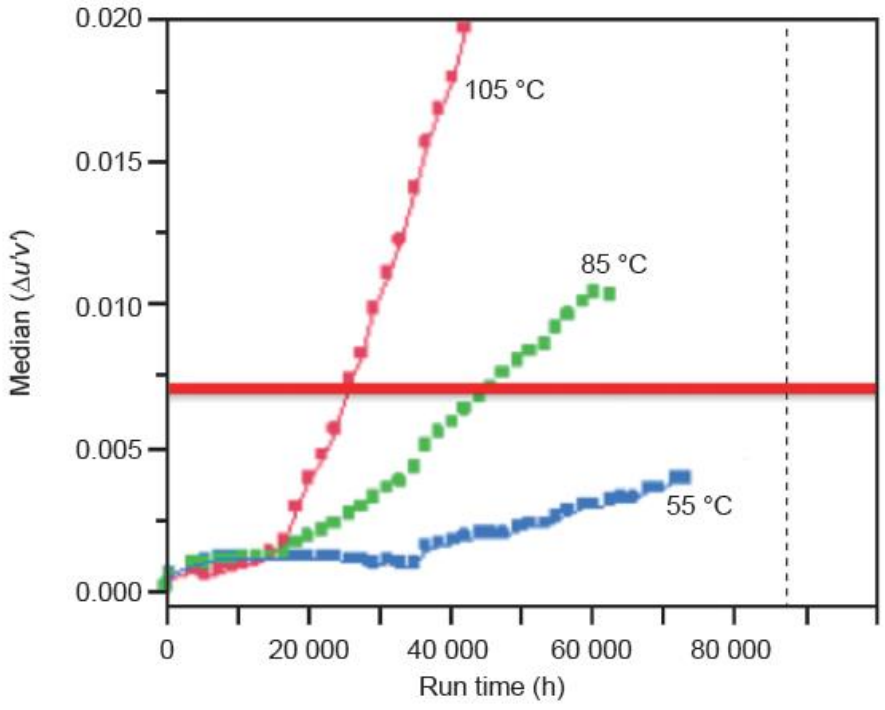


Fig 9. Impact of the colour shift with temperatures (Advanced Materials and Materials Genome—Review - Progress in Understanding Color Maintenance in Solid-State Lighting Systems)

3.2 Why does the colour shift happens in LED?

3.2.1 The quality, the colour temperature of the LEDs, the colour rendering index and the colour defines how the light is seen or perceived by an observer. However, light which is seen by the observer gradually deteriorates with time, although here in the case of solid-state lighting this may take years. Several tests and reports are required to state that the product developed meets the desired requirements of the lumen output, efficacy, and the performance for the designed period. The reports such as L70, LM 79, LM 80, and TM 21 etc., are needed to state that after installation of the LEDs in the designed fixtures, the overall properties are meeting to the requirements and the lifetime meeting the lumen output is assessed properly.

L70 is a lifetime measurement criterion developed by IESNA (Illuminating Engineering Society of North America) to evaluate the useful lifetime of an LED luminaire in terms of the expected number of operating hours until the light output has diminished to 70% of initial levels.

LM-79 is an approved process that measures the electrical and photometric properties of LED products. This process includes luminous flux, electrical power, efficiency, chromaticity as well as the diffusion of luminous intensity.

LM-80 is an approved process that measures the lumen maintenance of the flux for a group of electroluminescent diodes (LED) at various operating temperatures. LM-80 data usually includes colour measurement. Hence, any reputed make LED's usually will have colour maintenance data available for at least 6000 h.

TM-21 provides guidelines on the use of data compiled through LM-80 tests to assess the lifespan of a light source beyond the number of test hours recommended by LM-80

Both LM-80 and TM-21 results have been designed to be assessed together, as TM-21 uses test data provided by LM-80 with data obtained further to operating temperature.

Data Set	Case Temp. [TS]	Ambient Temp. [TA]	Drive Current [IF]	Average Lumen Maintenance at 6,000 Hours	(Average Chromaticity Shift (Δu'v') at 6,000 Hours	Reported TM-21 Lifetimes
1	85 °C	85 °C	3000 mA (6 V) 2000 mA (9 V) 500 mA (36 V)	94.5%	0.0020	L70(6k) > 36,300 hrs
1+	85 °C	85 °C	3000 mA (6 V) 2000 mA (9 V) 500 mA (36 V)	94.3%	0.0020	L90(13k) = 22,300 hrs L80(13k) = 59,200 hrs L70(13k) > 72,100 hrs
2	105 °C	105 °C	3000 mA (6 V) 2000 mA (9 V) 500 mA (36 V)	90.2%	0.0034	L70(6k) = 26,000 hrs
2+	105 °C	105 °C	3000 mA (6 V) 2000 mA (9 V) 500 mA (36 V)	90.2%	0.0034	L70(7k) = 27,700 hrs

Fig 10: Typical performance report in different conditions of a typical LED (LM 80 report for typical LED)

3.2.2 All these assessments mostly focus on the light output predominantly and its deterioration with time. While the aspects of colour shift analysis cannot be determined. This poses a great risk unlike other sources of luminaires such as halogens as the colour shifts occur only after several years of operation in LEDs and usually the trend may go unnoticed. Colour shift is the change in the colour from the initial day when it is in operation with the time based on several factors such as quality of LEDs chosen, the methodology chosen to dissipate the heat or reduce the junction temperature inside the fixture, its driving current under different circumstances and climatic conditions, the aging effect etc., all could contribute to the colour shift. Hence, colour stability is an important factor which need to be considered by the manufacturers in ensuring the fixture with better longevity and performance are used at Airports.

3.2.3 The colour stability is the ability of the light source to maintain its colour over time. This can be deteriorated due to several reason such as degradation of the encapsulation, degradation of the semiconductor components, higher driving current leading to increase the junction temperatures etc.,

3.3 Measurement of Colour using Chromaticity Coordinates x, y:

3.3.1 In colorimetry, the quantification of colour is based on the three-component theory of colour vision, which states that the human eye possesses receptors for three primary colour (red, green, and blue) and that all colour is seen as mixtures of these primaries. In colorimetry, these components are referred to as X-Y-Z coordinates. These are called tristimulus values, while visualizing the same is a tough task and hence, graphical models and graphing methods are developed to visualize the colours easily. The x-y coordinate system is generally used.

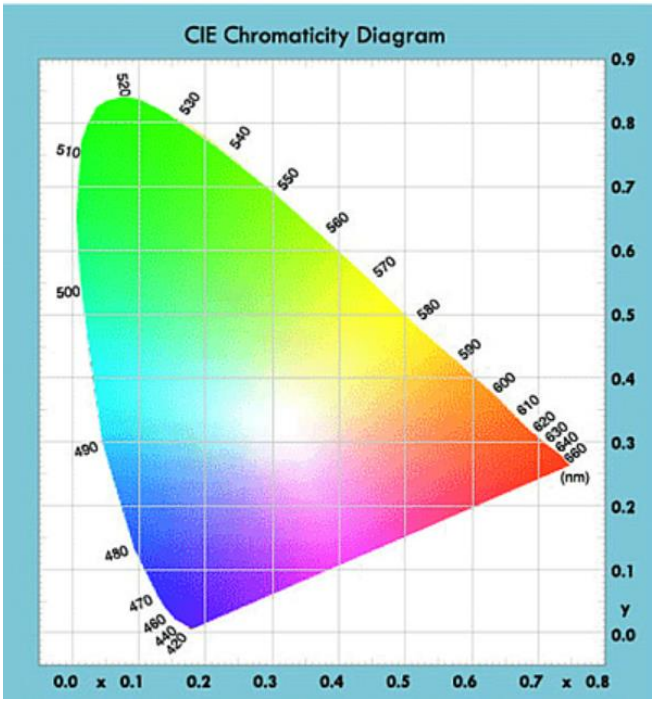


Fig 11 : CIE Chromaticity diagram

3.4 Standards of measurement as per the SARPs and the features of the present equipment

3.4.1 ICAO Annex 14 SARPs, Appendix 1- clause 2.4 provides the guidance on measuring the colour at centre , horizontal and vertical limits for elliptical or circular iso candela curves and for rectangular to measure at the centre and the limits of the diagonals. The light colour at the outermost candela curve to ensure there is no colour shift which could cause signal confusion to the pilot.

3.4.2 These values to be recorded for review and judgement of acceptability by the State. In some cases, the regulator recommends measuring the colour beyond the outermost boundary of the Isocandela curve.

3.4.3 There is a huge discrepancy in the reality considering the present process of measuring the colours by the agencies in the field of measuring the photometric tests. Airport operators are more focused on the intensity measurements and meeting the ICAO/ Maintenance criteria. The criterion of

measuring the color to be documented or reviewed to identify the colour and its shift year on year. This helps the operator to understand the actual scenario of the fixtures. In general, the LED fixtures are warranted for 2 years normally and in special cases for 5 years, however, the performance is measured against the intensity only. Whenever there is a great change in the colour shifts, the deviation can be monitored visually only. While the minor color shifts and the trend they drift from one value to another value cannot be inspected visually.

3.4.4 Vendors/ Agencies delivering the services of photometric measurement of the AGL fixtures at airports, to further focus on these standards for reviewing the color measurement check as intended by the regulator. Along with the measurement of average intensities and ratios, the color parameter to be measured as part of understanding the color shift trend with time.

AGENCY A International Airport A

Report Name : RCL 15M CAT3-SIDE A - 27L T2 **Date:** 25-10-2021

Time: 08:37:22

Measurement run by: admin **Scanning Direction:** Forward

Number of lights : 267 **Compliance of AGL Function:** Compliant

Passed Light (%) : 100 **Unserviceable lights tolerance (%** 5

Number of passed Lights: 267 **Faulty Light (%):** 0

Number of faulty Lights: 0

Light No	Light Ref	Average (Cd)	Max Beam(Cd)	Max Beam (V°)	Max Beam (H°)	ICAO (%)	Status	x chrom	y chrom	Algt	Color	Xgps	Ygps
1	RCL-09R-	4757	6231	4.2	-0.4	95	PASS	0.369	0.365	G	W	1311.3648	7743.604561
2	RCL-27L-12	4915	6487	4.4	0.9	98	PASS	0.394	0.369	G	W	1311.364931	7743.59618
3	RCL-09R-	4009	4409	3.0	2.0	80	PASS	0.385	0.367	G	W	1311.365096	7743.588023
4	RCL-27L-12	4764	6288	4.2	-0.4	95	PASS	0.385	0.369	G	W	1311.365254	7743.579682

Fig 12. Typical photometry report mentioning the color and coordinates

3.4.5 Based on the above report, the X chromaticity value and Y chromaticity value are clearly depicted with the reference colour as “White”.

3.4.6 While the following questions are still to be answered when converted from Halogen to LED:

- Whether measuring color as a requirement is being followed at all the airports? If yes the color shift is measured year on year while using the LEDs?
- Whether the exact process as guided by the regulatory standards are followed?
- Whether the color in the outer most curve is being measured to assess the color shift ?

In reference to the same, it is being proposed to include the color aspect in the photometric measurement concept as part of preventive maintenance schedule deployment, which basically pushes the Agencies and the operators to focus on the colour aspect.

4. INFERENCES

4.1 Based on the above discussion, the following conclusions can be drawn:

i. Identifying the Colour shift in LEDs is more of a serious concern due to its long-life span.

ii. Several factors such as higher junction temperatures, higher driving currents and the degradation of the materials can result in early color shifts.

iii. The maintenance regime is common for both halogen and LED.

iv. In reality, color shifts can only be noticed after a certain period of use. In halogen lamps this happens mainly due to the degradation of the lamps and due to lesser life span, as the same would be replaced at regular intervals, the color shift issue would be handled eventually.

v. Although the lamp life is 50,000 hours, the test reports can ascertain the lamp life, color shift and lumen efficacy only upto period of 6000 hours only. Although with TM21 projections luminous efficiency can be projected for a certain period in different temperatures, the same is not possible to project the color shifts. Hence, a regular monitoring & testing mechanism shall be employed for ensuring the photometric output and properties of the LEDs are meeting the requirements.

vi. The color shift needs to be measured at centre and at the horizontal and vertical limits of the Isocandela diagram for the elliptical or circular beams. Along with these measurements, the colour at the outermost Isocandela curve beam to be measures and for some applications, the lights may be used beyond that of the outermost Isocandela curve (e.g., stop bar lights at significantly wide runway-holding positions) and in those cases, the State should assess the actual application and if necessary, require a check of colour shift at angular ranges beyond the outermost curve.

vii. The clause 18.4.5 from ADM part 4 also clearly states that **"The test equipment should measure and record the Isocandela diagram, alignment and color of each light, the tests being made with the lighting operating at the 100 per cent power supply level."** The required aspect of measuring the colour is clearly stated in ADM part 4 and reference on the guidance on measurement of color shift is referred to in the ICAO. However, inclusion of measuring color as part of recommended standards is proposed in this paper as part of ICAO requirements. The requirement of mentioning the monitoring of "color" parameter is needed to ensure the color shift is monitored very closely especially with the LED's. This makes the Airports, AGL manufacturers and photometric agencies to focus more seriously on measuring the color as one of the prime parameters along with intensity.

viii. More predictive methods to analyse the LEDs functionality with respect to performance and color properties to be evaluated for the operating period of the life by the manufacturers.

ix. AGL product manufacturers mainly assemble the subcomponents purchased from several other agencies. The LEDs are generally procured from the LED manufacturer and used by AGL manufacturer. In general, the AGL application is quite different unlike other domestic applications such as Building lighting, high mast lighting etc., as here physical load is exerted upon the fixture. The LED manufacturer and the AGL product manufacturer shall assess the LEDs based on these factors also and its impact on the performance of the AGL fixtures.

x. In order to emphasize the importance of color shift, at the least, the same need to be measured as a first point. Hence, along with the photometric parameters, it is being proposed to measure the color as a basic need.

5. ACTION BY THE MEETING

5.1 The meeting is invited to:

a) note the information contained in this paper; and

b) review, discuss and recommend the following revisions in "Annex 14, Volume I, 10.5 Visual aids":

10.5.3 **Recommendation.—** *The system of preventive maintenance employed for a precision approach runway category II or III should include at least the following checks:*

a) visual inspection and in-field measurement of the intensity, beam spread, colour and orientation of lights included in the approach and runway lighting systems;

b) control and measurement of the electrical characteristics of each circuitry included in the approach and runway lighting systems; and

c) control of the correct functioning of light intensity settings used by air traffic control.

10.5.4 **Recommendation.—** *In-field measurement of intensity, beam spread, colour and orientation of lights included in approach and runway lighting systems for a precision approach runway category II or III should be undertaken by measuring all lights, as far as practicable, to ensure conformance with the applicable specification of Appendix 2.*

10.5.5 **Recommendation.—** *Measurement of intensity, beam spread, colour and orientation of lights included in approach and runway lighting systems for a precision approach runway category II or III should be undertaken using a mobile measuring unit of sufficient accuracy to analyse the characteristics of the individual lights.*

—END—

AP-ADO/TF/5 – **WP/09**
Revision 01
Agenda Item 4

International Civil Aviation Organization

The Fifth Meeting of the Asia/Pacific Aerodrome Design and Operations Task Force (AP-ADO/TF/5)

Chiang Rai, Thailand, 30 January – 2 February 2024

Agenda Item 4: Planning, Design and Construction of Aerodromes

REVIEW ON THE REQUIREMENT OF THE RUNWAY GUARD LIGHTS PROVISION WHEN STOP BARS ARE AVAILABLE AND RECOMMENDATIONS ON THE STOP BAR OPERATION SEQUENCE TIMINGS

(Presented by India)

SUMMARY

This paper presents on the review on the requirement of the runway guard lights provision and the dependency of the stop bar lighting at Airports when operated under different operational conditions. As per the SARPs the runway guard lights are provided where stopbars are not installed or operated. The paper discusses on the proposed recommendations on the safety and operational aspects of the stop bar sequence of operations in conjunction with the provision of the runway guard lights.

1. INTRODUCTION

1.1. Stop bar lighting is an effective measure to prevent runway incursions along with the other visual aids especially during the low visibility operations. Some studies suggest that the stop bar lighting, when put into operation for 24 hrs., will be more effective. Interlocking provision to be made as per the standards for the TCLs and the STOP BARS for providing the visual conformation to the pilot on the clearance. While the ATC communication clearance is another mandate which shall be followed for crossing the runway holding position and entering the runway.

1.2. In line with the same, the regulations pertaining to ICAO- ANNEX 14 & ADM part - 4 provide guidance on the provision of stop bar lighting. Also, the other related clauses pertaining to the provision of the runway guard lighting system when stop bars are made available etc., are also discussed with the proposed changes.

2. REGULATORY REFERENCES AND STANDARDS:

2.1 As per ICAO Annex 14- SARPS

5.3.20.12 The lighting circuit shall be designed so that:

a) stop bars located across entrance taxiways are selectively switchable;

b) stop bars located across taxiways intended to be used only as exit taxiways are switchable selectively or in groups;

c) when a stop bar is illuminated, any taxiway centre line lights installed beyond the stop bar shall be extinguished for a distance of at least 90 m; and

d) stop bars are interlocked with the taxiway centre line lights so that when the centre line lights beyond the stop bar are illuminated the stop bar is extinguished and vice versa.

Note.— Care is required in the design of the electrical system to ensure that all of the lights of a stop bar will not fail at the same time. Guidance on this issue is given in the Aerodrome Design Manual *(Doc 9157), Part 5.*

5.3.23.1 Runway guard lights, Configuration A, shall be provided at each taxiway/runway intersection associated with a runway intended for use in:

a) runway visual range conditions less than a value of 550 m where a stop bar is not installed; and

b) runway visual range conditions of values between 550 m and 1 200 m where the traffic density is heavy.

2.2 From ADM Part 4 - Visual Aids:

10.4.14 The specifications for stop bars include a provision for the suppression of the taxiway centre line lights for a distance of 90 m beyond an activated stop bar in the direction that is intended for an aircraft to proceed. When the stop bar is suppressed these inter-linked taxiway centre line lights shall be simultaneously illuminated.

10.4.15 An aircraft that is stationary at a stop bar may require at least 30 seconds to move the 90 m covered by the interlocked taxiway centre line lights. Premature reselection of the stop bar after the issue of a clearance may, particularly in low visibility conditions, result in the pilot having less than the required segment of lighting guidance.

10.4.19 Annex 14, Volume I, specifies, as a Standard, that runway guard lights, Configuration A, shall be provided at each taxiway/runway intersection associated with a runway intended for use in:

a) runway visual range conditions less than a value of 550 m where a stop bar is not installed; and

b) runway visual range conditions of values between 550 m and 1 200 m where the traffic density is heavy.

10.4.20 As the number of operations continues to increase at many airports around the world, the opportunity for runway incursions also increases. As part of runway incursion prevention measures, Annex 14, Volume I also recommends that runway guard lights, Configuration A or Configuration B, should be provided at each taxiway/runway intersection where runway incursion hot spots have been identified, and used under all weather conditions during day and night.

10.4.24 The installation of runway guard lights, Configuration A, has been found useful to increase the conspicuity of stop bars installed at runway-holding positions associated with precision approach runways.

10.5.2 The selective switching of lighting is an important capability in the implementation of an A-SMGCS. The “ICAO Operational Requirements for A-SMGCS” assume the continuing use of this technique as a means of selectively indicating routes, providing dedicated guidance, and assisting the

control function. **The selection can be done manually in response to visual observation from the control tower. In some cases, surveillance sensors can be used to assist the manual operation**. **In other cases a degree of automation may be introduced, as for example in the case of the reactivation of a stop bar after a fixed time interval.** The control of stop bars through the use of position sensors can be illustrated by the following example. It should be noted that the example given assumes certain ATC procedures. Different procedures require appropriate system designs to be developed.

10.5.3 Stop bars locations are provided with three aircraft position sensors as shown in Figure 10-2. Various types of position sensors, or a control signal from the A-SMGCS, can be used: position sensor 1, located across the taxiway and 70 m before the stop bar; position sensor 2, located across the taxiway and immediately after the stop bar; and position sensor 3, located across the runway and about 120 m beyond the threshold. When an aircraft is cleared to taxi for take-off, the pilot taxies following the taxiway centre line lights which remain on only up to the stop bar at the runway-holding position. When the aircraft crosses position sensor 1 (see Figure 10-2), a light appears on a special control board in the control tower. This advises the controller that an aircraft is nearing the stop bar and that the pilot is expecting clearance to enter the runway. To permit the aircraft to cross the stop bar (see Figure 10-3), the controller not only issues a clearance through radiotelephony but also switches off the stop bar by pressing a button. This automatically illuminates that part of the taxiway centre line lighting beyond the stop bar. **When the aircraft crosses position sensor 2 (see Figure 10-4), the stop bar is automatically switched on again to protect the runway.** When the aircraft commences the take-off run and crosses position sensor 3 (see Figure 10-5), that portion of taxiway centre line lighting between the stop bar and position sensor 3 is automatically switched off. In the event an aircraft crosses the stop bar without authorization from the controller, position sensor 2 serves as a safety barrier (see Figure 10-6) and the system alerts the controller both visually, through a light on the control board, and by sounding an alarm.

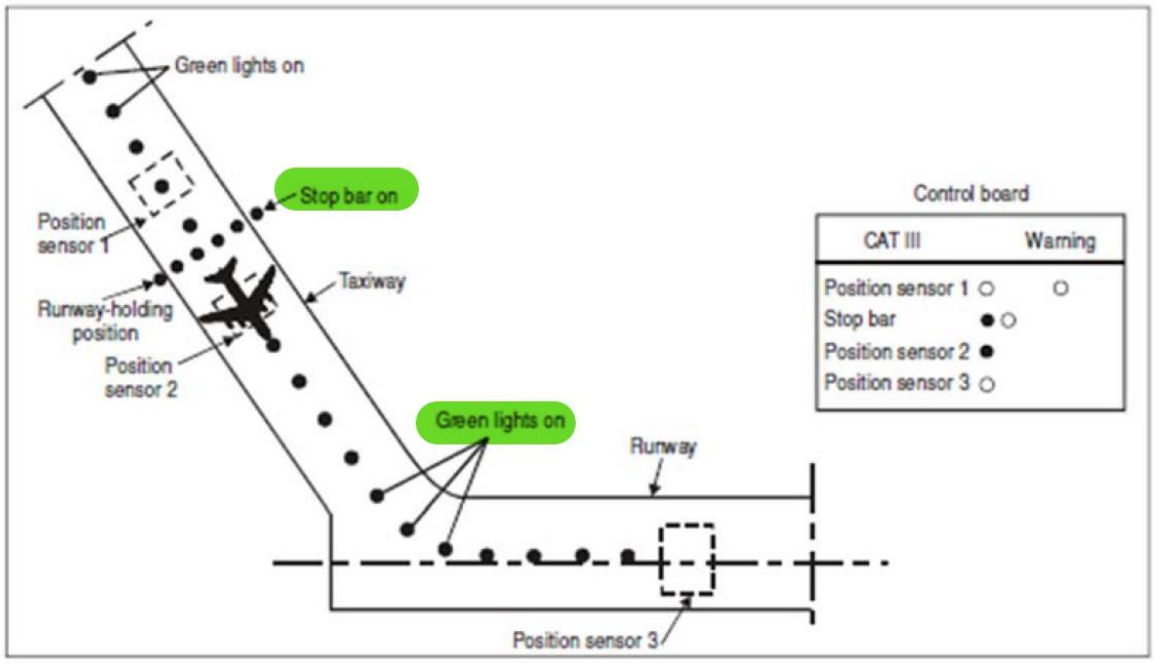


Figure 10-4. Control of stop bar through position sensors — Aircraft crossing position sensor 2

3. PROPOSAL AND DISCUSSIONS

CASE 1: Concerns when Interlocking provision is implemented as per ICAO ANNEX 14 SARPS clause 5.3.20.12(d)

When Interlocking provision is provided for the stop bars and the TCL's, when the Stop bars are ON and TCLs would be OFF and vice versa. For example, if the Stop bar is OFF either manually through a controlling system by any other mechanism the TCLs would be switched ON. When the Stop Bars are reactivated then TCLs would be off. This mechanism was implemented for many years where the technology of the individual lamp controlling and monitoring system (ILCMS) or any other automation is not really available.

The required time of 30 seconds as guided by ADM part -4 , visual Aids, shall be assessed by the airports and shall design the system accordingly. Some Airports may require higher duration which shall be analysed and through a structured approach the assessment need to be done. In any case during the transit of the Aircraft towards the runway, the required guidance which shall be provided by the TCL's shall not be compromised upon.

As per the ICAO Annex 14- SARPs:

5.3.23.1 Runway guard lights, Configuration A, shall be provided at each taxiway/runway intersection associated with a runway intended for use in:

a) runway visual range conditions less than a value of 550 m where a stop bar is not installed.

As per the above clause, the runway guards are not installed where stop Bar lights are provided. While as per the above discussion, in case of interlocking, if stop bars are in OFF condition and TCL's are in ON condition, if an Aircraft already in midst of covering the 90 metres section, the stop bars are in OFF condition. In this case, the next Aircraft which is lined up will be posed by following concerns:

i. Establishing the runway holding position as stop bars are OFF and no RGL's are present to at least assess the holding point. (Fig 1)

ii. The availability of TCLs without stop bars may give an impression of continuous availability of TCL, which might be interpreted as a regular taxiway as stop bar is OFF and RGLs are not available. (FIG 2)

Based on the above deductions, the presence of runway guard lights would make the pilot aware of the clear demarcation of the runway holding position, even when stop bar lights are not available.

Due to the above scenario, a probability exists for the runway incursion where the runway holding position is not guarded without any other visual guidance especially in the low visibility conditions, where runway guard lights not available and markings are not seen. Establishing the runway holding position in this case would be very tough for the aircraft.

TCLs are available when stop bar lights are OFF, the presence of flashing runway guard lights would indicate the need for taking the clearance from the ATC tower. Once the runway guard lights are available, he gets a clear indication of the presence of the runway holding position. Hence, provision of runway guard lights irrespective of STOP BAR lighting system availability would be advantageous w.r.t the safety and operational perspectives.

From clause 10.4.19 and 10.4.24 reference from ADM part 4 – visual Aids, the provision of runway guard lights irrespective of STOP BAR lighting system availability would be advantageous w.r.t the safety and operational perspectives.

Also, the clause does not speak on the runway guard light requirement when the RVR conditions are greater than 1200 mtrs. Considering the heavy density traffic conditions, the same might also be recommended to ensure that the runway holding position is clearly identified. However, when RVR conditions are between 550-1200 m, as in this case also, if airports prefer to operate the stop bar, RGLs might not be required, nevertheless the RGLs are still recommended to have in all the conditions.

Also, this would help the regular FOLLOW ME services and other maintenance vehicles to distinguish the runway holding position in all the conditions.

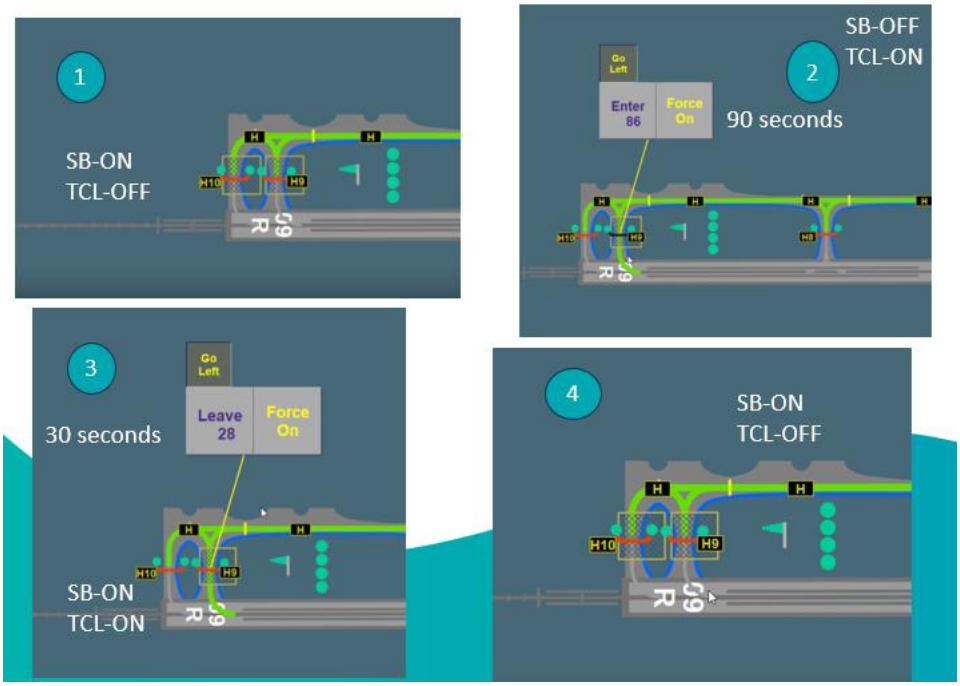
The below case discusses the time setting for the reactivation of STOP BAR which would be reviewed to ensure enhanced safety.

CASE 2: Review on time settings for the reactivation of STOP BARs

There is a certain period for the taxiways where the stop bars are OFF and the TCL's are ON (Step 2), for which no specific guidance is not available. While this could be a safety concern based on the set time for the Step 2.

For example, considering the entire sequence to be 120 seconds (Note: During this time the TCLs would be switched ON continuously for 120 seconds period of time) , if step 2 is set for 90 seconds and step 3 is for 30 seconds, there is 90 sec time available with the stop bar OFF condition, which means the next aircraft when entering, it does not have any reference position for holding without the guidance of the runway guard lights as he will be seeing continuous TCL guidance for 90 seconds. Considering that the minimum time required for the aircraft to cover the 90 metres TCL section is 30 seconds, in any case the probability of the next aircraft visualizing the STOP BAR OFF and TCL ON condition will be 60 seconds, which is a serious safety concern and can contribute to the runway incursions.

The time settings for the reactivation of stop bar to be limited to prevent such probabilities. In the previous example the stop bar reactivation time is 90 seconds, while the same can be reduced to 30 seconds in order to guide the next aircraft to STOP at the runway holding position. In this case along with having the required guidance of where to hold, the required guidance on the runway occupancy by the previous aircraft also can be visually guided through activation of stop bars at much earlier time.



Step 1- STOP BAR – ON AND TCL- OFF
Step 2- STOP BAR – OFF AND TCL- ON
Step 3- STOP BAR- ON AND TCL – ON
Step 4- STOP BAR- ON AND TCL -OFF

4. INFERENCES

4.1 Based on the above discussion, the following conclusions can be drawn.

4.2 From clause 10.4.19 and 10.4.24 reference from ADM part 4 – visual Aids and the discussion on the proposal, the provision of runway guard lights irrespective of STOP BAR lighting system availability would be advantageous w.r.t the safety and operational perspectives.

4.3 The time setting for the reactivation of STOP BAR may be reviewed to ensure safety can be enhanced further.

5. ACTION BY THE MEETING

5.1 The meeting is invited to:

a) note the information contained in this paper; and

b) review, discuss and recommend the following revisions in "Annex 14, Volume I, 5.3.23 Runway guard lights."

5.3.23.1 Runway guard lights, Configuration A, shall be provided at each taxiway/runway intersection associated with a runway intended for use in:

a) runway visual range conditions less than a value of 550 m where a stop bar is not installed; and

b) runway visual range conditions of values between 550 m and 1 200 m where the traffic density is heavy and where a stop bar is not installed

Note 1.— Runway guard lights, Configuration B, may supplement runway guard lights, Configuration A, when deemed necessary.

Note 2.— Guidance on the design, operation and location of runway guard lights, Configuration B, is given in the Aerodrome Design Manual *(Doc 9157), Part 4.*

5.3.23.2 **Recommendation.—***Runway guard lights, Configuration A, should be provided at each taxiway/runway intersection associated with a runway intended for use in:*

a) runway visual range conditions less than a value of 550 m where a stop bar is installed; and

b) runway visual range conditions of values between 550 m and 1 200 m where the traffic density is heavy and where stop bar is installed

c) runway visual range conditions of values greater than 1 200 m where the traffic density is heavy.

~~5.3.23.2~~ 5.3.23.3 **Recommendation.—** *As part of runway incursion prevention measures, runway guard lights, Configuration A or B, should be provided at each taxiway/runway intersection where runway incursion hot spots have been identified, and used under all weather conditions during day and night.*

~~5.3.23.3~~ 5.3.23.4 **Recommendation.—** *Configuration B runway guard lights should not be collocated with a stop bar.*

~~5.3.23.4~~ 5.3.23.5 Where more than one runway-holding positions exist at a runway/taxiway intersection, only the set of runway guard lights associated with the operational runway-holding position shall be illuminated.

—END—

INTERNATIONAL CIVIL AVIATION ORGANIZATION

REGIONAL GUIDANCE FOR THE DESIGN AND OPERATION OF ALTIPORTS

[DRAFT]

First Edition, ../../ 2024

This Guidance Material was developed by AP-ADO/TF and approved by the AOP/SG/.. Meeting and published by ICAO Asia and Pacific Office, Bangkok

RECORD OF AMENDMENTS

AMENDMENTS			
No.	Date Applicable	Date Entered	Entered by:

AMENDMENTS			
No.	Date Applicable	Date Entered	Entered by:

Table of Contents

CHAPTER 1. GENERAL

1.1 Introduction

1.1.1 This regional guidance material provides general guidance on altiport's site selection, physical characteristics, obstacle limitation surfaces and visual aids that should be provided at altiports, as well as certain facilities and technical services normally provided at conventional land aerodromes.

1.1.2 Stolport Manual (Doc 9150) defines an ALTIPORT as "a small airport in a mountainous area with a steep gradient runway, used for landing up the slope and for take-off down the slope, thereby making use of only one approach/departure area." (FOREWORD, para 4 refers)

1.1.3 Most of the Annex-14 Volume - I and Stolport specifications may not be applicable to altiports which are constructed in mountainous regions, though some of the STOL aeroplanes in use today are designed to operate from altiports.

1.1.4 As no standards and recommended practices (SARPs) for altiports exist in any of the ICAO documents, this guidance material covers all the aircraft operating aspects of altiports except non-visual navigation aids. The airport terminal building and ground side operations are not addressed in this document.

1.1.5 Since altiports are generally operated under visual meteorological conditions (VMC), the provisions described below are limited to this type of operation [6]:

a) An altiport has at least:

- a steeply sloped runway extended at the top by a low-sloped segment itself associated with a substantially horizontal platform comprising the waiting and parking areas; and/or
- a unique approach and take-off path, which itself is supported by the lower end of the runway strip.

b) The lower part of the steep slope of the runway can be usefully extended by a segment of less steep slope[1] allowing the pilot:

- to make contact more comfortable on landing;
- to have a better view of the end of the runway during the take-off roll prior to take-off;
- to limit the length of the runway necessary for a maneuvering during the accelerating-stop in case of one engine failure while an aeroplane is in take-off run [2].

c) The design of an altiport is based on the idea that, since take-off is downhill and landing is uphill, the steep segment of the runway is used as an additional factor of acceleration on take-off and deceleration on landing to reduce the length required for both, and thus allow an aerodrome to be located at the site to be served. This principal characteristic of altiport runways **is not without posing important problems** for the operation of

[1] *nevertheless, higher than the maximum permissible slope for the runways of conventional aerodromes.*

[2] *minimum requirement for multi-engine aeroplanes carrying more than ten passengers or having a maximum take-off mass of 5,700 kg or less.*

aeroplanes, the use of which are used in the domain of non-conventional flight.

d) The average longitudinal slopes that can be found on altiports are outside the correction ranges covered by the flight manual charts and would require large extrapolations, leading to **aeroplanes intended for use on altiports being subject to additional certification**.

e) However, for altiports intended to receive only light aeroplanes, a simplified method for determining their runway lengths will be used, as described in Attachment A, Section 1.

f) It should be noted that the classical definitions of take-off and landing on conventional runways do not apply to altiports, for which the passages at 35 ft for take-off and 50 ft for landing have no meaning, and that the length to be given to the runway only refers to the take-off speed at which the aircraft leaves the ground after having initiated its take-off roll as well as, possibly, to the accelerated-stop distance of the most critical aeroplane.

Notes: -

1) At altiport an engine failure is not considered during take-off and climb out until reaching safety altitude of 400 ft above ground level (altiport elevation). Likewise, during approach an engine failure is not considered beyond missed approach point. (Refer to "Supplement No. 178R2 of LET410 UVP-E20, Page, 3, 6 & 8 of 18" [14])

2) If an engine fails after the decision speed is reached, the aeroplane will have sufficient speed and power available to complete the take-off safely in the remaining take-off distance available. However, because of the high speed, there would be difficulty in stopping the aeroplane in the remaining accelerate-stop distance available [2.3 of Section 2, Attachment A of Annex 14, Volume I].

1.2 Altiport design aeroplanes

1.2.1 For the purposes of this guidance material, the altiport design aeroplane is assumed to be an aeroplane with short take-off landing (STOL) performances that has a reference field length of **800 m or less**. In size, the altiport design aeroplane is assumed to have a wingspan of **15 m up to but not including 24 m** and an outer main gear wheel span (OMGWS) of **4.5 m up to but not including 6 m**. In terms of maximum take-off mass, the altiport design aeroplane is assumed to have a maximum take-off mass of **5,700 kg or less**.

Note:-

STOL operations of Dornier 228 are limited for maximum take-off mass of 5,700Kg (Supplement No 1131, Dornier 228). However, such information is not available in Supplement No. 178R2 of L410 UVP-E20.

1.2.2 List of aeroplanes with STOL performance currently being operated at altiports in Indonesia and Nepal are provided in **Appendix 1**.

1.3 Definitions

Refer to *Annex 14 Aerodromes, Volume I Aerodrome Design and Operations* for definitions of terms used for land aerodromes.

When the following terms are used in this manual they have the following meanings:

Altiport. ~~A small airport~~ An aerodrome in a mountainous/hilly terrain with a short runway and a steep ~~gradient runway~~ longitudinal slope, used for landing up the slope and for take-off down the slope, thereby making use of only one approach/departure ~~area~~ path in most of the cases and where operations are possible only by aeroplanes with STOL performance capabilities.

Stolport. An airport whose physical characteristics, visual and non-visual aids and total infrastructure are created to support safe and effective public air transport in and out of densely populated urban areas as well as to and from rural areas with difficult terrain.

1.4 Applicability

1.4.1 This guidance material is meant for the use of altiport planners and the appropriate airport authorities in examining the feasibility of altiport operations at existing aerodromes or other sites and in the planning, design and approval of altiports. Interpretation of the material requires the exercise of discretion and the making of decisions, particularly by the airport authorities.

1.5 Site Selection

1.5.1 Before a commitment of resources is made to establish an altiport in a mountainous area, there should be recognized social, environmental, economic, and operational advantages over existing transportation systems. These advantages hinge on the potential of greatly reducing trip time by providing service from urban areas to remote mountainous areas.

1.5.2 An altiport with a short runway requires a protection of less airspace compared to that needed for conventional airport due to the possibility of providing steep obstacle limitation surfaces allowing a greater flexibility in locating the altiport site.

1.5.3 Once an altiport site is provisionally selected, planning authorities will have to consider the details of construction and application of altiport specifications. This consideration might include a series of demonstration flights. The flights would serve several purposes. The community would be reassured about the safety and compatibility of altiport operations; the effects of air turbulence caused by hills could be tested; and route structures and air traffic service (ATS) separation standards could be established.

1.5.4 At the same time, the site would be examined with respect to the provision/or availability of ground transportation up to the nearest possible location from the feasible altiport site, without which some advantage is lost. Another important consideration governing site selection is the nature and composition of the soil and subsoil upon which prepared surfaces will be supported and, in particular, the adequacy of drainage to prevent the erosion of surfaces. Detailed guidance on airport site evaluation and selection is given in the *Airport Planning Manual (Doc 9184), Part 1 – Master Planning*.

1.5.5 Lastly, having established an altiport location, planners will turn to the design using the descriptions provided in this manual to define the physical characteristics, obstacle limitation surfaces and visual aids. This guidance is contained in the following chapters.

CHAPTER 2. ALTIPORT DATA

2.1 General

2.1.1 *Annex 14, Volume I, Chapter 2* sets forth details of aerodrome data to be determined about aerodromes and reported to the appropriate aeronautical information services (AIS). Where applicable, these requirements should be met by an altiport.

2.1.2 Where the use of an altiport is restricted to a particular aeroplane type, the appropriate aeronautical information service should be informed.

2.1.3 Altiport data should be reported as prescribed in *Annex 15* and *PANS-AIM (Doc 10066)*.

CHAPTER 3. PHYSICAL CHARACTERISTICS

3.1 General

3.1.1 The planning of an altiport comprises the development of suitable physical characteristics to provide the necessary operating elements for services by the altiport design aeroplanes. In addition, capacity or the forecast rate of utilization should be considered by the planner. The maximum rate of use is dependent on such factors as demand, weather and air traffic control capabilities as much as on altiport features. Although the characteristics described in this chapter are meant only to provide safe and effective field lengths and clearances, it is likely, in light of such external factors, that an altiport whose physical characteristics conform to this chapter could handle any forecast frequency of service.

3.2 Runways

3.2.1 Orientation of runway

3.2.1.1 This guidance material is developed for design and operations of altiport to be used only in visual meteorological conditions and intended for use by day only.

3.2.1.2 It is anticipated that the configuration for the most altiports would be a single runway in which operations are restricted to landing uphill and taking off downhill and an associated parking area (Figure 3-1).

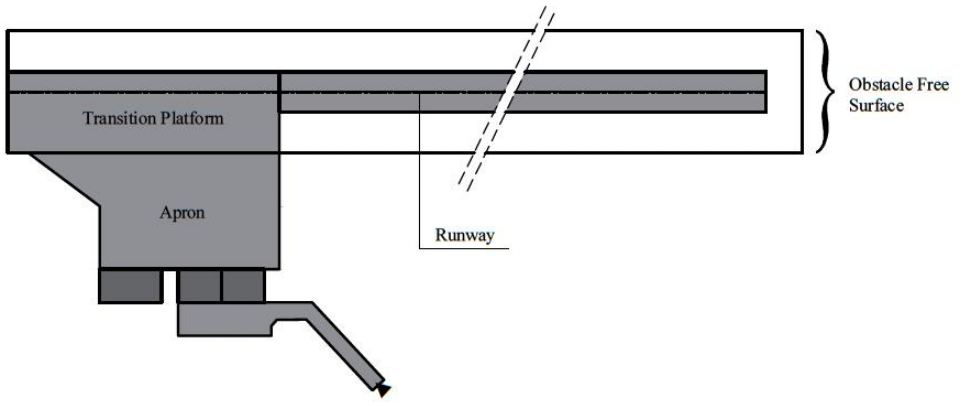


Figure 3 – 1: Schematic diagram of an altiport with paved runway

3.2.1.3 An altiport sites may lessen the opportunity for an ideal runway orientation in the direction of the prevailing wind due to topography of the site. Nevertheless, altiport design should aim for maximum usability factor and the orientation of the runway should take into account of crosswind limitation of the altiport design aeroplane. Guidance on factors to be taken into account in the study of wind distribution is given in *Annex 14, Volume I, Attachment A, Section 1*.

3.2.1.4 The decision on runway orientation should also take into account areas over which traffic will operate on approach, missed approach and departure so that obstructions in these areas or other factors will not unduly restrict operations.

3.2.2 Runway length

3.2.2.1 The length of an altiport runway should be determined using take-off and landing performance charts obtained from the aeroplane flight manual of the altiport design aeroplane and considered together with the following factors:

a) whether the approaches are open or restricted;

b) longitudinal slope of the proposed runway;

c) elevation of the site;

d) temperature and humidity of the site; and

e) nature of the runway surface.

3.2.2.2 When the appropriate aeroplane flight manual is not available the length of an altiport runway may be determined as described in **Section 1 of Attachment A**.

3.2.3 Clearways

3.2.3.1 Where a clearway is provided, an actual runway length less than that suggested by 3.2.2.1 may be considered satisfactory. In such a case any combination of runway, and clearway should meet the take-off and landing requirements of the altiport design aeroplane, taking into consideration the same factors as in 3.2.2.1. The guidance on the use of clearways given in *Annex 14, Volume I, Attachment A, Section 2,* is applicable to altiports.

3.2.4 Runway width

3.2.4.1 Detailed guidance for determination of runway width for altiport is provided in **Section 2 of Attachment A**.

3.2.4.2 For paved runways, the absolute minimum width of **18 m** is recommended for use in visual meteorological conditions and intended for use by day only.

3.2.4.3 For unpaved runways, the minimum width of the runway should be at least the width of the graded portion of the runway strip or **60 m**.

3.2.4.4 The site selection and orientation of a runway in the mountains is generally quite constrained, so particular attention must be paid to crosswinds in determining the width of the runway beyond the minimums thus recommended above.

3.2.5 Slopes on runways

Longitudinal slopes of the runway

3.2.5.1 The slope computed by dividing the difference between the maximum and minimum elevation along the runway centre line by the runway length should not exceed **10 per cent**.

3.2.5.2 Along no portion of a runway should the longitudinal slope exceed **15 per cent**.

3.2.5.3 The longitudinal slope of the upper segment of the runway (at least 1/6 of the length of the runway) should not exceed **3 per cent**.

3.2.5.4 The longitudinal slope of the lower segment of the runway (at least 1/3 of the length of the runway) should not exceed **3 per cent**.

Note:-

If landing is to be conducted downhill the slope (opposite direction compared to normal landings at altiports) due to excess tail wind and a favorable less steep slope of the runway, the length of the upper segment *of the runway should not be less than one-fourth of the length of the runway.*

Longitudinal slope changes

3.2.5.5 In longitudinal profile, the transition from:

a) the upper segment of the runway to the segment with the steep slope should be accomplished by a curved surface with a rate of change not exceeding 3.4 per cent per 30 m (minimum radius of curvature of 1,000 m); and

b) one slope to another slope at any segment of the steep sloped runway and between last segment of the steep sloped runway and lower segment of the runway should be accomplished by a curved surface with a rate of change not exceeding 0.85 per cent per 30 m (minimum radius of curvature of 4,000 m).

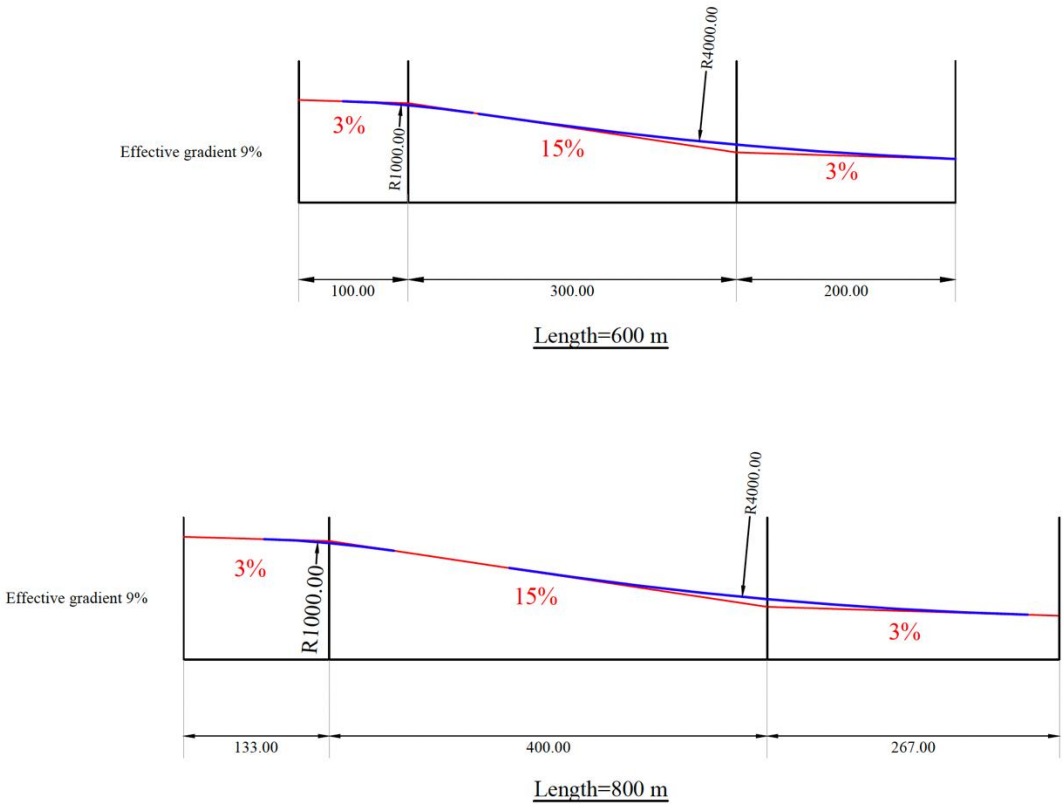


Figure 3 – 2: Schematic longitudinal profile of runway

Distance between slope changes

3.2.5.6 Undulations or appreciable changes in slopes located close together along a runway with steep slope should be avoided. The distance between the points of intersection of two successive curves should not be less than:

a) the sum of the absolute numerical values of the corresponding slope changes multiplied by minimum radius of curvature of 3,000 m; or

b) 45 m;

whichever is greater.

3.2.5.7 Guidance on implementing this specification is given in *Annex 14, Volume I, Attachment A, Section 4.*

Transverse slopes of runway

3.2.5.8 To promote the most rapid drainage of water, the runway surface should either be cambered or sloped from high to low in the direction of the wind most frequently associated with rain. A transverse slope should not exceed **2 per cent** for paved and **2.5 per cent** for unpaved runways. For a cambered surface the slope on each side of the centre line should be symmetrical.

3.2.5.9 The transverse slope should be substantially the same throughout the length of the runway except at the intersection with a taxiway where an even transition should be provided taking account of the need for adequate drainage.

3.2.5.10 Guidance on transverse slopes is given in the *Aerodrome Design Manual (Doc 9157), Part 3*.

3.2.6 Strength of runways

3.2.6.1 A runway should have a bearing strength capable of supporting continual traffic of the altiport design aeroplane along the length of the declared take-off run or the declared landing distance, and throughout its full width.

3.2.6.2 A normal landing may impose little or no impact load on the landing surface. However, the load factors arising from an emergency, or a badly controlled landing should be considered.

3.2.7 Surface of runways

3.2.7.1 The surface of an altiport runway should be constructed without irregularities that would affect aeroplane performance during take-off or landing. Surface unevenness that would cause vibration or other control difficulties of an aeroplane should be avoided. Guidance on runway surfaces is given in the *Aerodrome Design Manual (9157), Part 3.*

3.2.7.2 Special attention must be paid to the construction of the upper layers, which is difficult due to the existence of a fairly steep slope. The possibility of more rapid erosion due to this slope should also be considered.

3.2.7.3 The texture of the surface of an altiport runway requires special attention in view of the short-field landing requirements. A rough texture surface that is conducive to braking should be used. Where aquaplaning from poor drainage is anticipated to be prevalent, considerations should be given to grooving the runway surface. A grooved surface has been shown to be effective in providing braking action on wet runways. Guidance on methods used to measure surface texture is given in the *Airport Services Manual (9137), Part 2*, while guidance on grooving runways is contained in the *Aerodrome Design Manual (9157), Part 3*.

3.3 Runway strips

3.3.1 General

3.3.1.1 The runway should be included in a runway strip. The purpose of a runway strip is to provide for the following operational considerations:

a) a graded area for aeroplanes accidentally running off the runway;

b) a cleared area for aeroplanes drifting from the runway after take-off;

c) a cleared area for aeroplanes carrying out a missed approach;

d) an area for the installation of essential visual aids; and

e) an area for drainage and run-off from the runway.

3.3.2 Runway strip width and length

3.3.2.1 A runway strip is an area free of any obstacle containing at least the runway including its upper segment and the lower segment.

3.3.2.2 To allow the best use of the whole length of the runway, it is recommended to extend the strip beyond the upper end of the paved runway by **a length at least equal to half of the maximum wingspan** of the critical altiport design aeroplane.

3.3.2.3 In the case of a paved runway only, the strip shall extend **30 m** beyond the lower end of the runway.

3.3.2.4 An altiport runway strip width of at least **30 m** on either side of the runway centre line is adequate for day-time operations in visual meteorological conditions.

3.3.3 Graded areas

3.3.3.1 To provide for a) in 3.3.1.1, the portion of a runway strip outside the runway and within a distance of **30 m** from the centre line of the strip should be graded. The surface of that portion of the runway strip that abuts the runway edge should be flushed with the surface of the paved runway.

3.3.3.2 To protect a landing aeroplane from the danger of an exposed edge, the runway strip should be prepared against blast erosion to at least **30 m** before the start of a runway.

3.3.3.3 Where deemed necessary for proper drainage, an open-air storm water conveyance may be allowed after the graded portion of a runway strip and would be placed as far as practicable from the runway.

3.3.4 Longitudinal and transverse slopes of runway strips

3.3.4.1 The longitudinal slope of the lateral parts of the strip should preferably be identical to that of the runway.

3.3.4.2 When carried out, snow and ice removal must be done on the width of the paved runway. A 0.50 m difference in level at the edge of the runway followed by a 15% upward slope to the lateral limit of the strip may be allowed on both sides [6].

3.3.4.3 When the runway - whether paved or unpaved - is only groomed, the grooming must be carried out over a minimum width of 30 m, beyond which an upward slope, at a maximum of 15 %, will be extended up to the lateral limit of the strip [6].

3.3.4.4 The transverse slopes on runway strips should conform to those specified in *Annex 14, Volume I,* for a strip associated with a runway with code number 1.

3.3.5 Objects on runway strips

3.3.5.1 For safety considerations, no object, unless essential as an aid to air navigation, should be installed on a runway strip. Air navigation equipment that must be located on a runway strip should be marked, be of minimum mass and height, and frangibly designed so as to constitute the minimum hazard to aircraft. Frangibility requirements are set out in *Annex 14, Volume I, Chapters 3, 5 and 9.*

Note.— Guidance on design for frangibility is contained in the Aerodrome Design Manual (Doc 9157), Part 6.

3.4 Taxiways

3.4.1 General

3.4.1.1 As mentioned in 3.2.1.2, the likely configuration of an altiport is a single runway served by taxiway (s) (if provided) or upper transitional platform to link the apron (See Figure 3 - 3 and Figure 3 – 4).

3.4.1.2 A taxiway should be designed so that when the cockpit of the design aeroplane is over the taxiway centre line markings, the clearance distance between the outer main wheel of the aeroplane and the edge of the taxiway should not be less than **2.25 m**.

3.4.1.3 When designing taxiways at an altiport, the specifications should conform to the Standards and Recommended Practices described in Annex 14, Volume I, Chapter 3. Guidance on design of taxiways is given in the *Aerodrome Design Manual (9157), Part 2*.

Figure 3 - 3: Taxiway linking to apron (Alpe d'Huez Airport, France)

3.5 Aprons

3.5.1 General

3.5.1.1 It will be necessary to provide an apron to permit the loading and unloading of passengers and cargo as well as aircraft servicing without interfering with altiport traffic. The distance from the edge of an apron to the edge of a runway strip should be sufficient for an aeroplane parked on the apron not to penetrate the transitional surface.

3.5.1.2 The upper platform of an altiport consists of:

- the upper part of the runway that can be used for landing or take-off maneuvers;
- a transitionl platform (or holding area as shown in Figure 3-4) where aircraft perform engine tests at the start up point, which can also be used as a turning pad, or a taxiway link (as shown in Figure 3-3); and
- the apron (aircraft parking area).

3.5.1.3 These components can be unpaved or paved.

3.5.1.4 Except on the upper segment-of the runway, which may be sloped up to **3 per cent**, the slope of the upper platform shall not exceed **2 per cent** in any direction. On an aircraft parking stand area, the maximum slope should not exceed **1 per cent**.

3.5.1.5 Where it is practically not possible to locate the apron at the upper platform the apron with taxiway may be located at other appropriate places if the topography and the longitudinal slope of runway permit (as shown in Figure 5-1).

Figure 3 – 4: Transition platform (Courchevel Altiport, France)

3.5.1.6 Side-by-side parking of aeroplanes and helicopters is not recommended. Since helicopters frequently use the altiports[3], it is recommended to reserve a specific parking area for them.

3.5.1.7 The Figures 3 -1 and Figure 3 – 2 show a schematic diagram of an altiport with a paved runway as well as the longitudinal profile of the runway in its simplest configuration.

3.5.2 Size of aprons

3.5.2.1 The necessary altiport capacity to handle planned or predicted altiport traffic will be the main determinant in establishing an apron's size. An apron's size should be sufficient to contain an adequate number of aircraft parking bays or spaces to cater to the altiport's traffic volume at its highest level.

3.5.2.2 As the number of aircraft parking bays or spaces required will depend, in part, on parking bay occupancy or turnaround time, aircraft operators intending to use the altiport should be consulted with respect to scheduling and other matters that affect the time an aeroplane needs to occupy the apron.

3.5.2.3 The size of an apron will also be governed by the size of the altiport design aeroplane and the parking method selected for use on the apron. While nose-in parking uses less space, economy and convenience will probably dictate self-manoeuvring, angled nose-in or angled nose-out parking. Figure 3-3 depicts a typical altiport apron.

[3] *In this case, the helicopters do not use the steep runway but a final approach and take-off area specifically dedicated to them.*

Figure 3 – 5: Example of typical altiport apron (Tenzing Hilary Altiport, Lukla, Nepal)

3.5.3 Strength of aprons

3.5.3.1 An apron should have sufficient bearing strength to support the mass of the altiport design aeroplane, keeping in mind that parts of the apron will be subject to higher stresses owing to slow moving and stationary aeroplanes and other vehicles/equipment.

3.5.4 Slopes of aprons

3.5.4.1. The slopes of an apron should be sufficient to prevent accumulation of water but should not exceed **1 per cent** in any direction.

3.5.4.2. Because of the possibility of spilled fuel and the ensuing fire hazard, an apron should not slope down towards a terminal building.

CHAPTER 4. OBSTACLE LIMITATION SURFACES

4.1 General

4.1.1 Obstacle limitation surfaces are established to define the airspace over and around an altiport that must be kept free of obstacles. The obstacle limitation surface sets out the limits above which objects should not extend.

4.1.2 In the planning and design of an altiport, obstacle limitation surfaces require careful consideration. In fact, the presence of objects located in the vicinity or planned for construction near an otherwise suitable altiport site may be the overriding factor in whether an altiport will be a realistic project. The operation of an altiport may be significantly affected by features beyond the altiport boundary such as buildings, bridges and towers or mountains, hills etc. Objects that penetrate the obstacle limitation surfaces described in this chapter may, therefore, impose take-off mass limitations, cause an increase in weather minima or both. They may also necessitate the displacement of the threshold.

4.1.3 Once a commitment is made to the establishment of an altiport, the sectors of the local airspace covered by the obstacle limitation surfaces should be regarded as integral to the altiport and therefore inviolable. Consequently, enactment of zoning legislation may be needed to preserve unobstructed airspaces for take-off, approach, missed approach and circling procedures. Legislation aside, the altiport authorities should be involved in community consultation and should maintain close liaison with local development planners to ensure that altiport requirements are included in forecasts and well-integrated into plans.

4.1.4 Altiport obstacle limitation surface requirements are normally set on the assumption that take-offs and landings will be made in a single direction. Therefore, the functions of surfaces may be integrated and the requirements of one surface nullified because of the more stringent requirements of another.

4.1.5 The obstacle limitation surfaces to be defined at an altiport will depend on terrain and the type of operation envisaged at the altiport. At the very minimum, for daytime operations in visual meteorological conditions, the surfaces requiring protection are the take-off and approach surfaces and the transitional surface.

4.1.6 Obstacle limitation surfaces (OLS), specified in Annex 14 Volume I for aerodromes reference code 1are not suitable for altiports.

4.1.7 Criteria for evaluating obstacles are contained in the *Procedures for Air Navigation Services - Aircraft Operations PANS OPS (Doc 8168,*) Volume II - Construction of Visual and Instrument Flight Procedures.

4.2 French practices for altiport OLS

4.2.1 The variety of runway configurations that can be encountered means that the obstacle limitation surfaces for an altiport can only be chosen after a study of the approach and departure procedures of the aeroplane.

4.2.2 The description given below of the obstacle limitation surfaces associated with a unique approach and take-off path is therefore only indicative and is only intended to provide guidance for altiport planners.

Approach/take-off surfaces

4.2.3 The characteristics in the shape and size of the obstacle limitation surfaces indicate that there is not any difference between approach/take-off surfaces.

4.2.4 The longitudinal profile of the centreline of the approach/take-off surface as shown in Figure 4 - 1 is generally characterized by:

a) a segment Δ_1 originating at lower side of the strip and having a negative slope at least as steep as that of the centreline of the lower segment of the runway (if slope of centreline of the lower segment of the runway is horizontal or positive then the slope should be equal to the runway strip);

b) a horizontal segment Δ_2; and

c) a segment having positive slope $\Delta 3$, the length of which is sufficient for the aircraft on take-off to clear the surrounding obstacles.

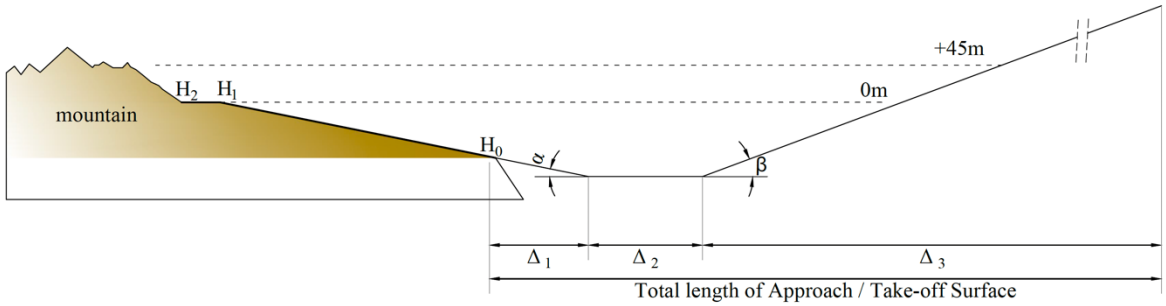


Figure 4 – 1: Longitudinal profile of the approach/take-off surface

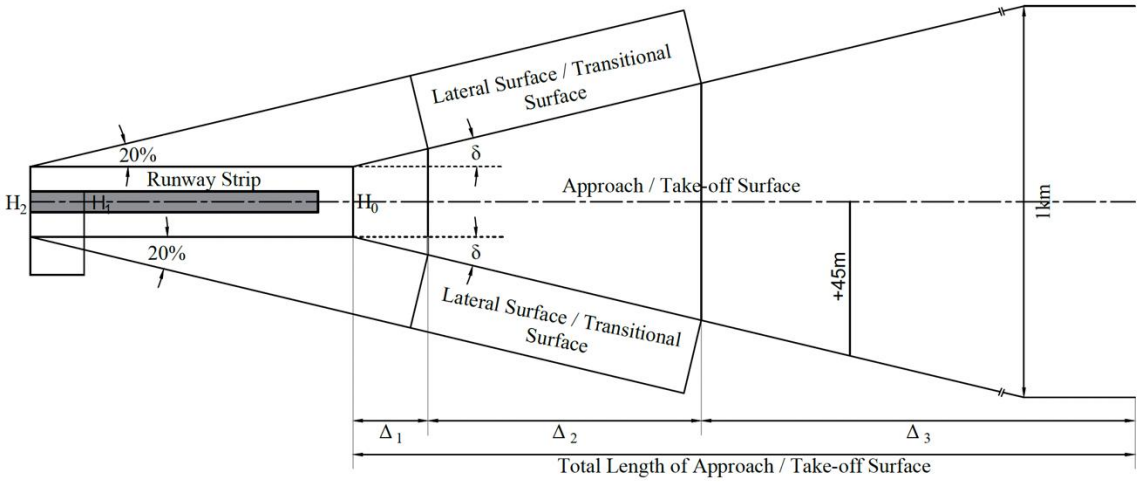


Figure 4 – 2: Plan of altiport approach/take-off surface and lateral/transitional surface

4.2.5 Since the total length of the approach/take-off surface must not be less than **2,000 m**, the values of $\Delta 1$, $\Delta 2$ and $\Delta 3$ will be set on a case-by-case basis according to:

a) the reference code corresponding to the most critical design aeroplane to be served by the altiport to select the slope (β); and

b) the operating constraints specific to the site studied.

<u>Note:</u> *The value of β may be taken 6% or 15:1 as per STOLPORT manual.*

4.2.6 The plan view of Approach and Take-of Surface is shown in Figure 4-2 and is generally characterized by:

a) an inner edge of specified length (equal to width of runway strip), horizontal and perpendicular to the extended centre line of the runway and located at the outer end of the strip;

b) two sides originating at the ends of the inner edge and diverging uniformly at a specified rate (with the divergence δ being at least **20 per cent** but never exceeding the value of 30 per cent**)** from the extended centre line of the runway until it reaches **1 km**;

c) an outer edge parallel to the inner edge, and beyond that, the width of the approach and take-off surface remains constant and equal to 1 km;

d) the above surfaces shall be varied when lateral offset, offset or curved approaches are utilized, specifically, 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, offset or curved ground track;

e) the elevation of the inner edge shall be equal to the elevation of the midpoint of the threshold; and

f) the slope(s) of the approach surface shall be measured in the vertical plane containing the centre line of the runway and shall continue containing the centre line of any lateral offset or curved ground track.

Transitional Surfaces (Lateral Surfaces)

4.2.7 The transitional surfaces consist of two surfaces at either side of the runway. The lower and upper limits of these Transitional (Lateral) Surfaces, are:

a) on the lower edge, the limit is defined by the length of the strip along the edge of the strip and from there extending along the bottom of the approach/take-off surface up to the first two segments of longitudional profile (Δ1 and Δ2 and) defined above; and

b) on the upper edge, the horizontal lines originating from the upper corners of the strip and forming a divergence of **20 per cent (**but never exceeding the value of 30 per cent) with the vertical plane containing the runway centreline.

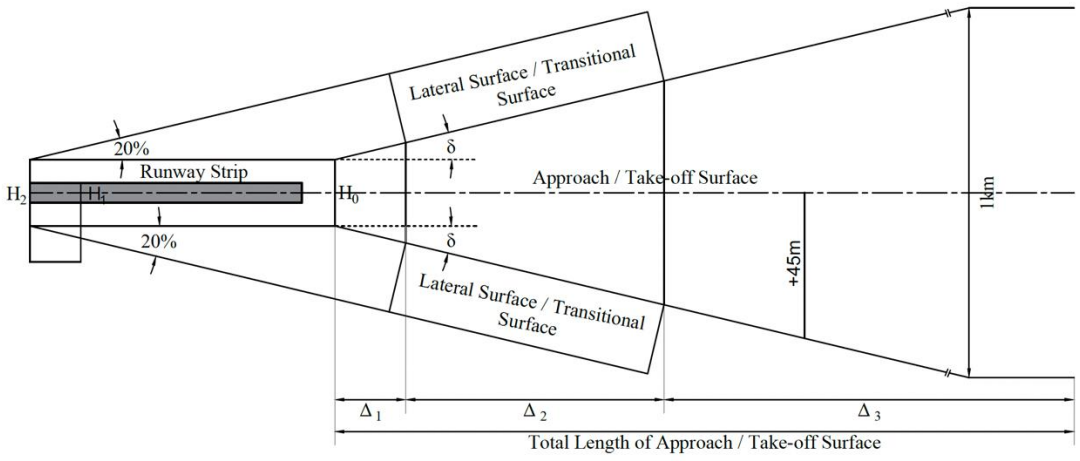


Figure 4 – 3: Plan of altiport approach/take-off surface and lateral/transitional surface

Inner horizontal surface

4.2.8 The selected site must also allow an aeroplane to make a low-level circling over the facilities before landing in order to ensure, if necessary, that the runway is clear on its upper segment.

4.2.9 The conditions of circling will also be the subject of a specific study, the conclusions of which will be associated with the extent of an inner horizontal surface. This surface will be positioned at a minimum height of 45 m, measured from upper platform, this surface will cover an area within a circular sector, centered on the upper platform, with a radius of 2,000 m and with sufficient opening (at least minimum of **65 degrees** towards each side of the runway centreline) to allow circling of a critical aircraft selected for the altiport.

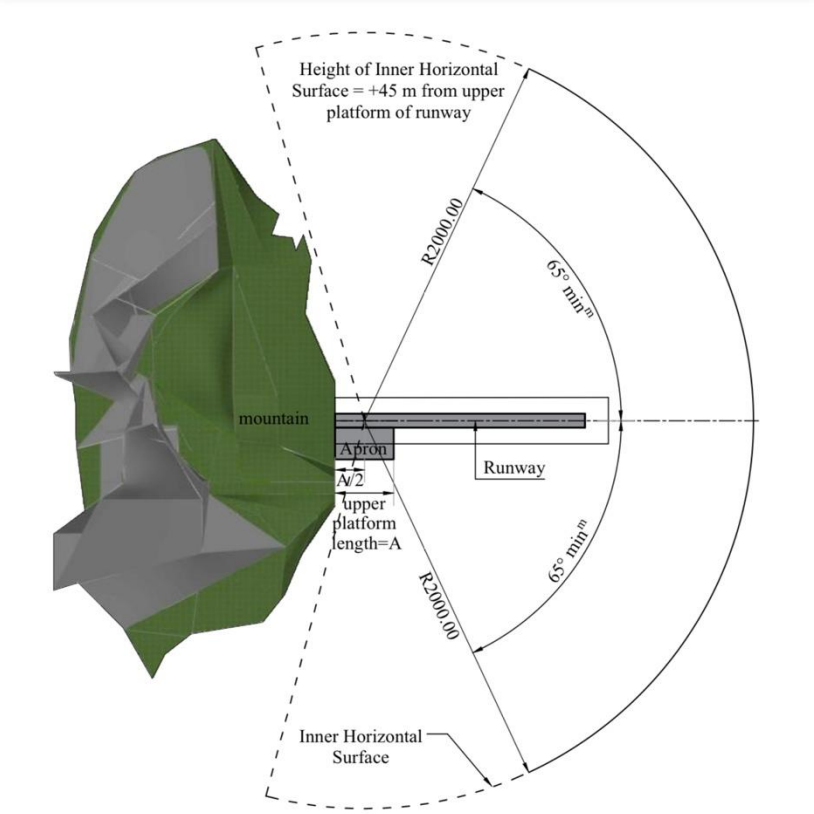


Figure 4 – 4: Inner Horizontal Surface

Missed approach surfaces

4.2.10 It is also recommended to provide a missed approach surfaces to protect the missed approaches.

4.2.11 When the terrain permits this missed approach surfaces can be constructed to be aligned as an extension of the runway (in the case of altiport with mountain pass) as shown in Figure 4-5 below. Its characteristics (width, slope and divergence) of lower edge will match with the take-off climb surface of a runway with normal characteristics (on conventional aerodromes) accommodating the same types of aircraft.

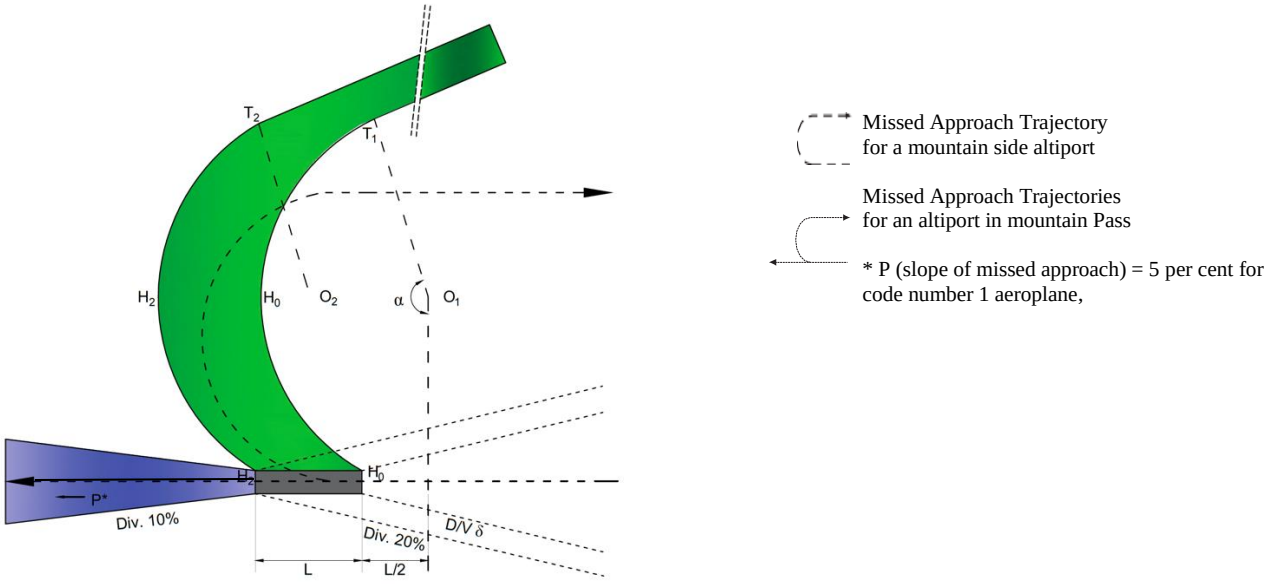


Figure 4 – 5: Missed approach surfaces (Plan)

4.2.12 However, when the terrain does not allow the missed approach to continue along the extension of the runway (e.g. altiports on the side of a mountain), the missed approach can only be carried out laterally (See Figure 4 – 5 with curved missed approach surface and Figure 4 –6).

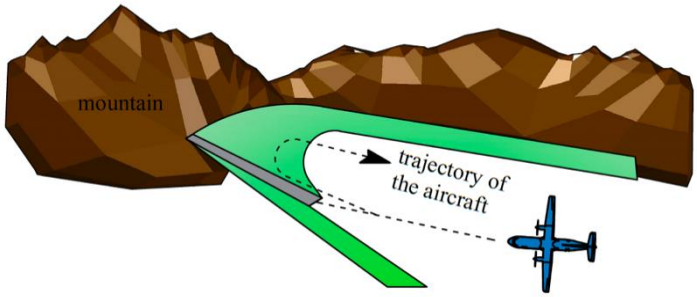


Figure 4 –6: Missed approach surfaces at altiport on a mountain side

4.2.13 The obstacle limitation surfaces protecting the missed approach should be constructed as shown in Figure 4-5, on the side where the missed approach is to be carried out:

a) the horizontal half-plane having elevation H_o as of the lower end of the strip;

b) the defined surface (cylindrical then flat) whose origin will be contained in a plane parallel to the center line of the runway and whose directions will be successively:

i. two horizontal arcs of a circle with elevations Ho and H2 (the latter being that of the upper side of the runway strip), each having a radius of at least 600 m, tangent to the plane containing centreline of the runway and the arc length of sectors (of circles) will be equal to the minimum angle (α) of the turn (depending on the terrain) to be carried out by the aircraft; and

ii. the horizontal tangents at the end of each of these two arcs (as shown in Figure 4 – 5 **as T1 and T2**).

4.2.14 The circular arc at elevation Ho should be centered at the extended runway centre line at a distance equal to one-half of the length of its main segment with a steep slope, from its lower

end.

4.2.15 The arc at elevation H_2 shall be centred at the midpoint of the runway centre line.

4.2.16 As far as possible, this lateral missed approach surface should complement the missed approach surface along the extended centerline of the runway as shown in Figure 4-7, when the latter can be provided.

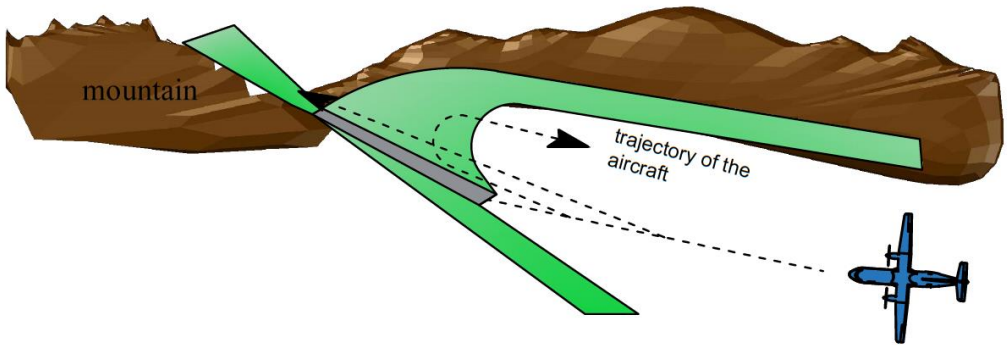


Figure 4 – 7: Missed approach surfaces at altiports in mountain pass or on dome shaped landforms

CHAPTER 5. VISUAL AIDS FOR NAVIGATION

5.1 General

5.1.1 In general, the specifications of Annex 14 Volume I for indicator and signalling devices, markings, lights, signs and markers are applicable for altiports.

5.1.2 Centre line marking is optional for unpaved runways; however, it may be necessary, at least on the upper part of the runway, to compensate for the lack of visibility caused to the pilot by the change of slope at the beginning of the rolling phase before take-off.

5.1.3 When an altiport is kept in operation without being cleared of snow, the edges of its runway will be marked with red flags spaced **25 m** apart.

5.1.4 Since an altiport can be subject to rapid variations in wind direction and intensity, it is necessary to have a windsock near the holding area for aeroplane taking off, and another at the runway threshold for aeroplane landing, since the conditions at these two points can be very different.

5.1.5 The visual aids provided at an altiport must serve to provide the pilot with the elements of guidance required to execute safe operations at the altiport.

5.2 Markings

5.2.1 The markings described in this chapter are suitable for altiport operations in visual meteorological conditions. Markings should be conspicuous and provide the maximum possible contrast under various conditions.

5.2.2 Runway markings should be white; taxiway and aircraft stand markings should be yellow and of a consistency that will reduce the risk of uneven braking.

5.3 Runway markings

5.3.1 Runway designation marking

5.3.1.1 A runway designation marking should be provided at the thresholds of a paved and unpaved runway as practicable. It should consist of a two-digit number that is the whole number nearest the one tenth of the magnetic azimuth of the centre line of the runway measured clockwise from magnetic north when viewed from the direction of approach. However, where an altiport is located in an area of compass unreliability a runway designation marking should display true azimuth rather than magnetic azimuth. Runway designation marking shall be in accordance with Annex 14, Volume I, Chapter 5, 5.2.2 as applicable.

5.3.2 Threshold marking

5.3.2.1 A runway threshold should be marked on paved runway with a series of white stripes **15 m** long, **1.8 m** wide, spaced 1.8 m apart located at the runway end.

5.3.2.2 A runway threshold marking should consist of a pattern of longitudinal stripes of uniform dimensions disposed symmetrically about the centre line of a runway. The number of stripes should be **4** for the runway width 18 m.

5.3.2.3 Where the threshold of an altiport runway is a displaced threshold, the beginning of the altiport runway should be indicated by a transverse stripe at least **1.8 m** wide. The portion of the runway before the displaced threshold should be marked with arrows and all other markings should be obliterated.

5.3.2.4 The arrows leading to a displaced threshold should be spaced at intervals of **30 m** with the point of the arrow immediately preceding the displaced threshold at **30 m** from the transverse stripe.

5.3.2.5 Guidance on the form and dimensions of the arrows are set out in Figure 5-4 A and B of *Annex 14, Volume I.*

5.3.3 Aiming point marking

5.3.3.1 An aiming point marking for paved runway should be provided at **150 m** from the threshold.

5.3.3.2 An aiming point marking should consist of two conspicuous stripes. The length of the stripe should be **30 – 45 m** and width of the stripe should be **4 m** and the lateral spacing between their inner sides should be 6 m.

5.3.4 Runway centre line marking

5.3.4.1 The runway centre line marking for paved runway should be in accordance with Annex 14, Volume I, Chapter 5, 5.2.2 as applicable.

5.3.5 Runway side stripe marking

5.3.5.1 A runway side stripe marking on paved runway should be provided between the thresholds of a paved runway where there is a lack of contrast between the runway edges and the shoulders or the surrounding terrain. A runway side stripe marking should consist of two stripes, one placed along each edge of the runway with the outer edge of each stripe approximately on the edge of the runway. A runway side stripe should have an overall width of at least **0.45 m**.

5.4 Taxiway marking

5.4.1 The taxiway edge and/or centerline markings should be provided in an altiport. The taxiway markings specified in Annex 14, Volume I, Chapter 5, are considered suitable for altiports.

5.4.2 At an intersection of a taxiway with a runway where the taxiway serves as an exit from the runway, the taxiway centre line marking should be curved into the runway centre line marking. The taxiway centre line marking should consist of a continuous yellow line **15 cm** wide parallel to and **1.8 m** from the runway centre line marking for **30 m** curving at a specified radius to join the taxiway centre line as shown in *Figures 5-6 of Annex 14, Volume I*. The turning radii of the taxiway centerline marking at the intersection of runway and taxiway should be **30 m** at **90 degree** exits.

Figure 5 – 1: Runway marking at Phaplu Airport, Nepal

5.5 Wind direction indicator

5.5.1 Since an altiport can be subject to rapid variations in wind direction and intensity, it is necessary to have a windsock near the holding area for aircraft taking off, and another at the runway threshold for aircraft landing, since the conditions at these two points can be very different. The specifications for wind direction indicators in *Annex 14, Volume I, Chapter 5*, are considered suitable for altiports.

5.6 Signs

5.6.1 General

5.6.1.1 Signs may be provided at an altiport to give information or instructions. The guidance on the sizes of signs, their inscriptions, methods of illumination, location, abbreviations commonly used and frangibility of signs given in the *Aerodrome Design Manual (Doc 9157), Part 6*, is applicable to signs at altiports.

5.6.1.2 A sign should be located as near to the edge of the pavement as possible. Signs should be lightweight and frangibly designed and mounted sufficiently low to preserve clearance with any overhanging part of the critical aeroplane.

5.6.1.3 Only mandatory signs on a movement area should use the colour red for background. A sign should be legible from the cockpit of an aeroplane at the farthest point of viewing.

5.6.2 Mandatory instruction signs

5.6.2.1 When provided, mandatory instruction signs should comprise runway holding position signs and NO ENTRY signs. A NO ENTRY sign should be located at the beginning of an area to which entry is prohibited.

5.6.2.2 Wherever possible, runway holding position signs and NO ENTRY signs should be located on each side of a taxiway facing the direction of approach to the runway or prohibited area. Where for some reason only one sign is utilized, it should be located any side (left or right) wherever feasible.

5.6.2.3 A mandatory instruction sign should consist of a white inscription on a red background.

5.6.2.4 Where applicable, the mandatory instruction sign inscriptions set forth in *Annex 14, Volume I,*

*Chapter 5, 5.4.2*should be used.

5.6.3 Information signs

5.6.3.1 Given the compressed area and simplicity of a typical altiport, little use of information signs is foreseen. Where required, an information sign should convey information such as a specific location or destination on a movement area. Whenever possible an information sign on a taxiway should be located any side of the taxiway (left or right) wherever feasible.

5.6.3.2 An information sign should consist of either black inscriptions on a yellow background or yellow inscriptions on a black background.

5.6.3.3 Where applicable, the information sign inscriptions set forth in *Annex 14, Volume I, Chapter 5, 5.4.3* should be used.

5.7 Markers

5.7.5 General

5.7.5.1 Markers should be lightweight and frangibly mounted. Those located near a runway or taxiway should be sufficiently low to preserve clearance with any overhanging part of the critical aeroplane. Guidance on the frangibility of markers is given in the *Aerodrome Design Manual (Doc 9157), Part 6.*

5.7.6 Unpaved runway edge and runway strip markers

5.7.6.1 On unpaved runways, where the runway strip is not maintained to normal grading standards, the runway must be marked using edge markers, except that runway edge markers may be omitted if the full width of the runway strip is maintained suitable for aeroplane operations and the runway strip is marked using strip markers. Where the runway is not provided with edge markers, the threshold locations need to be marked appropriately in the shape of a ⌊ ⌋ as shown in Figure 5-2 and Figure 5-3.

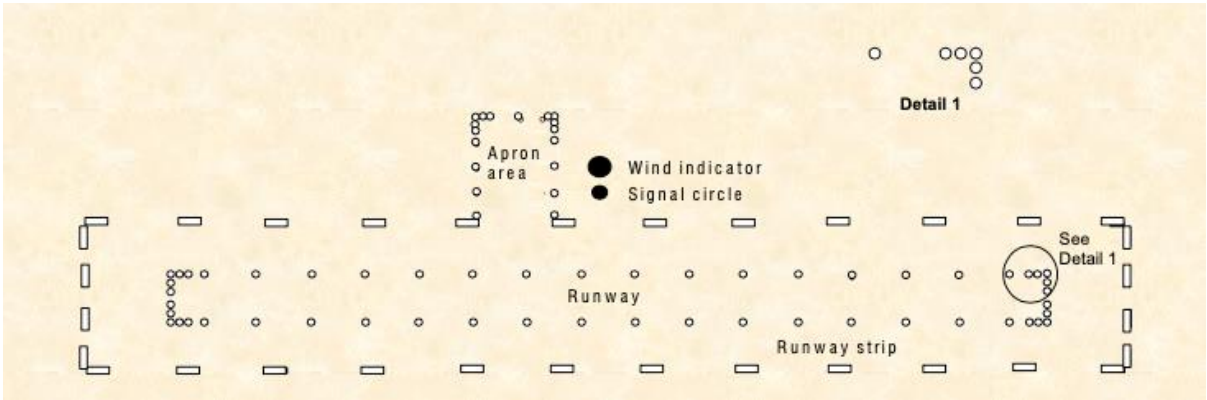


Figure 5 – 2: Runway and runway strip markers

5.7.6.2 Markers of conical shape for runway and markers of flat rectangular shape for runway strip should be used to clearly delineate the runway and runway strips limits on unpaved runways.

5.7.6.3 If flat rectangular markers are used to delineate the limit of the runway strip, they should measure at least **1 m** wide by **3 m** long and be placed with the longer dimension parallel to the runway centre line. If conical markers are used to delineate the runway limit, they should not be more than **30 cm** high and **0.4 m** base diameter.

5.7.6.4 The runway strip should be marked by using cones, gable markers or tires. Runway strip cone markers should have a **0.75 m** base diameter and be **0.5 m** in height. Gable markers should be **3 m** in length.

5.7.6.5 Cone or similar size markers need to be spaced not more than **90 m** apart. Gable or similar size markers need to be spaced not more than **180 m** apart.

5.7.7 Edge markers for snow covered runways

5.7.7.1 When the limits of a snow-covered runway are not otherwise indicated, it is recommended that edge markers should be provided. Edge markers for snow covered runways should be placed along the edges at intervals of not more than **90 m** and far enough from the centre line to not interfere with aeroplane on the runway. The threshold and end of the runway should be marked.

5.7.7.2 Evergreen trees **1.2 m to 1.5 m** high or other conspicuous, lightweight markers are appropriate to be used as edge markers for snow covered runways.

5.7.8 Unpaved taxiway edge markers

5.7.8.1 Taxiway edge markers should be provided where the limits of an unpaved taxiway are not obvious, and taxiway centre line markers are not provided.

5.7.8.2 A taxiway edge marker should be retroreflective blue. The marked surface as viewed by the pilot should be rectangle and should have a minimum viewing are of **150 cm^2**.

5.7.8.3 Taxiway edge markers should be frangible. Their height should be sufficiently low to preserve clearance for propellers.

Figure 5 – 3: Example of Runway and Threshold markers

CHAPTER 6. VISUAL AIDS FOR DENOTING OBSTACLES

6.1 Objects to be marked and lighted

6.1.1 The marking and/or lighting of obstacles is intended to reduce hazards to aircraft by indicating the presence of obstacles. It does not necessarily reduce operating limitations which may be imposed by an obstacle.

6.1.2 A fixed obstacle that extends above an approach, or take-off climb surface within **2,000 m** of the inner edge should be marked and lighted except that:

a) such marking and lighting may be omitted when the obstacle is shielded by another fixed obstacle; and

b) the marking may be omitted when the obstacle is lit by day by high intensity obstacle lights.

6.1.3 A fixed obstacle above an inner horizontal surface should be marked and lighted except that:

a) such marking and lighting may be omitted when:

1) the obstacle is shielded by another fixed obstacle;

2) For an inner horizontal surface extensively obstructed by immovable objects or terrain, circling procedures have been established to ensure safe vertical clearance below the circling flight paths; or

3) the appropriate authority determines that the obstacle has no operational significance through an aeronautical study; and

b) the marking may be omitted when the obstacle is lit by day by high intensity obstacle lights.

6.1.4 Mobile equipment and vehicles, other than aircraft, on the movement area of an altiport are obstacles and should be marked and lighted except that equipment and vehicles used only on aprons may be exempt.

6.2 Marking and lighting of objects

6.2.1 Objects should be marked and lighted in accordance with *Annex 14, Volume 1, Chapter 6, 6.2*.

CHAPTER 7. VISUAL AIDS FOR DENOTING RESTRICTED USE AREAS

7.1 Closed runway and taxiway marking

7.1.1 Markings denoting a closed runway should be placed at each end of the runway and along the runway at intervals of not more than **300 m**.

7.1.2 Markings denoting a closed taxiway should be placed at each end of the taxiway or part of the taxiway that is closed,

7.1.3 Closed runway and taxiway markings should be painted on the surface if permanent but may be made of other materials if the closing is temporary. The marking should be in the form of an **"X"**, each arm of which should be at least **6 m** long and **0.9 m** wide as shown in Figure 7-1 of *STOLPORT Manual (Doc 9150)*.

7.2 Unserviceable-area marking

7.2.1 Unserviceable portions of a maneuvering area should be conspicuously marked with devices like cones, flags or marker boards placed at intervals that clearly mark the unserviceable area. Characteristics of unserviceable area marking devices are:

a) a cone should be at least **0.5 m** high;

b) a flag should be at least **0.5 m** square;

c) a marker board should be at least **0.5 m** high and **0.9 m** long; and

d) the foregoing devices should be red, orange or yellow or one of these colors in combination with white.

7.3 Pre-threshold area

7.3.1 Where the surface leading to the runway threshold is paved but is not suitable for normal use by aircraft and exceeds **60 m** in length, the entire pre-threshold should be marked with yellow chevron markings.

7.3.2 The chevrons should be formed of yellow stripes **0.9 m** wide and should be set at an angle of **45 degrees** to the extended runway centre line as shown in Figure 7.2 of *Annex 14, Volume I.*

7.4 Non-Loadbearing Surface Marking

7.4.1 Shoulders for taxiways, runway turn pads, aprons and other non-loading bearing surfaces which cannot readily be distinguished from load-bearing surfaces and which, if used by aeroplane, might result in damage to the aeroplane should have the boundary between such areas and the load-bearing surface marked by a taxi side stripe marking.

7.4.2 A taxi side stripe marking should consist of a pair of solid lines, each **15 cm** wide and spaced **15 cm** apart and the same colour as the taxiway centre line marking should be placed along the edge of the load-bearing pavement, with the outer edge of the marking approximately on the edge of the load-bearing pavement.

CHAPTER 8. EQUIPMENT AND INSTALLATIONS

8.1 Electrical power supply systems for air navigation facilities

8.1.1 Adequate power supply should be available at altiport for the safe functioning of air navigation facilities.

8.1.2 Where provided, the following aerodrome facilities should be provided with a power supply:

a) the signalling lamp and the minimum lighting necessary to enable air traffic services personnel to carry out their duties;

Note.— The requirement for minimum lighting may be met by other than electrical means.

b) all obstacle lights which, in the opinion of the appropriate authority, are essential to ensure the safe operation of aircraft;

c) meteorological equipment;

d) essential security lighting,

e) essential equipment and facilities for the aerodrome responding emergency agencies;

8.1.3 Requirements for a power supply should be met by either of the following:

— the public power, which is a source of power supplying the aerodrome service from a substation through a transmission line; or

— standby power unit(s), which are engine generators, solar-wind power, UPS batteries, etc., from which electric power can be obtained.

CHAPTER 9. ALTIPORT OPERATIONAL SERVICES, EQUIPMENT AND INSTALLATIONS

9.1 Altiport emergency planning

9.1.1 To prepare an altiport to cope with an emergency, altiport planners should use the specifications in *Annex 14, Volume I, Chapter 9*, and the emergency planning guidance contained in the *Airport Services Manual (Doc 9137), Part 7*, to develop an altiport emergency plan commensurate with aircraft operations and other activities.

9.1.2 When established, an altiport emergency plan should provide for the actions to be taken in an emergency occurring at the altiport or in its vicinity. The plan should co-ordinate the response or participation of all agencies that could assist in responding to an emergency. The outline of aerodrome emergency plan is given in *Appendix 2 of Airport Service Manual (Doc 9137), Part 7*.

9.1.3 There should be a procedure established for testing an altiport emergency plan with a view to improvement.

9.1.4 If the formal altiport emergency plan cannot be established, the altiport operator should establish an emergency management procedure in accordance with State regulations, which should include the followings:

(a) the positions of those who constitute the membership of the altiport emergency committee (if established);

(b) the description of the role of each emergency service organisation involved in the emergency response arrangements, as applicable;

(c) the procedures for liaison with the authorised person responsible for local emergency planning arrangements;

(d) the procedures for notification and initiation of an emergency response;

(e) the procedures for activation, control and coordination of altiport-based emergency responders (if any) during the initial stages of an emergency;

(f) the procedures for use of the altiport's emergency facilities (if any);

(g) the procedures for facilitating altiport access and the management of assembly areas (if any);

(h) the procedures for an altiport to respond to a "local stand-by" event, if applicable;

(i) the procedures for initial response to a "full emergency" event on, or in the immediate vicinity of, the altiport;

(j) the arrangements for keeping altiport emergency facilities, access points and assembly areas (if any) in a state of readiness;

(k) arrangements to ensure emergency preparedness by both on and off-altiport responders; and

(l) the arrangements to return the altiport to operational status after an emergency.

9.2 Rescue and firefighting

9.2.1 An altiport should be provided with appropriate rescue and firefighting equipment and services, the primary objective of which is to save lives in the event of an aircraft accident or fire at the altiport. This objective would be met by making a fire-free escape route for the evacuation or rescue of passengers and crew. A secondary objective is to protect property by containing or extinguishing fire resulting from an aircraft accident.

9.2.2 Rescue and firefighting services should also have a standby function, coming to a high state of readiness when an in-flight emergency is declared. Altiport operators should be guided on rescue and firefighting equipment and services by the specifications in *Annex 14, Volume I, Chapter 9,* and the material in *Annex 14, Volume I, Attachment A, Section 17,* and *the Airport Services Manual (Doc 9137), Part 1*.

9.2.3 When it is not feasible to provide the rescue and firefighting services at an altiport, the altiport operator should establish the following:

a) Installation of fire hydrants and firefighting facilities in appropriate places at an altiport;

b) Ensure the mechanism to deal with rescue operation in normal and difficult terrain during any aircraft incident or accident at or in the vicinity of an altiport;

c) Provision of basic firefighting training to operate the fire hydrants and installed firefighting equipment to the security staff or other available staff at an altiport in an event of fire incident; and

d) MOU with the local security and medical authorities from the vicinity of an altiport for necessary assistance in an event of aircraft incident and accident and structural fire.

9.3 Disabled aircraft removal

9.3.1 An altiport emergency plan should include a plan for removing a disabled aircraft that is on or adjacent to the movement area. Guidance on removal of a disabled aircraft is given in the *Airport Services Manual (Doc 9137), Part 5*.

9.3.2 If an altiport does not have a plan for removal of disabled aircraft, the altiport should have the procedures for removing an aircraft that is disabled on or near the movement area. The procedures may include the following:

a) identifying the roles of the altiport operator and the holder of the aircraft's certificate of registration;

b) notifying the holder of the certificate of registration;

c) obtaining appropriate equipment and persons to remove the aircraft;

d) identifying:

1) the names and roles of the persons responsible for arranging the removal of an aircraft; and

2) the telephone numbers for contacting the relevant individuals during and after normal working hours.

9.3.3 The procedures described in 9.3.2 should be in line with national regulations or local government regulations.

Note:- Light aircrafts can also be removed manually without necessitating any specialized equipment.

9.4 Wildlife strike hazard reduction

9.4.1 An altiport operator should institute a method of controlling wildlife (birds and animals) that constitute a hazard to aircraft operations. Guidance on wildlife hazard management is given in the *PANS-Aerodromes (Doc 9981), Part II, Chapter 6* and *Airport Services Manual (Doc 9137), Part 3*.

9.4.2 An altiport operator should institute a method of controlling wildlife hazard for the safe operation of an aircraft.

9.4.3 An altiport should have wildlife hazard management procedures to deal with the hazards to aircraft operations caused by the presence of wildlife on or in the vicinity of the altiport, including details of the arrangements for the following:

a) monitoring wildlife activities at the aerodrome;

b) assessing any wildlife hazard;

c) mitigating any wildlife hazard;

d) reporting wildlife hazards to aircraft through one or more of the following as applicable: the AIP, NOTAM, air traffic control;

e) identifying proposed or actual sources of wildlife attraction outside the altiport boundary; and

f) liaising with the relevant planning authorities or proponents to facilitate wildlife hazard mitigation.

9.5 Apron Safety

9.5.1 Procedures on apron safety are specified in the *PANS-Aerodromes (Doc 9981), Part II, Chapter 7.*

9.6 Altiport vehicle operation

9.6.1 *Annex 14, Volume 1, Attachment A, Section 18* and *PANS-Aerodromes (Doc 9981), Part II, Chapter 9 may be used for altiport vehicle operation.*

9.7 Siting of equipment and installations on operational areas

9.7.1 Unless its function requires it to be there for air navigation or for aircraft safety purposes, no equipment or installation should be:

a) on a runway strip, a taxiway strip if it would endanger an aircraft; or

b) on a clearway if it would endanger an aircraft in the air.

9.7.2 Any equipment or installation required for air navigation or for aircraft safety purposes which must be located on a runway strip and which:

a) penetrates the lateral (transitional) surface should be of minimum mass and height, frangibly designed and sited to reduce hazards to a minimum. Guidance on the frangibility requirements of navigation aids is contained in the *Aerodrome Design Manual (Doc 9157), Part 6.*

9.8 Fencing

9.8.1 A fence or other suitable barrier should be provided on an altiport:

a) to prevent the entrance to the movement area of animals large enough to be a hazard to aircraft; and

b) to deter the inadvertent or premeditated access of an unauthorized person onto a non-public area of the altiport.

9.8.2 Suitable means of protection should be provided to deter the inadvertent or premeditated access of unauthorized persons into ground installations and facilities essential for the safety of civil aviation located off the altiport.

9.8.3 A fence or other means should separate the movement area and other facilities or zones on the altiport essential to safe operations from areas open to the public.

9.8.4 Wherever fencing is not feasible to be provided some kind of mechanism should be employed to protect the movement area for the safety of aircraft operations.

CHAPTER 10. ALTIPORT MAINTENANCE

10.1 General

10.1.1 A maintenance programme, including preventive maintenance, should be established at an altiport to maintain facilities in a condition that does not impair safety, regularity or efficiency of air navigation.

10.1.2 A maintenance programme developed in accordance with *Annex 14, Volume I, Chapter 10,* and using the following guidance would be suitable for an altiport.

a) Guidance on the maintenance of runway shoulders is contained in *Annex 14, Volume I, Attachment A, Section8.1*, and in the *Aerodrome Design Manual (Doc 9157), Part 2.*

b) Guidance on maintenance of a runway surface to preclude harmful irregularities is given in *Annex 14, Volume I, Attachment A, Section 5*.

c) Guidance on runway condition report for reporting runway surface condition is given in *Annex 14, Volume I, Attachment A, Section 6, PANS-Aerodromes (Doc 9981), Part II, Chapter 2 and Circular 355*.

d) Guidance on improving braking action and on the clearing of runways is given in the *Airport Services Manual (Doc 9137), Part 2*.

e) Guidance on suitable chemicals for removing or preventing frost or ice on pavements is given in the *Airport Services Manual (Doc 9137), Part 2*.

10.1.3 A system of preventive maintenance of visual aids should be employed to ensure marking system reliability. Guidance on preventive maintenance of visual aids is given in the *Airport Services Manual (Doc 9137), Part 9.*

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APPENDIX 1 - ALTIPORT DESIGN AEROPLANES

Notes:- Table 1 contains a list of aeroplanes in operations at altiports in Indonesia and Nepal. It should be noted that operations by these aeroplanes require special authorization by the manufacturers for Maximum Performance STOL Operations and approved by the local regulatory authority.

Table 1

S. No	Aeroplanes	Remarks
A)	**Indonesia**	
1	Cessna - 206	
2	Cessna - 208	
3	PC-6	
4	DHC - 4 Carribou	
5	DHC - 6	
B)	**Nepal**	
	DHC 6 - 300	
	DHC 6 - 400 (Viking)	
	DO 228 - 212	
	L 410 UVP – E20	

ATTACHMENT A

GUIDANCE MATERIAL SUPPLEMENTARY TO ASIA PACIFIC GUIDANCE ON DESIGN AND OPERATIONS OF ALTIPORTS

1. Runway length

1.1 As for conventional aerodromes, the determination of the length[4] of an altiport runway requires the involvement of an expert service or organization. The simplified method, which is described below, is nevertheless a fairly good approximation for light aeroplanes.

1.2 For the longitudinal profile slopes adopted at altiports, the acceleration of an aeroplane at take-off is only significantly affected, in its rolling phase, compared to what it would be on a substantially horizontal runway, by the effect of the orthogonal projection of the aeroplane's weight on the runway's axis.

1.3 Therefore, if aH denotes the acceleration of the aircraft traveling at speed V on a horizontal runway Figure A1 - 1, the acceleration aα of the same aircraft traveling at the same speed on a slope of an angle α to the horizontal as shown in the Figure A1 - 2 has the value:

$$\mathbf{a}_\alpha = \mathbf{a}_H + g.\ sin\ \alpha \text{ ------A}$$

Figure A1-1

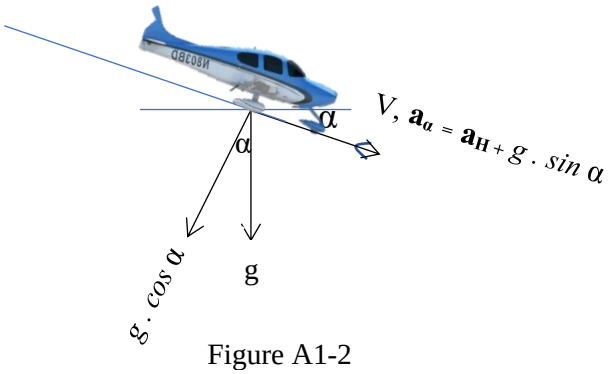

Figure A1-2

1.4 In the case of the deceleration corresponding to an acceleration-stop procedure the force due to gravity would be in opposite direction with respect to deceleration hence the equation-A may be rewrite as:

$$\mathbf{a}_\alpha = \mathbf{a}_H - g\ .\ sin\ \alpha\ .\ \text{-------- B}$$

1.5 The assumption is made below that an acceleration aH is invariant of the aeroplane type which makes this method as the approximation method.

1.6 Let us take the scenario with the multiple slopes of the runway, where the aeroplane movement uniformly accelerated (respectively decelerated) on each segment of runway i of constant slope αi and applying the newton's law of motion elimination of the time variable between

[4] *In view of the significant slopes, it is specified that the length referred to here is that measured on the ground.*

expressions the distance traveled on the axis and the speed leads to the relation:

$2ad=v_f^2 - v_i^2$;

where,

'a' is an acceleration, 'd' is distance travelled and v_f^2 is the final velocity and v_i^2 is the initial velocity of any object/aeroplane.

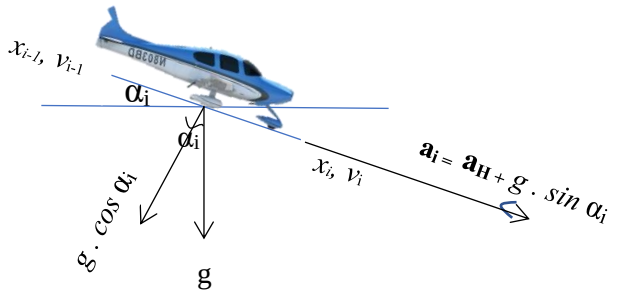

Figure A1-3

$2\ \mathbf{a}_i \cdot (x_i - x_{i-1}) = v_i^2 - v_{i-1}^2$ ---------**C**

in which:

- ✓ $\mathbf{a}_i = \mathbf{a_H} + g. \sin \alpha_i$
- ✓ $(x_i - x_{i-1})$ is the length of the section**,**
- ✓ v_{i-1} is the speed at the origin of said section,
- ✓ v_i is the speed at its end.

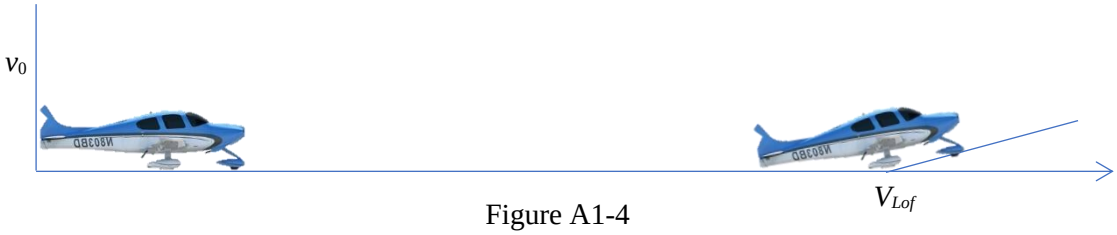

Figure A1-4

1.7 By successively writing this relation for each section of constant slope since the release brake ($v_0 = 0$) until the speed reaches the flight speed V_{Lof}, we obtain a series of equalities, which, by addition, results in the formula giving the length of runway preceding the point where the reference aeroplane leaves the ground after having initiated it's pitch up Figure A1-4.

$2 \Sigma\ \mathbf{a}_i \cdot (x_i - x_{i-1}) = V_{Lof}^2$---------**D**

1.8 Note that by making $\alpha = 0$, in the equation-**D** allows to substitute for the parameter $\mathbf{a}_i$ by value $\mathbf{a_H}$, whose value is not published with respect to the speed V_{Lof} and the distance at the end of at which this speed is reached on a horizontal runway.

1.9 For altiports intended to accommodate exclusively only light aeroplane, to which the method above is intended, the length to be given to the runway is taken equal to the product by **1.25** of the distance thus calculated from the equation-**D**.

1.10 The length of the runway determined under 1.9 should be increased at the rate of 7 per cent per

300 m elevation.

1.11 The length of runway determined under 1.10 should be further increased at the rate of 1 per cent for every 1°C by which the aerodrome reference temperature exceeds the temperature in the standard atmosphere for the aerodrome elevation (see *Table 3-1 of Aerodrome Design Manual (Doc 9157), Part 1 Runways*). If, however, the total correction for elevation and temperature exceeds 35 per cent, the required corrections should be obtained by means of a specific study. The operational characteristics of certain altiport design aeroplanes may indicate that these correction constants for elevation and temperature are not appropriate, and that they may need to be modified by results of aeronautical study based upon conditions existing at the particular site and the operating requirements of such aeroplanes.

1.12 Although current regulations do not require accelerate-stop for light aeroplanes, there is no reason why the possibility of a rejected take-off should not be considered in determining the runway length. Since the above reason applies to the deceleration introduced by the initiation of an accelerate-stop procedure, the decision speed, as may be, as it has been developed, can be determined within its possible range.

1.13 The length of an altiport runway does not necessarily have to provide for operations by the design aeroplane at its maximum mass. Rather, the aeroplane mass selected should be the mass required to carry out its allocated task and different take-off and landing masses may be determined for each site served by the design aeroplane.

2. Runway width

2.1 The width of an altiport runway may be determined by reference to the minimum values previously provided[5] for conventional aerodromes, according to the reference code of the most critical altiport design aeroplane to be accommodated.

2.2 On the basis of this information, if the code letter of an aeroplane does not seem to specify it differently for an altiport than for conventional aerodromes, the fact that the reference field length of the same aeroplane is not in itself significant for an altiport, should not, considering the correlation that exists between this distance and the one necessary for this aeroplane to reach its speed of rotation, be considered as removing all validity to the use of the code number[5] that is associated with it.

2.3 The minimum widths previously provided for conventional aerodromes will therefore be applicable without correction to altiports.

2.4 Thus, the minimum width of the runway will be **60 m** in unpaved configuration.

2.5 For paved runways, the absolute minimum width is **18 m**.

2.6 The site selection and orientation of a runway in the mountains is generally quite constrained, so particular attention must be paid to crosswinds in determining the width of the runway beyond the minimums thus defined.

[5] *although this situation cannot be established as a rule, it should be noted that, as they use a short take-off and landing runway, the aircraft used at the altiport generally use the code number 1*

ATTACHMENT B

CAA NEPAL PRACTICES FOR SHORT TAKE-OFF AND LANDING (STOL) OPERATIONS

(Refer to Chapter – 14, Part I - Flight Crew and Part II - STOL Fields Clearance Requirements)

URL:

https://caanepal.gov.np/storage/app/media/file%20upload/fora-6th-edition-consolidated-1-026262626.pdf

ATTACHMENT C

OBSTACLES LIMITATION SURFACES

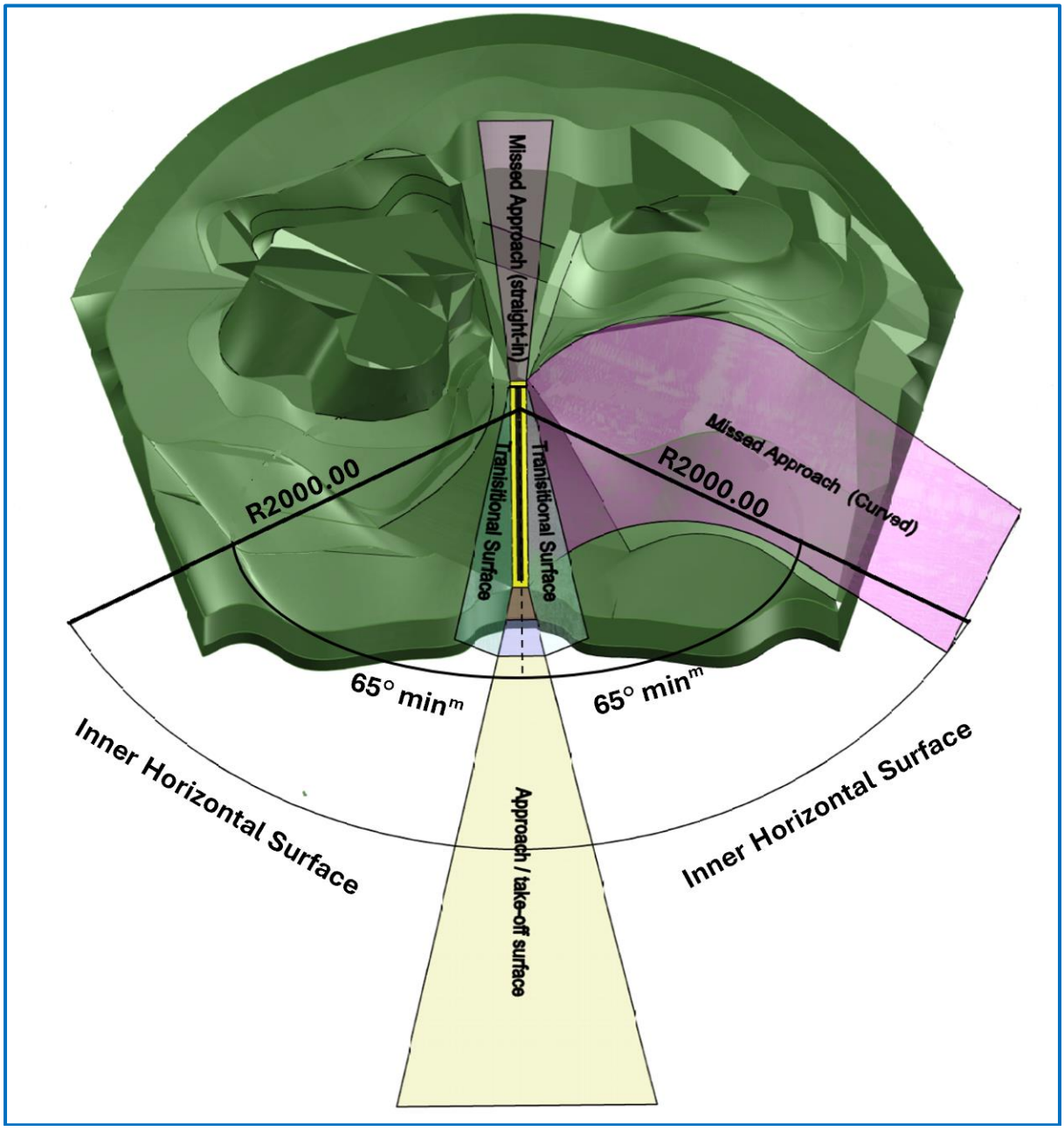

Figure ATT C-1: Missed approach surfaces at altiports in mountain pass or on dome shaped landforms

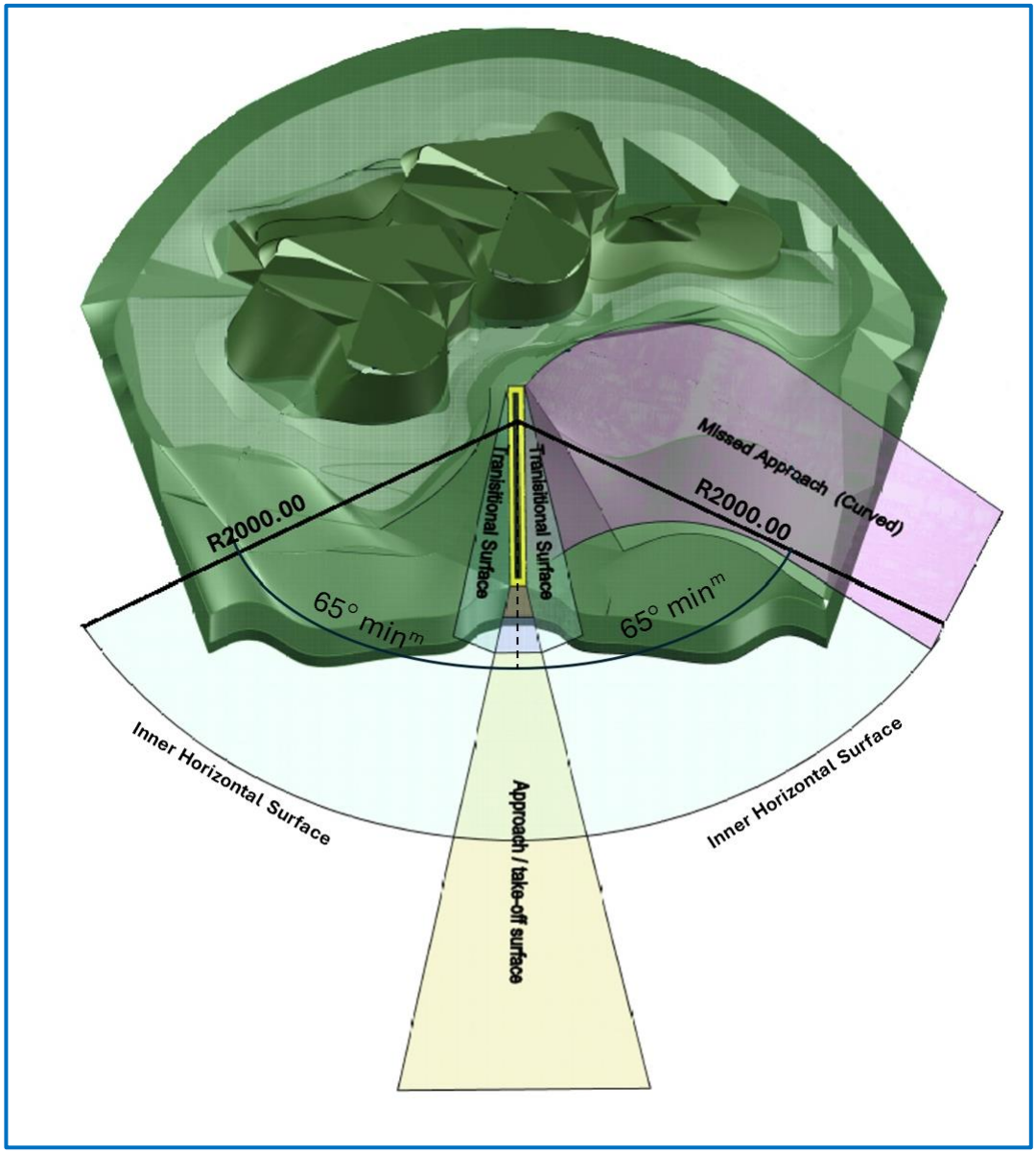

Figure ATT C-2: Missed approach surfaces at altiport on a mountain side

ATTACHMENT D

REFERENCES

1) ICAO Annex 14 Aerodromes, Volume I Aerodrome Design and Operations

2) Aerodrome Design Manual (Doc 9157, Part 1 to 6

3) Airport Planning Manual (Doc 9184), Part 1 – 3

4) Airport Services Manual (Doc 9137), part 1 - 8

5) Stolport Manual (Doc 9150);

6) Instruction Technique sur les Aérodromes Civils (ITAC), DGAC France

7) UNDP/ICAO Project, NEP/82/009, High –altitude STOL Performance Criteria Study, DHC 6 – 300 Series Twin Otter Aircraft, Nepal, February 1988

8) CAAN Flight Operations Requirements Aeroplane, Appendix 9 - STOL Field Clearance Requirements

9) Minimum Safety Requirements for Temporary / Unlicensed Aerodromes, DGCA India;

10) CASA CAAP 92A-1(0): Guidelines on Aerodromes intended for Small Aeroplanes conducting RPT Operations;

11) FAA AC 150/5325-4B: Runway Length Requirements for Airport Design, Chapter 2 Runway Length for Small Airplanes;

12) FAA AC 150/5220-22B: Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns;

13) AC139-6 Aerodrome design, Aeroplanes at or Below 5700 kg MCTOW (2015)

14) Supplement No. 178R2 of LET410 UVP-E20

15) Supplement No 1131, Dornier 228

16) PSM1 – 64 – POH, DHC – 6 – Twin Otter – Pilot Operating Handbook, Section 10.10.1 - Maximum Performance STOL Operations into Section 10 of PSM1-64-POH, after Temporary Revision 23.

Generic Aerodrome Safety Management System (SMS) Evaluation Tool and Guidance

[Document Control No.]

Revision: XX

Date: DD MMM YYYY

Table of Contents

Aerodrome SMS Evaluation Tool and Guidance

To be completed by the Accountable Executive or Safety Manager of the aerodrome:

Aerodrome: Click here to enter text.	Approval/Certificate Reference(s): Click here to enter text.
SMS Manual Revision: Click here to enter text.	Evaluator(s): Name: Click here to enter text. Department: Click here to enter text. Position: Choose an item.
Date of completion of the assessment by aerodrome operator: Click here to enter a date.	

To be completed by CAA staff:

Name: Click here to enter text. Click here to enter text. Click here to enter text.	Position: Click here to enter text. Click here to enter text. Click here to enter text.	Department: Click here to enter text.
		Date of completion of the assessment by CAA: Click here to enter a date.

Introduction

The Annex 19 of the International Civil Aviation Organization (ICAO) standardizes an approach to Safety Management applicable to various domains within aviation. As a result, the Safety Management International Collaboration Group (SM ICG) has developed an Safety Management Systems (SMS) Evaluation Tool to directly align with this approach. The tool has been adopted and customized for use by numerous States worldwide, including Australia, Thailand and others.

During the AP-AA/WG/5 meeting, a new task was introduced, aiming to develop a generic guidance for the evaluation of Aerodrome SMS. In a collaborative effort, Thailand, Australia and Maldives jointly worked on the development of the Aerodrome SMS Evaluation Tool and Guidance. Drawing insights from various established tools such as the SM ICG SMS Evaluation Tool, CASA Safety Management System Evaluation Tool and Guidance, Maldives CAA Management System Assessment Tool, CAAT SMS Evaluation Tool, UK CAA SMS Evaluation Tool, and EASA Management System Assessment Tool, this comprehensive tool underwent tailored modifications to accommodate the specific assessment needs inherent to Aerodrome SMS.

SMS Evaluation Tool Instructions for use

This tool assesses the overall effectiveness of aerodrome SMS by considering compliance and performance indicators derived from ICAO Annex 19 and the Safety Management Manual (Doc 9859). These indicators are structured according to the ICAO SMS Framework, with assessments made on whether each indicator is *Present (P)*, *Suitable (S)*, *Operating (O)*, or *Effective (E)*, as outlined in the accompanying definitions and guidance.

PSOE definitions for individual indicator (assessed and completed initially by the aerodrome operator and verified by CAA):

Present (P):	There is evidence that the indicator is clearly visible and is documented within the aerodrome's SMS documentation.
Suitable (S):	The indicator is suitable based on the size, nature, complexity and the inherent risk in the activity.
Operating (O):	There is evidence that the indicator is in use and an output is being produced.
Effective (E):	There is evidence that the indicator is effectively achieving the desired outcome and has a positive safety impact.

Element summary definitions (as used by CAA in the element summary assessment):

Initiating:	Not all of the indicators in this element are present and suitable.
Present and suitable:	All indicators in this element are at least present and suitable but not all are operating. This level is required for initial certificaton of an aerodrome.
Operating (but not effective):	All compliance and performance indicators are at least operating but the overall effectiveness for that element is not achieved.
Effectiveness achieved:	All compliance and performance indicators are at least operating and the overall effectiveness for that element is achieved.
Excellence:	Effectiveness is achieved as above and there are signs of best practice and excellence in how the aerodrome has implemented this element.

This concept of evaluating SMS effectiveness supports the move from traditional, compliance-based oversight to performance-based oversight that focuses on how the SMS is performing. It establishes a shared standard for assessing SMS effectiveness, fostering mutual acceptance of SMS practices.

The aerodrome operators should use the “How it is achieved” box to describe how they have achieved the PSO or E level for the indicator, detailing any documentation references, evidence or examples to support their self-assessment. Once these indicators are evaluated by the aerodrome operator, CAA will verify each indicator and assess the overall effectiveness assessment of each SMS element.

For the **initial** approval of an SMS all indicators must be **Present** and **Suitable** before the aeorodrome certificate is issued.
For **continued** approval, all indicators must be at least **Operating** for all of the elements.

Due to the continuously changing and dynamic nature of aviation, during ongoing or subsequent evaluations the **Suitable** designation should be re-evaluated considering any changes to the aerodrome and its activities.
An indicator cannot be considered **Operating** or **Effective** if it is **not Present**, and it cannot be considered as **Present** if it is not documented – documentation ensures consistent repeatable and systematic outcomes.

What to look for

This section guides the aerodrome’s evaluators or CAA inspectors when looking at each individual indicator and is not meant to be a checklist. The items listed are not specific to an individual Present, Suitable, Operating, or Effective level, but remind the evaluators or CAA inspectors of areas they may want to consider. Some items in this column may not be relevant depending on the size, type, or nature of the aerodrome.

Addressing findings and observations

For the initial evaluation, all processes should be **Present** and **Suitable**. If not, then the aerodrome certificate should not be granted. Once an SMS is functioning, a finding should be issued if a process is found not to be **Operating** during the evaluation.

Where an indicator is found not to be **Effective**, CAA inspector may consider issuing an observation to give rise to suggested improvements. However, findings should not be issued if the process is **Operating** but **not Effective**.

1 Safety Policy and Objectives (Annex 19 Appendix 2 1.)

1.1 Management Commitment (Annex 19 Appendix 2 1.1)

1.1.1 Safety policy, sign off and periodical review (Annex 19 Appendix 2 1.1.1 e) and g), *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	1.1.1	There is a safety policy, signed by the accountable executive, which observes all applicable legal requirements and standards; and considers best practices and it is reviewed periodically to ensure it remains relevant to the aerodrome.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for			
- Interview the accountable executive to assess his/her knowledge and understanding of the safety policy. - Check evidence that the accountable executive takes informed decisions in accordance with the safety policy. - Confirm the safety policy is relevant and meets applicable national regulations. - Check that 'safety' is key to the policy and remains a highest priority. - Interview staff to determine to what extent the safety values and objectives from the safety policy are known, as well as how readable and understandable they are. - Check evidences that all employees and key stakeholders contribute to the safe operations of the system in accordance with the safety policy. - Check that the safety policy is reviewed periodically for content and currency. - Check that the safety policy includes a commitment to continuous improvement; observes all applicable legal requirements and standards; and considers best practices.			
Present	**Suitable**	**Operating**	**Effective**
There is a safety policy, signed by the accountable executive, which includes a commitment to continuous improvement; observes all applicable legal requirements and standards; and considers best practices.	The safety policy is easy to read. The content is customised to the aerodrome.	The safety policy is reviewed periodically to ensure it remains relevant to the aerodrome.	The accountable executive has a clear understanding of the safety policy and is fully engaged in implementing it.

1.1.2 Safety policy and resources (Annex 19 Appendix 2 1.1.1 b), *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	1.1.2	The safety policy includes a clear statement about the provision of the necessary resources for the implementation of the safety policy.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for

- Review available, appropriate resources including staff, equipment, and finance.
- Review how the aerodrome manages resources by anticipating and addressing any shortfalls.
- Check there are sufficient and competent personnel and review how the aerodrome assesses it.
- Review targeted resources vs actual resources.
- Guarantee that strategy is not only defined according to the current resources but is also based on the needed resources and ways of working to appropriately mitigate the key safety risks.
- Check whether the resources are discussed with the accountable executive or during the safety committee meeting (or equivalent), as appropriate.
- Check whether any fatigue issues, lack of resources, human performance weaknesses are reported, notably through the internal safety reporting scheme.
- Check whether the principles of 'management of changes' are applied to anticipate the resources in case of changes.

Present	Suitable	Operating	Effective
The safety policy includes a statement to provide appropriate resources.	There is a process for assessing resources and addressing any shortfalls; needs are discussed at the right level of management. Volume and significance of the contracted activities (to and from) are properly factored for the determination of the resources to deliver safe operations.	The aerodrome is assessing the resources being provided to deliver a safe service and taking action to address any shortfalls.	The aerodrome is reviewing and taking action to address any forecasted shortfalls in resources. Needs are anticipated and forecasted, notably using the principles of the 'management of changes'.

1.1.3 Communication of the safety policy (Annex 19 Appendix 2 1.1.1 f), *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	1.1.3	The safety policy is communicated, with visible endorsement, to all staff including relevant contracted staff and third-party organisations.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for			
- Review how the safety policy is communicated. - Safety policy is clearly visible (or reachable, depending on the structure and size of the aerodrome) to all staff including relevant contracted staff and third-party organisations. - Question managers and staff regarding knowledge of the safety policy and its associated objectives. - All managers are familiar with the key elements of the safety policy and its associated objectives. - Evidence that senior management involved in safety activities participate to safety meetings, training, conferences, etc.			
Present	**Suitable**	**Operating**	**Effective**
There is a means in place for the communication of the safety policy and its associated objectives. The management commitment to safety is documented within the safety policy.	The safety policy and its associated objectives are clearly visible (or reachable) to all staff including relevant contracted staff and third-party organisations. The safety policy is understandable (consider multiple languages).	The safety policy and its associated objectives are communicated to all personnel (including relevant contracted staff and organisations). The accountable executive and the senior management team are promoting their commitment to the safety policy through active and visible participation in the safety management system.	People across the aerodrome are familiar with the safety policy and its associated objectives and can describe their obligations in respect of the safety policy.

1.1.4 Safety policy, commitment, and positive safety culture (Annex 19 Appendix 2 1.1.1 a) and c), *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	1.1.4	The safety policy reflects aerodrome's commitment regarding safety, including the promotion of a positive safety culture and the encouragement of safety reporting.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for

- The managers involved in safety activities are familiar with the key elements of the safety policy and its associated objectives, including the positive safety culture.
- Senior management involved in safety activities are efficiently participating in the safety management system and proactively managing safety policy, fostering a safety culture, and implementing objective processes set forth by the aerodrome to proactively manage risks.
- Evidence of senior management participation in safety meetings, training, conferences etc. where positive safety culture is promoted.
- Check how a positive safety culture is encouraged and impacts the overall effectiveness, notably for the safety reporting system and the actions thereof.
- Evidence of proactive behaviours by the managers involved in safety activities, demonstrating continuous leadership and continuous improvement.
- Relationship building with CAA and other key stakeholders (e.g. feedback, trust, exchange of information).
- Feedback from safety surveys that include specific just culture aspects. Confirmation that the internal safety reporting scheme is known and used without fears of reprisal.
- Review how a positive safety and just culture are promoted.
- Evidence that people do not fear to report in respect of the internal safety reporting scheme.

Present	Suitable	Operating	Effective
The safety policy is documented including the promotion of a positive safety culture and the encouragement of safety reporting. The safety policy highlights the primary responsibility for safety of all employees to proactively manage risks. The safety policy contains the main attributes of a positive safety culture,	The safety policy describes the commitment of all relevant staff involved in safety activities.	The safety policy and associated positive safety culture are operationally implemented and promoted at working level by the accountable executive and the key managers involved in safety activities.	The safety policy, its implementation and commitment are reviewed with the accountable executive and senior management on a regular basis. The aerodrome's commitment to safety addresses interactions with key external stakeholders.

	including a commitment to safety leadership and to a just culture across the aerodrome.			The internal safety reporting scheme is known and used without fears of reprisal.

1.1.5 Safety policy and Just culture (Annex 19 Appendix 2 1.1.1 d), *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	1.1.5	The safety policy clearly indicate which types of behaviours are unacceptable related to the aerodrome's aviation activities and include the circumstances under which disciplinary action would not apply.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for			
- Check that guidance and governance are developed on how to apply the just culture policy - Evidence of when the just culture principles have been applied following an event. - Evidence of interventions from safety investigations addressing organisational issues rather than focusing only on the individual. - Review how the aerodrome is monitoring voluntary reporting rates and review the number of aviation safety reports appropriate to the activities. - Safety reports include the reporter's own errors and events they are involved in (events where no one was watching). - Check that staff are aware of the just culture policy and principles. - Interview staff representatives to confirm that they agree with just culture policy and principles. - Consider feedback on how the "just culture" policy is applied and perceived from staff.			
Present	**Suitable**	**Operating**	**Effective**
A just culture policy and principles have been defined.	The just culture policy (or in any other related document) clearly identifies acceptable and unacceptable behaviours. The principles ensure that the policy can be applied consistently across the aerodrome. The just culture policy and principles are understandable and clearly visible (or reachable). Decision-making process related to the implementation of the just culture is	There is evidence of the just culture policy and supporting principles being applied and promoted to staff.	The just culture policy is applied in a fair and consistent manner and people trust the policy. There is evidence that the line between acceptable and unacceptable behaviour has been determined in consultation with staff representatives.

		designed according to the size of the aerodrome (e.g. involvement of staff representatives, staff committee, Unions, etc.)		

1.1.6 Safety objectives (Annex 19 Appendix 2 1.1.2, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	1.1.6	Safety objectives have been established that are consistent with the safety policy and they are communicated throughout the aerodrome.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for

- Assess whether the safety objectives are appropriate, relevant and in line with safety policy.
- Through the safety performance measurement and monitoring, check whether the safety objectives are being measured to monitor achievement through qualitative and quantitative means, such as SMART SPIs and SPTs. Check whether the safety objectives, as a minimum, target 'continuous improvement'.
- Check the minutes of the Safety Review Board (or equivalent) how the safety objectives are monitored.
- Safety objectives are defined that will lead to an improvement in processes, outcomes, and the development of a positive safety culture.
- Assess how safety objectives are communicated throughout the aerodrome. Check how these safety objectives as well as their associated metrics are visible (or reachable) to all staff involved in safety activities.
- Assess if the safety objectives have considered relevant documentation such as Industry sector risk profiles, State risk profiles, State safety objectives in the SSP and/or the NASP.

Present	Suitable	Operating	Effective
Safety objectives that have been established are consistent with the safety policy and are communicated throughout the aerodrome. Associated qualitative and quantitative measures are in place.	Safety objectives are relevant to the aerodrome and its activities. Safety objectives are understandable and clearly visible. Safety objectives are aligned with the SSP and/or the NASP, when appropriate.	Safety objectives are being measured and regularly reviewed, are relevant and are communicated throughout the aerodrome. They are monitored through the Safety Review Board (or equivalent) and adjusted, when needed.	Achievement of the safety objectives is being monitored by senior management and action taken to ensure they are being met. Safety objectives are not only aligned with the SSP and/or the NASP, but they are also compared with those of the risk profile sector. They are updated based on the latest relevant safety information available.

				The aerodrome is sometimes involved in the elaboration of the SSP and/or the NASP. Continuous improvement of safety is effectively measured.

For CAA use only

Summary Assessment on 1.1 'Management Commitment'				
☐ Initiating	☐ Present and Suitable	☐ Operating	☐ Effectiveness Achieved	☐ Excellence
Remarks: Click here to enter text.				

1.2 Safety Accountability and Responsibilities (Annex 19 Appendix 2 1.2)

1.2.1 Identification of the Accountable Executive (Annex 19 Appendix 2 1.2 a), *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	1.2.1	An accountable executive has been appointed with full responsibility and accountability to ensure the SMS is properly implemented and performing effectively.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for
- Evidence that the accountable executive has the authority to provide sufficient resources for relevant safety improvements. - Evidence that the accountable executive is fully aware of his/her SMS roles and responsibilities. - Evidence of decision making on risk acceptability. - Review SMS activities are being carried out in a timely manner and the SMS is sufficiently resourced. - Evidence of activities being stopped due to unacceptable level of safety risk. - Look for evidence that accountable executive actions are consistent with the active promotion of a positive safety culture within the aerodrome.

Present	Suitable	Operating	Effective
An accountable executive has been appointed with full responsibility and ultimate accountability for the SMS.	The accountable executive has control of resources.	The accountable executive ensures that the SMS is properly resourced, implemented and maintained and has the authority to stop the operation if there is an unacceptable level of safety risk. The accountable executive is fully aware of his/her SMS roles and responsibilities. The accountable executive is accessible to the staff in the aerodrome.	The accountable executive ensures that the performance of the SMS is being monitored, reviewed and improved. Beyond his/her SMS roles and responsibilities, the accountable executive continuously promotes the safety policy, safety standards, and safety culture of the aerodrome.

1.2.2 Safety accountabilities, responsibilities, and authorities (Annex 19 Appendix 2 1.2 b) to e), *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	1.2.2	Safety accountabilities, responsibilities, and authorities are defined and documented throughout the aerodrome and staff understand their own responsibilities.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for

- Question managers and staff regarding their roles and responsibilities.
- Confirm senior managers are aware of the aerodrome's safety performance, its most significant risks, and its safety objectives.
- Evidence of managers having safety related performance targets.
- Look for active participation of the management team in the SMS.
- Evidence of appropriate risk mitigation, action, and ownership.
- The levels of management authorised to make decisions on risk acceptance are defined and applied.
- Acceptance of risk is aligned with authorisations.
- Check for any conflicts of interest and that they have been identified and managed.

Present	Suitable	Operating	Effective
The safety accountability, responsibilities, and authorities are clearly defined and documented.	Key safety roles have been identified for safety accountability, responsibilities, and authorities (for example, through job descriptions, job family descriptions, or organisational charts).	Individuals have been identified to fill key safety roles, and they are aware of and fulfil their safety accountabilities, responsibilities, and authorities, and are encouraged to contribute to the SMS.	The accountable executive and the senior management team are aware of the substantive/significant risks faced by the aerodrome, and safety management system principles exist throughout the aerodrome so that safety is given the highest priority.

For CAA use only

Summary Assessment on 1.2 'Safety Accountability and Responsibilities'				
☐ Initiating	☐ Present and Suitable	☐ Operating	☐ Effectiveness Achieved	☐ Excellence
Remarks: Click here to enter text.				

1.3 **Appointment of key safety personnel** (Annex 19 Appendix 2 1.3)

1.3.1 Identification of the Safety Manager (Annex 19 Appendix 2 1.3, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	1.3.1	A competent safety manager who is responsible for the implementation and maintenance of the SMS has been appointed with a direct reporting line to the accountable executive.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

	What to look for
Guidance	- Check the availability of the safety manager (and supporting staff, if appropriate) to allocate sufficient time to the implementation and maintenance of the SMS - Check for any conflicts of interest and that they have been identified and managed. - Consider whether the responsibilities for the implementation and maintenance of the SMS should be given to a full-time person or to a safety manager supported by a team, enough empowered to advocate safety in case of conflict of interest (e.g. avoiding a person having functional activities both in production and surveillance); - Review safety manager role including credibility, competence, and status. - Review the training that the safety manager has received. - Evidence of maintained competency. - The safety manager has an appropriate level of knowledge and understanding of human factors. - Review how the safety manager gets access to internal and external safety information. - Review how the safety manager communicates and engages with operational staff and senior management. - Review the safety manager's workload/allocated time to fulfil role. - Check there are sufficient resources for SMS activities in a timely manner such as safety investigation and surveys, analysis, assessing, safety meeting attendance, SMS implementation's coherence (notably for the assessment of risks and the mitigation measures), periodic reports on safety performance, communication processes including identification and dissemination of safety related information (internally and externally), and safety promotion. - Check the need for Safety Action Group(s) to assist or act on behalf of the safety manager or the safety committee. - Review of safety report action and closure timescales. - Review staffing and competence levels for those involved in SMS activities; - Interviews with the accountable executive and the safety manager.

	Present	Suitable	Operating	Effective
	A safety manager who is responsible for the implementation and maintenance of the SMS has been appointed with a direct reporting line with the accountable executive.	The safety manager is competent. Sufficient time and resources are allocated to maintain the SMS, but not limited to, competent staff for safety investigation, analysis, auditing, and promotion. *See Annex 19 Appendix 2 1.3 Note: Depending on the size of the service provider and the complexity of its aviation products or services, the responsibilities for the implementation and maintenance of the SMS may be assigned to one or more persons, fulfilling the role of safety manager, as their sole function or combined with other duties, provided these do not result in any conflicts of interest.*	The safety manager has implemented and is maintaining the SMS. The safety manager is in regular communication with the accountable executive and escalates safety issues when appropriate. The safety manager is accessible to staff in the aerodrome.	The safety manager is competent in managing the SMS and identifying improvements in a timely manner. There is an established reporting scheme between the accountable executive and the safety manager to timely and regularly report on the safety issues.

1.3.2 Establishment of the safety committee (Annex 19 Appendix 2 1.3, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	1.3.2	The aerodrome has established appropriate safety committee(s), which includes the accountable executive and the heads of functional areas, to discuss and address safety risks and compliance issues.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for
- Review safety committee and meeting structure and Terms of Reference for each committee/meeting. - Review meeting attendance levels. - Review meeting records and actions. - Check that outcomes are communicated to the rest of the aerodrome. - Evidence of safety objectives, safety performance, and compliance are being reviewed and discussed at meetings. - Participants challenge what is being presented when there is limited evidence. - Senior management are aware of the most significant risks faced by the aerodrome and the overall safety performance of the aerodrome.

Present	Suitable	Operating	Effective
The aerodrome has established appropriate safety committees(s).	Safety committee(s)' structure and frequency support the SMS functions across the aerodrome. The scope of the safety committee(s) includes safety risks and compliance issues. The attendance of the highest-level safety committee includes at least the accountable executive and the heads of functional areas.	There is evidence of meetings taking place detailing the attendance, discussions, and actions. The safety committee(s) monitor the effectiveness of the SMS and compliance monitoring function by reviewing there are sufficient resources. Actions are being monitored.	Safety committees include key stakeholders. The outcomes of the meetings are documented and communicated, and all actions are agreed, taken and followed up in a timely manner. The safety performance and safety objectives are reviewed and actioned as appropriate.

			SPIs and qualitative means have been established to measure and monitor the established safety objectives	

For CAA use only

Summary Assessment on 1.3 'Appointment of key safety personnel'				
☐ Initiating	☐ Present and Suitable	☐ Operating	☐ Effectiveness Achieved	☐ Excellence
Remarks: Click here to enter text.				

1.4 Coordination of aerodrome emergency plan (Annex 14 9.1 and Annex 19 Appendix 2 1.4) *(cross references to aerodrome manual/aerodrome emergency plan and aerodrome internal audit report)*

1.4.1 Aerodrome emergency planning (Annex 14 9.1.1 to 9.1.3, 9.1.6 and 9.1.14, and Annex 19 Appendix 2 1.4, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	1.4.1	An appropriate aerodrome emergency plan, which defines the procedures, roles, responsibilities, and actions of all existing agencies (both on and off the aerodrome) and key personnel, commensurate with the aircraft operations and other activities conducted at the aerodrome, has been established and distributed.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Note: cross references to CAA audit report for initial certification/ continued surveillance

Guidance

What to look for

- Review the aerodrome emergency plan and how the procedures, roles, responsibilities, and actions of the all existing agencies (both on and off the aerodrome) are defined.
- Review how coordination with all existing agencies (both on and off the aerodrome) is planned.
- Review how the aerodrome emergency plan is distributed and where copies are held.
- Review when and how the aerodrome emergency plan was last reviewed, as well as any actions taken as a result.
- Interview key personnel and check they have access to the relevant parts of the aerodrome emergency plan.
- Check that different types of foreseeable emergencies have been considered.

Present	Suitable	Operating	Effective
An appropriate aerodrome emergency plan has been developed and distributed.	The aerodrome emergency plan defines the procedures, roles, responsibilities, and actions of all existing agencies (both on and off the aerodrome) and key personnel, commensurate with the aircraft operations and other activities conducted at the aerodrome. The appropriate coordination of all existing agencies which, in the opinion	The aerodrome emergency plan is reviewed to make sure it remains up to date. Changes to the aerodrome emergency plan are communicated. There is evidence of coordination (such as meetings, communication, trainings, etc.) with all existing agencies as appropriate.	The results of the aerodrome emergency plan review are assessed and actioned to improve its effectiveness. There is evidence of coordination with all existing agencies, which are analysed for further improvement.

		of the appropriate authority, could be of assistance in responding to an emergency occurring at an aerodrome or in its vicinity is defined with appropriate means. Key personnel have easy access to the relevant parts of the aerodrome emergency plan at all times.		

1.4.2 Aerodrome emergency exercise (Annex 14 9.1.12 to 9.1.13 and Annex 19 Appendix 2 1.4, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	1.4.2	The aerodrome emergency plan is periodically tested for the adequacy of the plan and the results reviewed to improve its effectiveness.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	
Note: cross references to CAA audit report for initial certification/ continued surveillance		

Guidance

What to look for			
- Check how the frequency and methods for testing the aerodrome emergency plan are defined. - Review when and how the aerodrome emergency plan was last tested, as well as any actions taken as a result. - Verify that variations of the different scenarios are regularly considered to test the robustness of the aerodrome emergency plan.			
Present	**Suitable**	**Operating**	**Effective**
The procedures for periodic testing of the adequacy of the aerodrome emergency plan and for reviewing the results in order to improve its effectiveness are defined.	The frequency and methods for testing the aerodrome emergency plan are defined in accordance with *[national]* regulations.	The aerodrome emergency plan is tested as defined frequency and methods. Different scenarios with variations test the robustness of the aerodrome emergency plan. There is evidence of reviewing the results of the aerodrome emergency	The results of the aerodrome emergency plan testing are assessed and actioned to improve its effectiveness.

			plan exercise with all agencies involved.	

For CAA use only

Summary Assessment on 1.4 'Coordination of aerodrome emergency plan'				
☐ Initiating	☐ Present and Suitable	☐ Operating	☐ Effectiveness Achieved	☐ Excellence
Remarks: Click here to enter text.				

1.5 SMS documentation (Annex 19 Appendix 2 1.5)

1.5.1 SMS Manual (Annex 19 Appendix 2 1.5.1, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	1.5.1	The SMS manual, which describes the safety policy and objectives, SMS requirements, SMS processes and procedures, as well as accountability, responsibilities, and authorities for SMS processes and procedures, has been developed and maintained, and it is readily available to all staff.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for

- Review how safety policies, processes and procedures are documented and amended.
- The SMS manual includes a system description including SMS interfaces.
- Check for easy access to the SMS Manual.
- Check the manner and format of the SMS manual.
- Check for cross references to other documents and procedures.
- Check availability of SMS manual to all staff.
- Check if staff knows who to contact (when needed) or where to find safety related documentation including procedures appropriate to their role.
- Review the supporting SMS documentation (hazard logs, meeting minutes, safety performance reports, risk assessments, etc.).

Present	Suitable	Operating	Effective
The SMS documentation includes the policies and processes that describe the aerodrome's SMS and processes.	The scope of the activities under the SMS is clearly defined. SMS documentation is comprehensible. SMS documentation is consistent with other internal management systems and is representative of the actual processes in place. The manner and format of the SMS documentation is appropriate to the aerodrome and readily available to all relevant personnel.	Changes to the SMS documentation are managed. Key personnel involved in SMS implementation is familiar with and follows the relevant parts of the SMS documentation, whereas employees are familiar with the content of the SMS documentation relevant to their activities	SMS documentation is proactively reviewed for continuous improvement.

		See Annex 19 Appendix 2 Note: Depending on the size of the service provider and the complexity of its aviation products or services, the SMS manual and SMS operational records may be in the form of stand-alone documents or may be integrated with other organisational documents (or documentation) maintained by the service provider.		

1.5.2 SMS operational records (Annex 19 Appendix 2 1.5.2, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator)		Indicator of compliance and performance	P	S	O	E
	1.5.2	SMS documentation, including SMS related records, are regularly reviewed and updated with appropriate version control in place.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				

	Click here to enter text.

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for
- Check how safety records are stored and version controlled. - Data protection and confidentiality rules have been defined and are consistently applied. - Check if appropriate staff is aware of the records control processes and procedures. - Check that the SMS records include the decisions taken during the Safety Review Board (or any other high-level safety committee) are supported by evidence.

Present	Suitable	Operating	Effective
The SMS documentation defines the SMS outputs and which records of SMS activities will be stored. Records to be stored, storage period, and location are identified.	Data protection and confidentiality rules have been defined.	SMS activities are appropriately stored and found to be complete and consistent with appropriate data protection and confidentiality control rules.	SMS records are routinely used as inputs for safety management related tasks and continuous improvement of the SMS.

				SMS documentation, including SMS related records, are regularly reviewed and updated with appropriate version control in place.

For CAA use only

Summary Assessment on 1.5 'SMS documentation'				
☐ Initiating	☐ Present and Suitable	☐ Operating	☐ Effectiveness Achieved	☐ Excellence
Remarks: Click here to enter text.				

2 Safety Risk Management (Annex 19 Appendix 2 2.)

2.1 Hazard Identification (Annex 19 Appendix 2 2.1)

2.1.1 Safety Occurrence Reporting (Annex 19 Appendix 2 1.1.1 c), *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	2.1.1	There is a confidential reporting system in place to capture mandatory occurrences and voluntary reports that is simple to use and accessible to all staff working at the aerodrome. It also provides appropriate feedback to the reporter, and, where appropriate, to other aerodrome personnel and aerodrome users.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	

Effective (E)	☐	

Guidance

What to look for

- Review the reporting system for access and ease of use [appropriateness of the reporting systems]. Depending on the size and complexity, the appropriateness of the reporting system can range from simple secured boxes to a digital system, including Apps to install on mobile devices.
- Check if staff trusts the reporting system, are familiar with it and know what should be reported.
- Check relevant staff are aware of which occurrences should be mandatory.
- Evidence that people do not fear to report in respect of the internal safety reporting scheme.
- Review reporting timescales.
- Review how data protection and confidentiality is achieved.
- Evidence of feedback to reporter (or a feedback loop addressing the aggregation of reports with their analysis, depending on the volume of occurrences)
- Assess volume and quality of reports including self-reporting.
- Review report closure rates.
- Check availability to contracted organisations and other organisations to make reports.
- Confirm responsibilities with regards to occurrence analysis, storage and follow-up are clearly defined.
- Assess how the operational managers and the senior management engage with the outputs of the reporting system.

Present	Suitable	Operating	Effective
There is a confidential reporting system to capture mandatory occurrences and voluntary reports that includes a feedback system and stored on a database.	The reporting system is accessible and easy to use for the personnel involved in the safety activities of the aerodrome. There is an appropriate means to capture issues from contracted	The reporting system is being used by all personnel. There is feedback to the reporter of any actions taken (or not taken), where	There is a healthy reporting system based on the pertinence of reports received. Safety reports are acted on in a timely manner.

	The process identifies how reports are actioned and timescales specified.	organisations and other organisations operating on the aerodrome. Data protection and confidentiality is ensured.	appropriate, and to the rest of the aerodrome. Reports are evaluated, processed, analysed, and stored. People are aware and fulfil their responsibilities in respect of the reporting system Reports are processed within the defined timescales.	Personnel express confidence and trust in the aerodrome's reporting policy and process. The reporting system is being used to influence management decisions and continuous improvement of the aerodrome performance.

2.1.2 Safety Investigation (Annex 19 Appendix 2 2.1.1, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	2.1.2	Safety investigations are carried out by appropriately trained personnel to identify root causes (why it happened, not just what happened).	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				

	Click here to enter text.

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance	What to look for
	- Review methods for carrying out investigations. - Sample recent investigations. - Safety investigations are carried out to identify root causes (why it happened, not just what happened). Check for evidence of root cause analysis and assess the quality of the analysis. - Evidence of rectification action. - Investigations of safety occurrences establish causal/contributing factors and identify human and organisational contributing factors. - Check the training of the staff carrying out the investigations. Investigators should be trained in human factors (HF) and investigation techniques.

Present	Suitable	Operating	Effective

	The methodology to define the criteria for safety investigations is documented.	The level of sign-off for safety investigations is defined and adequate to the level of risk.	The criteria for safety investigations are identified and applied. Safety investigations are carried out and recorded by appropriately trained personnel to identify root causes (why it happened, not just what happened).	The criteria for safety investigations are continuously updated to include internal and external sources as required. Safety investigations identify causal/contributing factors that are acted upon.

2.1.3 Identification of hazards (Annex 19 Appendix 2 2.1, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)	Indicator of compliance and performance		P	S	O	E
	2.1.3 (1)	There is a process that defines how hazards are identified from multiple sources through reactive and proactive methods (internal and external).	☐	☐	☐	☐
	How it is achieved (including relevant evidences)					
	Click here to enter text.					
	Comments					
	Click here to enter text.					

Indicator of compliance and performance	P	S	O	E

Evaluation (for aerodrome operator use)						
	2.1.3 (2)	There is a process in place to analyze safety data and safety information to look for trends and gain useable management information.	☐	☐	☐	☐
	How it is achieved (including relevant evidences)					
	Click here to enter text.					
	Comments					
	Click here to enter text.					

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance	What to look for
	- Review how hazards are identified, analysed, addressed, and recorded. - Consider hazards related to:

o Possible accident or serious incident scenarios

o Technical factors as well as human and organisational factors

o Business decisions and processes,

o Third party organisations.

- Review what internal and external sources of hazards are considered such as: safety reports, audits, safety surveys and/or studies, investigations, inspections, brainstorming, management of change activities, security, cybersecurity, sanitary crisis, environmental, commercial and other external influences, etc.
- Assess to which extent the process is not limited to the reactive part (i.e. occurrences) but also considers the proactive approach (as proposed above).
- Review structure and layout of hazard log.
- Is there a mechanism in place to document the hazard log in a way that enables its evolution over time? Is the hazard log periodically reviewed?
- There is a process in place to analyse safety data and safety information to look for trends and gain useable management information.
- Data is being analysed and results shared with the safety committee(s).
- Evidence of management decisions based on data analysis and reporting system outputs which determines any appropriate, corrective or preventive action required to improve aviation safety.

Present	Suitable	Operating	Effective
There is a process that defines how hazards are identified through reactive and proactive methods, using multiples sources. There is a process in place to analyse safety data and safety information to look for trends and gain useable management information.	Multiple sources of hazards (internal and external) are considered and reviewed, as appropriate. Hazards are documented in an easy-to-understand format. The data analysis process enables gaining useable safety information.	The hazards are identified and documented. Technical, human, and organisational factors related hazards are being considered. Data is being analysed and results shared with the safety committee(s)	There are processes and means that capture hazards (technical, environmental, human, and organisational factors related), which are maintained and reviewed to ensure they remain up to date. The aerodrome is continuously and proactively identifying hazards

				(technical, environmental, human, and organisational factors related) related to its activities and operational environment and involves all key personnel and relevant stakeholders. Hazards are assessed in a systematic and timely manner. management decisions are made based on the analysis of data and outputs from the reporting system which determines any appropriate, corrective or preventive action required to improve aviation safety.

For CAA use only

Summary Assessment on 2.1 'Hazard Identification'				
☐ Initiating	☐ Present and Suitable	☐ Operating	☐ Effectiveness Achieved	☐ Excellence
Remarks: Click here to enter text.				

2.2 Safety Risk Assessment and Mitigation (Annex 19 Appendix 2 2.2)

2.2.1 The analysis and assessment of safety risk (Annex 19 Appendix 2 2.2, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)	Indicator of compliance and performance		P	S	O	E
	2.2.1 (1)	There is a process for the management of risk that includes the analysis and assessment of risk associated with identified hazards expressed in terms of likelihood and severity (or alternative methodology).	☐	☐	☐	☐
	How it is achieved (including relevant evidences)					
	Click here to enter text.					
	Comments					
	Click here to enter text.					

Evaluation (for aerodrome operator	Indicator of compliance and performance		P	S	O	E
	2.2.1 (2)	There are criteria for evaluating the level of risk the aerodrome is willing to accept and risk assessments and ratings are appropriately justified.	☐	☐	☐	☐
	How it is achieved (including relevant evidences)					
	Click here to enter text.					

	Comments
	Click here to enter text.

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Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance	What to look for
	- Review risk classification scheme and procedures. - Check the methodology used to assess the risks; how this is documented, accurately defined, and used; check how the staff using that methodology is trained. - Check any assumptions made and whether they are reviewed. - Check that the process defines the level of risk that the aerodrome is willing to accept and who can accept what level of risk. - Severity and likelihood definitions and criteria are sufficiently defined (or that an alternative methodology is described) and adapted to the activities. Severity 'of what' ('possible worst scenario' and consequence) is also described. Differentiation between 'likelihood' and 'frequency' is understood. - Review whether risk assessments are carried out consistently and coherently across the aerodrome (e.g. consideration of various safety perspectives and views to make the relevant decision).

- Review how issues are classified when there is insufficient quantitative data available. When expert judgement is used, a collaborative risk assessment process is used (e.g. various expert judgement through cross-functional disciplines), taking into account different safety perspectives and views to make the relevant decision, to ensure the reproducibility of the assessment.
- Verify whether the risk assessments are updated when new data from the safety reporting system are available. Review what triggers a risk assessment and its review over time. Check that the risk register is being reviewed and monitored by the appropriate safety committee(s), where appropriate. Verify how experience, feedback and monitoring of recently published safety information serves that regular update.
- Review layout of risk register e.g. initial assessment, residual risk, mitigation actions, ownership, associated safety performance and follow-up.
- Sample identified hazards and how these are processed and documented.
- Check which safety committee(s) or person(s) oversee the 'acceptability'. Check the availability of instructions about implementation of 'As Low As Reasonably Practical' (ALARP). Check the right level of authority for decision-making.
- Evidence of risk reduction, evaluation of residual risk and risk acceptability, when appropriate, being applied in the data-driven decision-making.
- Evidence that risks, including those that are not generated by the aerodrome itself, are analysed and mitigated, without further transfer of risks.
- Check how trends and emerging issues are identified and managed.

Present	Suitable	Operating	Effective
There is a process for the analysis and assessment of safety risks. The level of risk the aerodrome is willing to accept is defined.	The risk assessment methodology, including 'severity' and 'likelihood' usable criteria are defined and fit the aerodrome's actual environment, including consideration to the expert judgement when data are not available. The risk matrix and acceptability criteria are clearly defined and usable.	Risk analysis and assessments are carried out in a consistent manner based on the defined process. The defined risk acceptability is being applied. Understanding of external inputs and outputs of safety risk management that should be addressed.	Risk analysis and assessments are reviewed for consistency and to identify improvements in the processes. Risk assessments are regularly reviewed to ensure they remain current. Risk acceptability criteria are used routinely, consistently applied in

		The used definitions are sufficiently explicit or detailed. For the acceptance of the risk's level, the right level of authority within the aerodrome (responsibilities) in cooperation with the stakeholders is clearly defined.		management decision making processes, and are regularly reviewed.

2.2.2 Applying risk controls (Annex 19 Appendix 2 2.2, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)	Indicator of compliance and performance		P	S	O	E
	2.2.2 (1)	The aerodrome has a process in place to make decisions and apply appropriate and effective risk controls.	☐	☐	☐	☐
	How it is achieved (including relevant evidences)					
	Click here to enter text.					
	Comments					
	Click here to enter text.					

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	2.2.2 (2)	Senior management have visibility of medium and high-risk hazards and their mitigation and controls.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for

- Risk controls are clearly identified. Evidence of risk controls being actioned and follow up.
- Evidence of mitigation including ownership and timeline.
- Mitigations are implemented in an appropriate time scale.
- Aggregate risk is being considered.
- Check whether the risk controls have reduced the residual risk.
- Check that new risk controls do not create additional risks.
- Check how the policy considers ALARP – verify the implementation of it.
- Check whether the acceptability of the risks is made at the right management level.
- Operational managers and senior management have visibility of medium and high risk as well as their mitigation and controls.
- Review the use of risk controls that rely solely on human intervention.
- Risk controls consider human performance and organisational factors.

Present	Suitable	Operating	Effective
The aerodrome has a process in place to decide and apply the risk controls.	Responsibilities and timelines for determining and accepting the risk controls are defined. Appropriate risk mitigation strategies and perspectives are considered.	Appropriate risk controls are being applied to reduce the risk to an acceptable level including timelines and allocation of responsibilities agreed with the stakeholders.	Risk controls are practical and sustainable, applied in a timely manner and do not create additional risks. Risk Controls take Human Performance into consideration.

			The aerodrome follows the process in place to make decisions and apply appropriate and effective risk controls. Operational, technical, human and organisational factors are considered as part of the development of risks controls. Senior management is actively involved in medium and high risks and their mitigation and controls.	

For CAA use only

Summary Assessment on 2.2 'Safety Risk Assessment and Mitigation'				
☐ Initiating	☐ Present and Suitable	☐ Operating	☐ Effectiveness Achieved	☐ Excellence
Remarks: Click here to enter text.				

3 Safety Assurance (Annex 19 Appendix 2 3.)

3.1 Safety performance monitoring and measurement (Annex 19 Appendix 2 3.1)

3.1.1 The means to verify the safety performance and to validate the effectiveness of safety risk controls (Annex 19 Appendix 2 3.1.1 and Doc 9774 Chapter 3 3D.5, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	3.1.1	There is a process in place to measure the safety performance of the aerodrome and to measure the effectiveness of safety risk controls. Note: An internal audit process is one means to monitor compliance with safety regulations, the foundation upon which SMS is built, and assess the effectiveness of these safety risk controls and the SMS	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance	What to look for
	- Check if there is a mechanism in place to ensure that the aerodrome utilises all relevant data feeding sources, to get a true picture of their risks, evaluate its safety performance; and, in time take appropriate actions and check their effectiveness. - Evidence of responsibilities, methods, and timelines to assess whether the risk controls are applied and effective. - Evidence of risk controls being assessed and monitored for effectiveness (e.g. audits, surveys, reviews, qualitative and/or quantitative means to measure and monitor safety performance such as SPIs, SPTs, alert levels, wherever appropriate, reporting systems). - Evidence that the aerodrome's risk assessment processes, including residual risks, are evaluated regularly. - Safety assurance takes into account activities carried out at the interfaces internally and externally: evidence of risk controls applied by other departments, contracted organisation, or other aerodrome users being assessed and overseen (e.g. quality check, reviews, and regular meetings). - Information from safety assurance activities feeds back into the safety risk management process. - Review where risk controls have been changed as a result of the assessment.

	Present	Suitable	Operating	Effective
	There is a documented process to assess whether the appropriate risk controls are applied and effective. The aerodrome has a documented internal audit programme with a link to a management review process. A person or group of persons with responsibilities for the monitoring function have been identified and they have direct access to the accountable executive.	Responsibilities, methods, and timelines for assessing risk controls are appropriately defined. The internal audit programme covers all applicable regulations and includes details of the schedule of audits. Independence of the internal audit function is achieved. The contribution of contracted organisations should be considered in the safety performance process, considering the potential effect it may have on the safety performance of the aerodrome. Safety assurance takes into account activities carried out at the interfaces internally and externally.	Appropriate risk controls are being verified to assess whether they are applied and effective. The internal audit programme is being followed and regularly reviewed. Internal and external audit results are reported to the accountable executive and senior management. Follow-up of the corrective/preventive actions plan is evidenced and reviewed by the relevant SMS governance body. The status of corrective/preventive actions is regularly communicated to relevant senior management and staff. The interface between internal audits and the safety risk management processes is described and operating.	Appropriate risk controls are assessed, and actions taken to ensure they are effective and delivering a safe service. The reasons for ineffectiveness of risk controls are investigated. The accountable executive and senior management actively seek feedback on the status of internal and external audit activities. Aerodrome personnel are proactively identifying and reporting potential non-compliance. The effectiveness of the SMS processes are reviewed on a regular basis.

3.1.2 Safety Performance Indicators (Annex 19 Appendix 2 3.1.2, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	3.1.2	Safety performance indicators (SPIs) linked to the aerodrome's safety objectives have been defined, promulgated, and are being monitored and analyzed for trends.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for			
– Evidence that SPIs are based on reliable sources of data. - Evidence of when SPIs were last reviewed. – The defined SPIs and targets are appropriate to the aerodrome's activities, risks, and safety objectives. – SPIs are focused on what is important rather than what is easy to measure. – Consideration of any State safety objectives from the SSP/NASP. – Review whether any action has been taken when an SPI is indicating a negative trend (reflecting a risk control or an inappropriate SPI). – Evidence that results of safety performance monitoring are discussed at the senior management level. – Evidence of feedback provided to the accountable executive.			
Present	**Suitable**	**Operating**	**Effective**
There is a process in place to measure the safety performance of the aerodrome including SPIs and targets linked to the aerodrome's safety objectives and to measure the effectiveness of safety risk controls.	SPIs are focused on what is important rather than what is easy to measure. Reliability of data sources is considered in the design of SPIs. SPIs are linked to the identified risks and safety objectives. Frequency and responsibility for the trend monitoring of SPIs are appropriate. Realistic targets have been set, wherever appropriate.	The safety performance of the aerodrome is being measured through meaningful SPIs, which are being continuously monitored and analyzed for trends, wherever appropriate. The result of the trend monitoring of SPIs supports actionable decisions.	SPIs are demonstrating the safety performance of the aerodrome and the effectiveness of risk controls based on reliable data. SPIs are reviewed and regularly updated to ensure they remain relevant. Where the SPIs indicate that a risk control is ineffective, appropriate action is taken.

		State safety objectives from the SSP/NASP are taken into consideration, as applicable.		

For CAA use only

Summary Assessment on 3.1 'Safety performance monitoring and measurement'				
☐ Initiating	☐ Present and Suitable	☐ Operating	☐ Effectiveness Achieved	☐ Excellence
Remarks: Click here to enter text.				

3.2 **The management of change** (Annex 19 Appendix 2 3.2 and Doc 9981 PANS – Aerodromes 2.4.4)

3.2.1 Identification and management of change (Annex 19 Appendix 2 3.2 and Doc 9981 PANS – Aerodromes 2.4.4, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	3.2.1	The aerodrome has a procedure to identify whether changes have an impact on safety of the aerodrome operations and to manage any identified risks in accordance with existing safety risk management processes.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for

- Key stakeholders are involved in the process. This may include individuals from other departments of the aerodrome and/or external organisations.
- Review what triggers the 'management of changes' process. Consider organisational, financial, commercial factors etc. as well as any other change that may affect safety (e.g. security, cybersecurity, environment, sanitary crisis, sickness, or staff retirement & transfer of knowledge).
- Review recent changes that have been through the risk assessment process.
- Check that change is signed off by an appropriately authorised person.
- Transitional risks are being identified and managed.
- Review follow up actions such as whether any assumptions made have been validated.
- Review whether there is an impact on previous risk assessments and existing hazards.
- Review whether consideration is given to the cumulative effect of multiple changes.
- Review that business-related changes have considered safety risks (organisational restructuring, upsizing, or downsizing, IT projects, etc.).
- Evidence of Human Performance (HP) issues being addressed during changes.
- Assess whether the risk mitigation actions resulting from these changes are evident and consistent with positive performance monitoring trends.
- Review impact of change on training and competencies.
- Review previous changes to confirm they remain under control.
- Consider how the reasons for these changes are communicated and how the changes are planned and communicated to those people affected by the change externally and internally. Consider how stakeholders (other departments, contractors, organisations, and Authorities) affected by the changes are involved in the process.

Present	Suitable	Operating	Effective
The aerodrome has established a change management process to identify whether changes have an	Triggers for the change management process and types of changes that	The aerodrome is using a defined change management process to identify whether substantive changes	The management of change process considers the accumulation or impact of multiple changes, and the change

	impact on safety of the aerodrome operations and to manage significant, identified risks in accordance with existing safety risk management processes. Methods, responsibilities, and timelines are defined in the process.	have to be assessed through the safety risk management process are defined. The process also considers business related changes and interfaces with other organisations/departments, having an impact on safety.	have an impact on safety of the aerodrome. Any identified risks are managed in accordance with existing safety risk management processes and are monitored through safety assurance. Internal and external factors such as Technical, Environmental, Human and Organisational related hazards are being considered, as appropriate.	and impact to safety-related functions are communicated with other organisations, including internal and external stakeholders. There is a means to share information with respect to management of change impact with external stakeholders. Safety risks are being managed consistent with the scope and time scale associated with the change. Risk mitigation actions resulting from management of change are part of the safety performance monitoring.

For CAA use only

Summary Assessment on 3.2 'The management of change'				
☐ Initiating	☐ Present and Suitable	☐ Operating	☐ Effectiveness Achieved	☐ Excellence
Remarks: Click here to enter text.				

3.3 **Continuous improvement of the SMS** (Annex 19 Appendix 2 3.3)

3.3.1 Continuous improvement of the SMS (Annex 19 Appendix 2 3.3, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	3.3.1	The aerodrome is continuously monitoring and assessing its SMS processes to maintain or continuously improve the overall effectiveness of the SMS.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for			
– Review the information and safety data used for management decision making and continuous improvement. – Evidence of: o Lessons learnt being incorporated into SMS and operational processes; o Best practices being sought and embraced; o Surveys and assessments of organisational culture being carried out and acted upon; o Data being analyzed and results shared with Safety Committees; and o Follow-up actions. – Information from external occurrences, investigation reports, safety meetings, hazard reports, audits, and safety data analysis all contribute towards continuous improvement of the SMS.			
Present	**Suitable**	**Operating**	**Effective**
There is a documented process in place to monitor and review the effectiveness of the SMS using the available data and information.	The SMS is periodically reviewed, and the review is supported by safety information and safety assurance activities. Senior management and different departments are involved. The decision-making is data informed. External information is considered in addition to internal information.	There is evidence of the SMS being periodically reviewed to support the assessment of its effectiveness and appropriate action being taken. The SMS is being periodically reviewed by the senior management team to support the assessment of its effectiveness and that appropriate actions are being taken.	The assessment of SMS effectiveness uses multiple sources of information including the safety data analysis that supports decisions for continuous improvements. The measurement of the aerodrome's safety performance addresses the continuous improvement of the SMS in a proactive manner, as well as the

			The aerodrome is using SMS and safety data to develop and assess effectiveness of the SPIs to enhance safety and continuous improvement of SMS processes.	safety objectives, which are regularly updated.

For CAA use only

Summary Assessment on 3.3 'Continuous improvement of the SMS'				
☐ Initiating	☐ Present and Suitable	☐ Operating	☐ Effectiveness Achieved	☐ Excellence
Remarks: Click here to enter text.				

4 Safety Promotion (Annex 19 Appendix 2 4.)

4.1 Training and education (Annex 19 Appendix 2 4.1)

4.1.1 Safety training programme (Annex 19 Appendix 2 4.1.1, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	4.1.1	There is a training programme for SMS in place that includes initial and recurrent training. The training covers individual safety duties (including roles, responsibilities, and accountabilities) and how the aerodrome's SMS operates.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for

– Review the SMS training programme including course content and delivery method.

- Check that the training covers individual safety duties (including roles, responsibilities, and accountabilities) and how the aerodrome's SMS operates.

– Ask staff when they last received SMS training and what they remember from it.

– Check training records against the training programme.

– Training considers feedback from external occurrences, investigation reports, safety meetings, hazard reports, audits, safety data analysis, training, course evaluations, etc.

– Review how training is assessed for new staff and changes in position.

- Check whether there is a process in place to measure the effectiveness of training and to take appropriate action to improve subsequent training. How the effectiveness of the training is rated?

– Review any training evaluation.

– Check that the training includes human and organisational factors.

– Ask staff about their own understanding of their role in the aerodrome's SMS and their safety duties.

– Check that all staff are briefed on compliance.

Present	Suitable	Operating	Effective
There is a training programme for SMS in place that includes initial and recurrent training. There is a process in place to measure the effectiveness of training and to take	The training covers individual safety duties (including roles, responsibilities, and accountabilities) and how the aerodrome's SMS operates.	The SMS training programme is delivering appropriate training to the different staff in the aerodrome and is being delivered by competent personnel.	SMS training is evaluated for all aspects (learning objectives, content, teaching methods and styles, tests) and is linked to the competency assessment.

	appropriate action to improve subsequent training.	Training material and methodology are adapted to the audience and include human performance when relevant. All staff requiring training are identified.	There is evidence of measuring the effectiveness of training and taking appropriate action to improve subsequent training.	Training is routinely reviewed to take into consideration feedback from different sources.

4.1.2 Competence (Annex 19 Appendix 2 4.1.1, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)	Indicator of compliance and performance		P	S	O	E
	4.1.2 (1)	There is a process that individually evaluates the competence of all aerodrome operations personnel related to their SMS responsibilities and takes appropriate remedial action when necessary.	☐	☐	☐	☐
	How it is achieved (including relevant evidences)					
	Click here to enter text.					
	Comments					
	Click here to enter text.					

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	4.1.2 (2)	The competence of SMS instructors/trainers is defined and assessed and appropriate remedial action taken when necessary.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for			
- Review how is competence assessment carried out on initial recruitment and recurrently. - Is there a process that evaluates the individual's SMS competence and takes appropriate remedial action when necessary? Does it consider 'human performance'? - Check whether the competence assessment includes competence assessment safety duties and responsibilities, as well as compliance management. - Is the competence of trainers defined and assessed? - Are appropriate remedial actions taken when necessary?			
Present	**Suitable**	**Operating**	**Effective**
A competency framework is defined for the staff having an impact on safety, including trainers.	There is a process in place to periodically assess the actual safety competency of personnel against the framework.	There is evidence of the competency assessment process being used and being recorded.	The competence assessment programme and process are routinely reviewed and improved. The competence assessment takes appropriate remedial action when necessary and feeds into the training programme.

For CAA use only

Summary Assessment on 4.1 'Training and education'				
☐ Initiating	☐ Present and Suitable	☐ Operating	☐ Effectiveness Achieved	☐ Excellence
Remarks: Click here to enter text.				

4.2 **Safety communication** (Annex 19 Appendix 2 4.2)

4.2.1 Safety Communication (Annex 19 Appendix 2 4.2, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	4.2.1	There is a process to determine what safety critical information needs to be communicated and how it is communicated throughout the aerodrome to all personnel, as relevant. This includes contracted organisations and personnel where appropriate.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for

- Review the sources of information used for safety communication.
- Review the methods used to communicate safety information e.g., meetings, presentations, briefings, videos, emails, websites, newsletters, leaflets, bulletins, posters etc.
- Assess whether the means of communication is appropriate, based on the aerodrome's structure and the audience. The communication should be simple and concise so that it is easily understood.
- Is the means for safety communication being reviewed for effectiveness and material used to update relevant training?
- Check that lessons learned, significant events, changes and investigation outcomes are being communicated.
- Check that a positive safety culture is regularly promoted, enhancing 'reporting culture' (where, how, when etc.) and the principles of 'just culture'.
- Check accessibility to safety information.
- Ask staff about any recent safety communication.
- Review whether information from occurrences is timely communicated to key stakeholders (internal and external) and whether it has been appropriately dis-identified.
- Does the aerodrome extend safety communication, as appropriate, to external key stakeholders?
- Check whether the staff know where to find the safety objectives and associated safety performance monitoring? Check whether the staff know the safety objectives in their domain of competence? Does the aerodrome communicate the status of safety objectives' achievement or monitoring?

Present	Suitable	Operating	Effective
There is a process to communicate safety critical information.	The process determined what, when, and how safety information needs to be communicated. The process includes contracted organisations and personnel, where appropriate.	Safety critical information is being identified and communicated throughout the aerodrome to all personnel, as relevant, including contracted organisations and personnel where appropriate.	The aerodrome analyses and communicates safety critical information effectively through a variety of blended methods, as appropriate, to maximise it being understood.

		The means of communication are adapted to: • The size and complexity of the aerodrome; • the audience and the significance of what is being communicated.		Safety communication is assessed to determine how it is being used and understood, and to improve it where appropriate. The promotion of the safety policy and its positive safety culture is visible. Decision making, actions, and communication reflect a positive safety culture and safety leadership demonstrating commitment to the safety policy.

For CAA use only

Summary Assessment on 4.2 'Safety communication'				
☐ Initiating	☐ Present and Suitable	☐ Operating	☐ Effectiveness Achieved	☐ Excellence
Remarks: Click here to enter text.				

5 **Interface Management** (Annex 19 Appendix 2 Note 2, Doc 9774 Chapter 3 3D.4.2 and Doc 9981 Pans – Aerodromes 2.4.2)

5.1 Interface Management (Annex 19 Appendix 2 Note 2, Doc 9774 Chapter 3 3D.4.2 and Doc 9981 Pans – Aerodromes 2.4.2)

5.1.1 Identification and Management of Internal and External Interfaces (Annex 19 Appendix 2 Note 2, Doc 9774 Chapter 3 3D.4.2 and Doc 9981 Pans – Aerodromes 2.4.2, *[Add national regulation(s)]*)

Evaluation (for aerodrome operator use)		Indicator of compliance and performance	P	S	O	E
	5.1	The aerodrome has identified and documented the relevant internal interfaces (within other departments) and external interfaces (contracted organisations and all users of the aerodrome, including fixed-base operators, ground handling agencies and other organisations that perform activities independently at the aerodrome in relation to flight or aircraft handling) and the critical nature of such interfaces.	☐	☐	☐	☐
		How it is achieved (including relevant evidences)				
		Click here to enter text.				
		Comments				
		Click here to enter text.				

For CAA use only

Verification of the evaluation result		Remarks
Present (P)	☐	Click here to enter text.
Suitable (S)	☐	
Operating (O)	☐	
Effective (E)	☐	

Guidance

What to look for

- Review how interfaces internally (with other departments) and externally (e.g. contracted organisations and all users of the aerodrome, including fixed-base operators, ground handling agencies and other organisations that perform activities independently at the aerodrome in relation to flight or aircraft handling) have been identified and documented. Review the system description of the interfaces, should it be documented in the SMS manual or any other equivalent document.
- Evidence that:
  - Safety critical issues, areas and associated hazards are identified;
  - Safety occurrences are being reported and addressed;
  - Risk controls actions are applied and regularly reviewed;
  - Interfaces are reviewed periodically.
- The aerodrome's SMS covers hazard identification for the external services, activities and internal interfaces.
- Training and safety promotion sessions are organised with relevant external organisations.
- External organisations participate in SMS activities and share safety information.
- Review how positive safety culture is promoted at the interfaces.
- The aerodrome's occurrences reporting system needs to extend to the external organisations, wherever appropriate.
- Management of changes impacting safety are appropriately addressed through the contracts.

	Present	Suitable	Operating	Effective
	The aerodrome has identified and documented the relevant internal and external interfaces and the critical nature of such interfaces.	The way the interfaces are managed is appropriate to the criticality in terms of safety. The means for communicating safety information is defined. The contracts adequately addressed the safety critical nature of the interfaces and the need to appropriately feed the Hazard Identification and Risk Assessment (HIRA), including the risk mitigations.	The aerodrome is managing the interfaces through hazard identification and risk management. There is assurance activity to assess risk mitigations being delivered by external organisations.	The aerodrome has a good understanding of interface management and there is evidence that the safety critical nature of the interface risks is being identified and acted upon. Interfacing organisations are sharing safety information, management of changes and take actions when needed. Evidence shows that a positive safety culture is promoted with interfacing organisations.

For CAA use only

Summary Assessment on 5.1 'Interface Management'				
☐ Initiating	☐ Present and Suitable	☐ Operating	☐ Effectiveness Achieved	☐ Excellence
Remarks: Click here to enter text.				

References

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Appendix

Suggested list of evidences

The following list is to help aerodrome operators in preparation for an Aerodrome SMS evaluation and the types of evidence CAA inspectors will be expecting to see. *Note: While the following list provides examples, it is not exhaustive, and there could be more to be considered.*

Area	Evidences
Management commitment	- Safety policy - Just Culture Policy and supporting processes
Safety accountabilities, responsibilities and authorities	- Safety accountabilities and responsibilities in job descriptions - Organisational chart with safety accountabilities
Appointment of key safety personnel	- Training records for safety manager, safety officer (if any) and management team - Safety committee meeting composition and the terms of reference - Safety committee meeting minutes
Aerodrome emergency planning	- Aerodrome emergency plan and evidence of aerodrome emergency exercise
SMS Documentation	- Access to the SMS Manual - SMS Operational records (such as hazard register, submitted safety reports, etc.) - Document control system
Hazard Identification (inculding Safety reporting system)	- Hazard log or risk register - Safety reporting system (including feedback to reporters)

	- Safety data and information analysis - Evidence of safety investigations - Evidence of investigator training
Risk Assessment and Mitigation	- Safety risk management reports
Safety Performance Monitoring and Measurement	- Safety objectives - Safety Performance Indicators (SPI) - Audit programme and reports - Auditing of contracted organisation - Audit closure tracking and monitoring reports
Management of Change;	- Examples of safety risk management reports or safety cases
Continuous Improvement of SMS	- Safety committee meeting minutes - Safety performance reports
Training & Education	- SMS training programme - SMS training material - SMS training records - Competence assessment records
Safety Communication	- Recent safety communications - Latest safety briefings, newsletters or bulletins.

SMS Interfaces	- Examples of internal and external interfaces

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FRAMEWORK FOR MONITORING THE ESTABLISHMENT AND IMPLEMENTATION OF RUNWAY SAFEY TEAM (RST) AT AERODROMES IN APAC STATES

State / Administration:

No.	Questions	Option
1	Has the airport established the Runway Safety Team (RST)?	• Yes • No
2	If the answer to Question 1 is "Yes", then when was the RST established?	• Specify year
3	If the answer to Question 1 is "No", is runway safety formally included in the agenda of another aerodrome forum?	• Yes, please specify • No
4	Has the airport established the Terms of Reference (TOR) of the RST?	• Yes • No
5	If the answer to Question 4 is "Yes", is the TOR in line with the recommended TOR in the State Runway Safety Programme or as per TOR provided in the ICAO Runway Safety Team Handbook?	• Yes • No
6	Has the RST developed the Runway Safety Team Handbook?	• Yes • No
7	What is the frequency of RST Meetings?	• 1 time/year • 2 times/year • 3 times/year • 4 times/year • Others, please specify
8	Does the CAA also participate in the RST?	• Yes • No • Upon request
9	Does the RST prepare and maintain the record of discussion of the RST Meetings?	• Yes • No
10	Has the RST prepared the Register/Log of the RST Action Plan with the responsible entity for taking action within the defined timeline?	• Yes • No
11	Does the RST review and update the implementation of the RST Action Plan in the meeting?	• Yes • No
12	Does the aerodrome operator provide training on Runway Safety and other relevant Runway Safety matters to RST members?	• Yes • No

FRAMEWORK FOR MONITORING THE ESTABLISHMENT AND IMPLEMENTATION
OF RUNWAY SAFEY TEAM (RST) AT AERODROMES IN APAC STATES
State / Administration:

No.	Questions	Airport name
1	Has the airport established the Runway Safety Team (RST)?	
2	If the answer to Question 1 is "Yes", then when was the RST established?	Specify year
3	If the answer to Question 1 is "No", is runway safety formally included in the agenda of another aerodrome forum?	
4	Has the airport established the Terms of Reference (TOR) of the RST?	
5	If the answer to Question 4 is "Yes", is the TOR in line with the recommended TOR in the State Runway Safety Programme or as per TOR provided in the ICAO Runway Safety Team Handbook?	
6	Has the RST developed the Runway Safety Team Handbook?	
7	What is the frequency of RST Meetings?	
8	Does the CAA also participate in the RST?	
9	Does the RST prepare and maintain the record of discussion of the RST Meetings?	
10	Has the RST prepared the Register/Log of the RST Action Plan with the responsible entity for taking action within the defined timeline?	
11	Does the RST review and update the implementation of the RST Action Plan in the meeting?	
12	Does the aerodrome operator provide training on Runway Safety and other relevant Runway Safety matters to RST members?	

ASIA PACIFIC GENERIC GUIDANCE MATERIALS AND CUSTODIANS

Procedure for periodic review and update of the Asia/Pacific Generic Guidance Materials
in the area of Aerodromes and Ground Aids
[Second Edition, September 2024 approved by AOP/SG/8]

1. INTRODUCTION

1.1 In accordance with the TORs and task lists of the various Working Groups and Task Forces of AOP/SG, a number of Generic Guidance Materials (GGMs) were developed by these Working Groups/Task Forces and approved by AOP/SG and APANPIRG. All Generic Guidance Materials are published on ICAO APAC Website at eDocuments Webpage under AGA heading for use/reference by States/Administrations and can be accessed using URL: https://www.icao.int/APAC/Pages/eDocs.aspx.

1.2 The list of Asia/Pacific GGMs developed by various Working Groups and Task Forces and approved by AOP/SG and APANPIRG including the details of the Custodians is provided in **Attachments A to D**.

2. PROCEDURE

2.1 The Working Groups/Task Forces identify a custodian of the individual Asia/Pacific GGM from State(s)/ International Organization(s)/Industries with the responsibility to review and update the respective Asia/Pacific GGM(s) in coordination with ICAO APAC Office whenever it becomes necessary.

2.2 For periodic review and update of the Asia/Pacific GGMs in the area of AGA in future, the following process should be followed by the Custodians and the Secretariat:

a) The Secretariat would inform to the respective custodian(s) of the Asia/Pacific GGM(s) once ICAO approved amendments to ICAO SARPs and PANS-Aerodromes (Doc 9981), revisions to Airport Services Manuals and other relevant ICAO documents that may necessitate the review and update of the GGM(s);

b) The Secretariat/Custodian(s) exchange information about newly developed States/Industries good practices relevant to Asia/Pacific GGM(s) as soon as they become aware of their availability;

c) The custodian of the respective GGM coordinates with the relevant subject matter experts of the respective Working Group/Task Force and the Secretariat to initiate the review of the GGM;

d) Once the review and revision of the GGM is completed the custodian would present the revised GGM through the Working Paper at the respective WG/TF meeting for its endorsement with a draft conclusion for adoption by the AOP/SG; and

e) After the adoption of the draft conclusion by the AOP/SG the revised GGM(s) should be uploaded by the Secretariat on the ICAO APAC Website on eDocuments Webpage under AGA heading.

Attachment A

List of GGMs developed by AP-AA/WG and approved by AOP/SG with details of the custodians

S. No	APAC Generic Guidance Materials	Edition/Version, Date	States involved in the Development of Generic Guidance Materials	Custodian (Responsible party for future review and updates)
1	Asia Pacific Regional Guidance on AIP – AD 1.5 Status of Certification of Aerodromes	Version 1.0, Dec 2020	Secretariat	**Secretariat** apac@icao.int pshakya@icao.int
2	Generic Aerodrome Certification Procedure	Version 1.0, Dec 2020	Thailand (lead) and Philippines	**Thailand** - Mr. Teeravee Yongwattanajiaranon (Ling) teeravee.y@caat.or.th
3	Generic Procedures for Accepting Non-compliance in Aerodromes	Version 1.0, Dec 2020	Nepal (lead) and Malaysia	**Nepal** - Mr. Babu Ram Paudel paudelbabu@gmail.com
4	Generic Training Programme and Training Plan for Aerodrome Inspectors	Version 1.0, 2 July 2021	India	**India** - Mr. Amit Srivastava amits.dgca@nic.in
5	Generic Aerodrome Inspector Handbook	Version 2.0, 2023	Thailand (lead) and Bangladesh	**Thailand** - Mr. Teeravee Yongwattanajiaranon (Ling) teeravee.y@caat.or.th
6	Generic Aerodrome Manual	Version 1.0, 2 July 2021	India	**India** - Mr. Sudhir Singh sudhir_singh@hotmail.com and Mr. Amit Srivastava amits.dgca@nic.in
7	Generic Aerodrome Certification Specific Operating Regulations	Version 1.0, 2 July 2021	Malaysia (lead), India and Nepal	**Malaysia** - Mr. Mahyuddin Bin Sajuri mahyuddin@caam.gov.my
8	Generic Organization Structure of the Aerodrome Regulatory Unit	Version 1.0, 2 July 2021	Malaysia (lead), India and Nepal	**Malaysia** - Mr. Mahyuddin Bin Sajuri mahyuddin@caam.gov.my
9	Generic Surveillance Programme by Aerodrome Operators	Version 1.0, 2 July 2021	Malaysia (lead), India and Nepal	**Malaysia** - Mr. Mahyuddin Bin Sajuri mahyuddin@caam.gov.my
10	Generic Surveillance Programme for Certified Aerodromes	Version 1.0, August 2022	Malaysia (lead), India and Nepal	**Malaysia** - Mr. Mahyuddin Bin Sajuri mahyuddin@caam.gov.my

11	ICAO Asia-Pacific Aerodrome Assistance Go-Team Methodology	March 2024	ACI	**ACI** - Mr. SL Wong sl@aci-asiapac.aero ICAO Secretariat apac@icao.int
12	Asia-Pacific Generic Aerodrome Enforcement Policy and Procedures Manual	October 2023	Malaysia (Lead) and India	**Malaysia** - Mr. Mahyuddin Bin Sajuri mahyuddin@caam.gov.my
13	Asia-Pacific Generic Aerodrome Exemptions Policy and Procedures Manual	October 2023	Australia (Lead) and India	**Australia [TBC]**
14	Asia-Pacific Generic Aerodrome SMS Evaluation Tool and Guidance	First Edition, September 2024	Thailand (Lead), Australia, and Maldives.	**Thailand** - Angsana Panmongkon angsana.r@caat.or.th

Attachment B

List of GGMs developed by AP-WHM/WG and approved by AOP/SG with details of the custodians

S. No	APAC Generic Guidance Materials	Edition/Version, Date	States involved in the Development of Generic Guidance Materials	Custodian (Responsible party for coordination for future review and updates)
1	Composition of National Wildlife Hazard Management Committee	Sep. 2019	Nepal, Bhutan, Lao PDR	**Nepal** Mr. Deo Chandra Lal Karna, d_karna@hotmail.com
2	Terms of References of National Wildlife Hazard Management Committee	Sep. 2019	Nepal, Bhutan, Lao PDR	**Nepal** Mr. Deo Chandra Lal Karna, d_karna@hotmail.com
3	Asia Pacific Guidance for Evaluation of Aerodrome Wildlife Hazard Management Programme	First Edition, 2 July 2021	WBA, Australia, Bangladesh, India, Thailand and ACI	**WBA** Ms. Lalita Vaswani lalita@worldbirdstrike.com
4	Asia Pacific Guidance for Establishment of National Procedure for Recording and Reporting Wildlife Strikes to Aircraft	First Edition, 2 July 2021	Philippines, Sri Lanka, Nepal, WBA, IFALPA	**WBA** Ms. Lalita Vaswani lalita@worldbirdstrike.com
5	Asia Pacific Guidance on Development and Implementation of Airport Wildlife Hazard Management Programme	First Edition, August 2022	Australia, Fiji, India, WBA, AAPA	**WBA** Ms. Lalita Vaswani lalita@worldbirdstrike.com
6	ICAO Asia Pacific Wildlife Hazard Management Go-Team Methodology	Second Edition, …. 2024	Australia, India, Thailand, ACI and WBA	**Australia** Ashley McAlpine Ashley.Mcalpine@casa.gov.au

Attachment C

List of GGMs developed by AOPC/SWG and approved by AOP/SG

S. No	APAC Generic Guidance Materials	Edition/Version, Date	States involved in the Development of Generic Guidance Materials	Custodian (Responsible party for coordination for future review and updates)
1	Asia/Pacific Regional Guidance on Aerodrome Operations Personnel Competency Requirement Framework	Version 1.0 – December 2020	Bangladesh, Cambodia, China, Macao, China (Lead), Maldives, Myanmar Singapore, ACI	Mr. Pedro Cavem (Yangon International Aerodrome, Myanmar) Email: Pedro.Cavem@yangon.aero

Attachment D

List of GGMs developed by WA/SWG and approved by APANPIRG

S. No	APAC Generic Guidance Materials	Edition/Version, Date	States involved in the Development of Generic Guidance Materials	Custodian (Responsible party for coordination for future review and updates)
1	Sample APAC Regulations for Water Aerodromes	First Edition (unedited version) — March 2015	Indonesia, Maldives (Lead), Sri Lanka, New Zealand and USA	CAA Maldives Ms. Fathimath Ramiza Email: ramiza@caa.gov.mv
2	Asia Pacific Regional Guidance on Requirements for the Design and Operations of Water Aerodromes for Seaplane Operations	First Edition — January 2019	Indonesia, Maldives (Lead), Sri Lanka, New Zealand and USA	CAA Maldives Ms. Fathimath Ramiza Email: ramiza@caa.gov.mv

—END—

ICAO APAC WHM Go Team Assistance Mission Programme Document

1. Purpose

This document offers a structured program for a five-day mission of an ICAO Wildlife Hazard Management (WHM) Go Team. The program content may be customised to align with the specific needs and environment of the Host State.

2. Preparations Before the Mission

The leader of the Go Team mission should send an ICAO APAC questionnaire on WHM to the Host State at least 6 weeks before the mission. The Host State is expected to complete the questionnaire at least two weeks before the mission, enabling a better understanding of their WHM requirements and challenges. The Host State is also expected to identify and invite well in advance relevant stakeholders in their State to participate in the Go Team activities.

Members of the Go Team mission should send necessary documents to the Host State for security clearance and preparation of airside permits. The onus of obtaining the necessary permits and clearances for airside access shall be the sole responsibility of the State in coordination with the airport well in advance taking into consideration the duration of the Go Team program, as the State specific security regulations may vary and the application process take time.

3. Mission Program

The Go Team may follow or adapt the mission program detailed below to suit the needs of the Host State. The program should be communicated at least two weeks in advance to the Host State for effective coordination and planning with relevant stakeholders.

Day	Activities	Action By or Participants
Day 1	Initial meeting and introductions	Host State and Go team
	Explain mission by Go Team, including objective of mission, ICAO requirements and guidance on WHM e.g. Annex 14, doc 9137 Part 3, and industry guidance (WBA, ACI guidance)	Go Team
	Explain the framework of State Safety Programme (SSP) to establish a national plan and procedures related to wildlife hazard management, not only at the aerodrome but also in its vicinity.	Host State
	Present an overview of WHM in State, including regulations, SSP, national plan, procedures, established committees, and wildlife strikes data.	Host State
	Identify and review key WHM concerns and adjust mission program as needed based on the questionnaire completed by Host State before the mission and the discussions in the morning of Day 1.	Host State and Go Team

Day	Activities	Action By or Participants
Day 2	Morning session - discussion on key concerns and actions taken so far. Considering location, resourcing, and any environmental factors, discuss potential practical mitigation options available. Afternoon session - Fieldwork to assess current WHM practices such as: • Habitat management; • Risk assessment and mitigation; • Identification of species, wildlife survey and monitoring, and strike data; and • Wildlife hazard control measures.	Host State and Go Team
Day 3	Based on discussions and evidence gathered on previous days and in consultation with the Go Team, Host State to propose an outline action plan and to prepare roadmap to progress and complete action plan. Reference documents for preparation of action plan and roadmap: • State WHM Program and documents, e.g. audit procedure • Airport WHM Plan (agree on an alternative if Airports do not have a WHMP, e.g. any relevant documents available providing essential elements of a WHM Plan) • State regulations and procedures related to WHM	Go Team accompanied by the relevant stakeholders of the Host State

Day 4	In the morning, continuation of discussion on recommendations and action plan.
	
	In the afternoon draft initial report consisting of:
	
	• *Key observations*:
	  • Summary of Key WHM Concerns: Go-Team members should compile a concise summary of the most critical WHM concerns identified during the mission (Day 1-4). These should be the issues that have the highest potential impact on aviation safety.
	
	• *Observations*:
	  • Achievements and opportunities for improvements in the Host State's existing WHM program covering aspects such as
		Host State and Go Team
		
		Go Team

Day	Activities	Action By or Participants
	documentation, training, monitoring, reporting, and coordination. • Detailed WHM Findings: Provide details of the WHM situation in the host state based on the mission's observations. • Implementation of ICAO SARPs recommended practices of international associations guidance related to WHM. Identify and document any areas where there may be deviations or room for improvement. • *Recommendations*: • Mitigation Measures and enhancements to existing practices: Offer specific recommendations for addressing the identified and emerging WHM concerns. These recommendations should be actionable and tailored to the context of the Host State. These may include suggestions to improve existing regulatory framework, protocols, equipment, or training programs. • Discussions of potential improvements in implementation of ICAO SARPs. • *Roadmap* • Timelines: Develop a timeline for implementing the recommended actions. Specify short-term and long-term goals, indicating when each action should be completed. • Action Items: List the specific tasks or actions required to achieve each recommendation. These action items should be detailed, outlining the steps needed to carry out the recommendations effectively.	
Day 5	Presentation of initial report with preliminary observations and recommendations, recommended action plan and roadmap to undertake and complete agreed actions. Discussions and comments on initial report	Go Team and Relevant Stakeholders Host State and relevant Stakeholders

4. Follow Up After the Mission

The Go Team should submit a final report on the mission based on the agreed initial report to the Host State with a copy to the Regional Office of ICAO APAC within 6 weeks after the mission.

The Host State should review and provide any comment on the report back to the Go Team via the Regional Office of ICAO APAC within 3 months after receiving the report.

References

- Annex 14 Aerodromes
- Annex 19 Safety Management
- Doc 9981 PANS Aerodrome
- Doc 9137 Part 3 on Wildlife Hazard Management of the Airport Services Manual
- Doc 9332 Manual on the ICAO Bird Strike Information System (IBIS) (new 2024 edition expected)
- WHM Go Team Methodology (Appendix D to WHM-WG/5 Report)
- ACI Wildlife Hazard Management Handbook
- ICAO APAC Regional WHM documents (under the AGA tab)
- Survey Questionnaire - State's problems /issues /deficiencies on Wildlife Hazard Management (Attachment to State Letter T 11/5.9 — AP069/19 (AGA))
- WBA guidance documents

Additional References

- Australian Airport Association (AAA) Airport Practice Note 9 - Wildlife Hazard Management at Airports
- Australian Airport Association (AAA) Airport Practice Note 6 - Managing Bird Strike Risk-Species Information
- Australian Aviation Wildlife Hazard Group (AAWHG) Recommended Practice 1.3 Wildlife Risk Assessment and Analysis

- End -

List of Aerodromes used for International Operations in APAC Region that have to be certified

S. No in APAC Database	Sub-region	State / Admin	ICAO Code	Name of City	Name of Aerodrome
1	SA	Afghanistan	OAHR	Herat	Herat Intl
2	SA	Afghanistan	OAKB	Kabul	Kabul Intl
3	SA	Afghanistan	OAKN	Kandahar	Kandahar Intl
4	SA	Afghanistan	OAMS	Mazar-e-Sharif	Mazar-e-Sharif
42	SEA	Brunei	WBSB	Brunei	Brunei Intl
73	NA	China	RCYU	Hualien	Hualien
107	NA	China	RCMQ	Taichung	Cingcyuangang
108	NA	China	RCNN	Tainan	Tainan
149	SA	India	VICG	Chandigarh	
154	SA	India	VOGO	Goa	
155	SA	India	VEGK	GORAKHPUR	
157	SA	India	VIDX	HINDAN	
161	SA	India	VIJO	JODHPUR	
172	SA	India	VOPB	Port Blair	
173	SA	India	VAPO	Pune	
175	SA	India	VISR	Srinagar	
180	SA	India	VOVZ	VISAKHAPATAN	
250	PAC	Kiribati	PLCH	Kiritimati	Christmas I.
251	PAC	Kiribati	NGTA	Tarawa	Bonriki Intl
253	SEA	Lao PDR	VLLB	Luangprabang	Luangprabang Intl
254	SEA	Lao PDR	VLSK	Kaisonphimvihan	Savannakhet Intl
255	SEA	Lao PDR	VLPS	Pakse	Pakse Intl
264	SEA	Malaysia	WMKD	Kuantan	Haji Ahmad Shah
266	SEA	Malaysia	WBKL	Labuan	
282	PAC	Micronesia	PTPN	Pohnpei I.	Pohnpei Intl
283	PAC	Micronesia	PTKK	Weno I.	FM Chuuk Intl
284	PAC	Micronesia	PTYA	Yap I.	Yap Intl
285	PAC	Micronesia	PTSA	Kosrae I.	Kosrae
292	PAC	Nauru	ANYN	Nauru I.	Nauru intl
321	SEA	Philippines	RPVK	Kalibo, Aklan	Kalibo Intl*
325	SEA	Philippines	RPLC	Pampanga	Diosdado Macapagal Intl*
326	SEA	Philippines	RPVP	Puerto Princesa City	Puerto Princesa Intl*
327	SEA	Philippines	RPSP	Panglao	Bohol-Panglao Intl*
350	SEA	Thailand	VTSG	Krabi	
355	SEA	Thailand	VTSB	Surat Thani	

S. No in APAC Database	Sub-region	State / Admin	ICAO Code	Name of City	Name of Aerodrome
357	SEA	Timor Leste	WPDB	Suai	Commander-in-Chief of the FALINTIL – Kay Rala Xanana Gusmão Intl
360	PAC	Tuvalu	NGFU	Funafuti	Funafuti Intl

* Airports granted with temporary aerodrome certificates

S. No.	Asia and Pacific State's USOAP EI in AGA Area (Date: 17 June 2024) Source: iSTARS 4.0, USOAP DATA TABLE			
	State	USOAP EI (In Per Cent)		Remark
1	Afghanistan	18.75	Less than or equal to 60%	02-16/12/2019, Documentation-base Audit
2	Australia	87.29	More than or equal to 75%	12-19/09/2023, Focus Audit
3	Bangladesh	64.22	More than 60% to less than 75%	19-27/09/2017, ICVM
4	Bhutan	78.10	More than or equal to 75%	7-16/08/2018, ICVM
5	Brunei	80.34	More than or equal to 75%	17/02-01/03/2007, CMA Audit
6	Cambodia	57.02	Less than or equal to 60%	10-21/12/2018, CMA Audit
7	China	88.19	More than or equal to 75%	20/03-03/04/2007, CMA Audit
8	Cook Islands		Less than or equal to 60%	Nill AGA Activity
9	DPR Korea	84.38	More than or equal to 75%	26/05-04/06/2008, CMA Audit
10	Fiji	76.15	More than or equal to 75%	27/08-04/09/2019, ICVM
11	India	92.68	More than or equal to 75%	09-16/11/2022, ICVM
12	Indonesia	69.23	More than 60% to less than 75%	10-18/10/2017, ICVM
13	Japan	92.24	More than or equal to 75%	14-23/06/2010, CMA Audit
14	Kiribati		Less than or equal to 60%	Nil USOAP Activity
15	Lao PDR	75.00	More than or equal to 75%	21-27/04/2015, ICVM
16	Malaysia	47.90	Less than or equal to 60%	29/09-30/10/2020, Off-site Validation Activity
17	Maldives	79.63	More than or equal to 75%	16-22/06/2014, ICVM
18	Marshall Islands	9.17	Less than or equal to 60%	25-28/05/2010, CMA Audit

19	Micronesia	0.92	Less than or equal to 60%	13-17/12/2010, CMA Audit
20	Mongolia	88.18	More than or equal to 75%	28/06-07/07/2010, CMA Audit
21	Myanmar	63.16	More than 60% to less than 75%	100-21/12/2018, CMA Audit
22	Nauru	5.71	Less than or equal to 60%	03-03/03/2008, CMA Audit
23	Nepal	67.74	More than 60% to less than 75%	13-25/04/2022, CMA Audit
24	New Zealand	80.17	More than or equal to 75%	05-15/12/2016, CMA Audit
25	Pakistan	70.63	More than 60% to less than 75%	29/11-10/12/2021, CMA Audit
26	Palau	7.34	Less than or equal to 60%	22-26/11/2010, CMA Audit
27	Papua New Guinea	57.60	Less than or equal to 60%	14-26/06/2023, CMA Audit
28	Philippines	45.87	Less than or equal to 60%	30/05/08/06/2017, ICVM
29	Rep. of Korea	98.26	More than or equal to 75%	13-22/05/2008, CMA Audit
30	Samoa	58.56	Less than or equal to 60%	11-16/02/2010, CMA Audit
31	Singapore	100.00	More than or equal to 75%	16-19/11/2021Virtual ICVM
32	Solomon Islands	14.42	Less than or equal to 60%	27/03/2014, Off-site Validation Activity
33	Sri Lanka	91.67	More than or equal to 75%	25/10-04/11/2010, CMA Audit
34	Thailand	49.59	Less than or equal to 60%	14-21/05/2019, ICVM
35	Timor Leste	24.30	Less than or equal to 60%	07-10/12/2010, CMA Audit
36	Tonga	27.52	Less than or equal to 60%	18-27/11/2019, ICVM
37	Tuvalu		Less than or equal to 60%	Nil USOAP Activity
38	Vanuatu	21.82	Less than or equal to 60%	18-27/11/2019, ICVM
39	Viet Nam	54.95	Less than or equal to 60%	15-21/06/2016, ICVM

AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION
Endorsed at APANPIRG/34, 11 – 13 December 2023, Hong Kong, China
[Updated on 28 June 2024]

Updated on 16 Dec. 2020

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	<u>Afghanistan</u>							
Annex 14 Volume I	**Herat International Airport**	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.				A
	Kabul International Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.				A
	Kandahar International Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.				A
	Mazar-e-Sharif Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.				A
Annex 14 Volume I PANS-Aerodromes PANS-AIM	AIP	**Status of Certification of Aerodromes in AIP**	Effective from 1 Jan 2021	Status of certification of aerodromes yet to be published in AIP AD 1.5.				A

Updated on ~~22 June 2023~~ 12 June 2024

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	<u>Bangladesh</u>							
Annex 14 Volume I	**Hazrat Shahjalal International Airport, Dhaka**	**Runway/ Taxiway**	**ICAO mission April 2009**	Runway strip width insufficient (280m strip not available for the full length of runway);	runway strip in accordance with Annex 14, Volume I will be provided	CAABD	Runway strip width 280m available for the full length of runway (Mitigation measures for storm water drain on the western side strip, is being replaced with concrete hollow pipes into graded surface. ~~45% of the construction work has been done and total work will be completed by June 2024. No obstructions on graded area).~~ Construction work has been completed for around 1000m out of the 3200m length of the runway and the total work will be completed by June 2025. No obstructions on graded area).	A

Updated on 16 Dec. 2020

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
Annex 14 Volume I	**Brunei Darussalam** **Brunei International Airport**	**Taxiway**	ICAO Mission of April 2011	non provision of enhanced taxiway centre line marking in accordance with Para 5.2.8 of Annex 14, Volume I Objects on taxiway strips; vegetation on pavement joints and maintenance of joints	Both Northern Parallel Taxiway and Southern Parallel Taxiway Centre line have been repainted yellow and enhanced with black borders on each side.	Airport Operator (DCA Aerodrome Division)		A A
		Apron		non provision of ICAO compliant signage in accordance with section 5.4 Annex 14, Volume I	Airfield signages have always been provided at BIA that follow ICAO standards and measurement. Recent replacement of old and faded labels have also been completed in 2018.	Airport Operator (DCA Aerodrome Division)		A
		Rescue and Fire Fighting (RFF):		non provision of direct access for the rescue and fire fighting vehicles from the fire station into the runway;	Duly noted that there is no direct access for fire fighting vehicles to the runway at the moment, but one will be concluded within the second phase of the Airfield Pavement Rehabilitation Project.	Airport Operator (DCA Aerodrome Division)	4th Qtr. 2022	A

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
		Wildlife Hazards:		Establishing a national bird control committee in accordance with APANPIRG Conclusion 18/1.	Aerodrome Division headed by Head of Aerodrome to firstly establish an in-house committee and will cooperate with Regulatory Division	Airport Operator (DCA Aerodrome Division)	4th Qtr. 2021	B
	Brunei International Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.				A
Annex 14 Volume I PANS-Aerodromes PANS-AIM	AIP	**Status of Certification of Aerodromes in AIP**	Effective from 1 Jan 2021	Status of certification of aerodromes yet to be published in AIP AD 1.5.				A

Updated on ~~16 Dec. 2020~~ 25 June 2024

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	China							
Annex 14 Volume I	**Hualien Airport**	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.				A
	Taichung Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.				A
	Tainan Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.				A
~~**Annex 14 Volume I PANS-Aerodromes PANS-AIM**~~	~~AIP~~	~~**Status of Certification of Aerodromes in AIP**~~	~~Effective from 1 Jan 2021~~	~~Status of certification of some of the aerodromes used for international operations yet to be published in AIP AD 1.5.~~	The AIP will be amended to include this deficiency.	Civil Aviation Administration of China (CAAC)	Published the Status of Certification in AIP AD 1.5 with effect from 15 May 2024. Resolved	~~A~~

Updated on ~~25 June 2023~~ 25 June 2024

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	India							
Annex 14, Volume I	**Mumbai International Airport**	**Runway**	**AGA mission January 2009**	Runway strip is insufficient 300m strip width is not available for the full length of runway 09/27 in accordance with 3.4.3 of Annex 14, Volume I.	280m strip width for full length of runway 09/27 will be made available	MIAL	**31 Dec 2026** Land acquisition in progress. MIAL has filed temporary exemption with DGCA for non-compliance. Due to presence of slum in beginning of RWY 09/27 south – RWY strip 280m not available.	A
Annex 14 Volume I	**Chandigarh Airport**	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified. – Defence Aerodrome				A
Annex 14 Volume I	**Goa Airport**	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified. – Defence Aerodrome				A
Annex 14 Volume I	**Port Blair Airport**	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified. – Defence Aerodrome				A
Annex 14 Volume I	**Pune Airport**	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified. – Defence Aerodrome				A
Annex 14 Volume I	**Srinagar Airport**	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified. – Defence Aerodrome				A

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	India							
Annex 14	**GORAKHPUR (VEGK)**	**Aerodrome Certification**	25 June 2024	Aerodrome yet to be certified. – Defence Aerodrome				A
Volume I	**HINDAN (VIDX)**	**Aerodrome Certification**	25 June 2024	Aerodrome yet to be certified. – Defence Aerodrome				A
Annex 14	**JODHPUR (VIJO)**	**Aerodrome Certification**	25 June 2024	Aerodrome yet to be certified. – Defence Aerodrome				A
Volume I	**VISAKHAPATNAM (VOVZ)**	**Aerodrome Certification**	25 June 2024	Aerodrome yet to be certified				A

Updated on 16 June 2023

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
Annex 14 Volume I	**<u>Kiribati</u>** **Christmas Island Airport, Kiritimati**	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.	Issued with the Interim Certificate since the Operator is not yet fully complied to the requirements	Airport Kiribati Authority	31 Dec 2023	A
	Bonriki International Airport, Tarawa	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.	The Aerodrome Operator is not yet fully complied to the requirements	Airport Kiribati Authority	31 Dec 2023	A
Annex 14 Volume I PANS-Aerodromes PANS-AIM	AIP	**Status of Certification of Aerodromes in AIP**	Effective from 1 Jan 2021	Status of certification of aerodromes yet to be published in AIP AD 1.5.	The AIP will be amended to include this deficiency	Civil Aviation Authority of Kiribati (CAAK)	15 Oct 2023	A

Updated on 11 July 2023

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
Annex 14 Volume I	**<u>Lao PDR</u>** **Wattay International Airport**	**Taxiway**	**ICAO Mission of March 2011**	Provision of stop bars at runway-holding position in accordance with Para 5.3.20 of ICAO Annex 14, Volume I	AOL request exemption to DCAL and proposed to install in Long Term Plan.	Airport of Laos (AOL)	DCA exempt of runway hold position lights in accordance to AOL and mention in the Certification.	A
		Wildlife Hazards:		Establishing a national bird control committee in accordance with APANPIRG conclusion 18/1.	DCAL to propose prime minister decree and establish national committee accordingly.	Department of Civil Aviation of Lao PDR (DCAL)	To be completed in 2024	B
	Luang Prabang International Airport	**Taxiway**		Provision of runway hold position lights in accordance with Para 5.3.19 of ICAO Annex 14, Volume I on new taxiways	Under consideration by Airports of Laos to purpose for support the budgets and installation	AOL	We have planned budgets and installation during 2021 to 2025	A
		Aerodrome Certification	Effective from 1 Jan 2021	Aerodrome yet to be certified.		DCAL and AOL	Aerodrome Certification will be completed in December 2023 (on Process)	A
	Savannakhet International Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.		DCAL and AOL	Aerodrome Certification will be completed in December 2024	A

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Pakse International Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.		DCAL and AOL	Aerodrome Certification will be completed in December 2024	A

Updated on ~~29 June 2022~~ 17 July 2024

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
Annex 14 Volume I	**<u>Malaysia</u>** **Kuantan Haji Ahmad Shah Airport**	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.	Coordination among Ministry of Transport, Ministry of Defense and Airport Operator are being conducted to get the aerodrome certified	Ministry of Transport and Ministry of Defense	~~31 December 2021~~ June 2025	A
	Labuan Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.	Coordination among Ministry of Transport, Ministry of Defense and Airport Operator are being conducted to get the aerodrome certified	Ministry of Transport and Ministry of Defense	~~31 December 2021~~ Dec. 2024	A

Updated on 16 Dec. 2020

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Marshall Islands							
Annex 14 Volume I PANS-Aerodromes PANS-AIM	AIP	**Status of Certification of Aerodromes in AIP**	Effective from 1 Jan 2021	Status of certification of aerodromes yet to be published in AIP AD 1.5.				A

Updated on 16 Dec. 2020

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Micronesia (Federated States of)							
Annex 14 Volume I	**Pohnpei International Airport**	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.				A
	FM Chuuk International Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.				A
	Yap International Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.				A
	Kosrae Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.				A
Annex 14 Volume I PANS-Aerodromes PANS-AIM	AIP	**Status of Certification of Aerodromes in AIP**	Effective from 1 Jan 2021	Status of certification of aerodromes yet to be published in AIP AD 1.5.				A

Updated on 16 Dec. 2020

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	<u>Nauru</u>							
Annex 14 Volume I	**Nauru International Airport**	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.				A
Annex 14 Volume I PANS-Aerodromes PANS-AIM	AIP	**Status of Certification of Aerodromes in AIP**	Effective from 1 Jan 2021	Status of certification of aerodromes yet to be published in AIP AD 1.5.				A

Updated on 16 Dec. 2020

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Palau							
Annex 14 Volume I PANS-Aerodromes PANS-AIM	AIP	**Status of Certification of Aerodromes in AIP**	Effective from 1 Jan 2021	Status of certification of aerodromes yet to be published in AIP AD 1.5.				A

Updated on ~~26 June 2023~~ 27 March 2024

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	<u>Philippines</u>							
Annex 14 Volume I	**Kalibo International Airport, Akla**	**Aerodrome Certification**	Effective from 1 Jan 2021	Permanent aerodrome certificate yet to be issued.			~~Temporary Aerodrome Certificate issued with validity from 31 Dec. 2022 until 30 June 2023 as per Aerodrome Certificate issued on 22 Dec. 2022.~~ Temporary Aerodrome Certificate issued with validity from 2 Jan. 2024 until 30 June 2024 Status of Aerodrome Certification as of 22 Feb. 2024 (As per CAAP Website)	A
	Puerto Princesa International Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Permanent aerodrome certificate yet to be issued.			~~Temporary Aerodrome Certificate issued with validity from 8 Jun 2023 – 9 Dec 2023 issued on 9 Jun 2023~~. Temporary Aerodrome Certificate issued with validity from 10 Dec. 2023 – 10 Jun. 2024. Status of Aerodrome Certification as of 22 Feb. 2024 published in CAAP Website.	A
	Bohol-Panglao International Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Permanent aerodrome certificate yet to be issued.			~~Temporary Aerodrome Certificate issued with validity from 28 Jun 2023 – 29 Dec 2023 (Awaiting the approval of the Director General of Temporary Certificate).~~	A

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
							Temporary Aerodrome Certificate issued with validity from 30 Dec. 2023 – 29 Jun. 2024. Status of Aerodrome Certification as of 22 Feb. 2024 published in CAAP Website.	
	Ninoy Aquino International Airport RPLL	**Aerodrome Certification**	Effective from 8 March 2022	Permanent aerodrome certificate yet to be issued.			~~Temporary Aerodrome Certificate issued with validity from 1 May 2023 – 30 Nov 2023 issued on 28 Apr 2023.~~ Permanently certified on 22 Dec. 2023. As per CAAP Website. Note: AIP AD 1.5 is yet to be amended. **Resolved**	A
	Diosdado Macapagal International Airport RPLC	**Aerodrome Certification**	6 March, 2023	Permanent aerodrome certificate yet to be issued.			~~Temporary Aerodrome Certificate issued with validity until 23 Jun 2023.~~ Temporary Aerodrome Certificate issued with validity from 7 Jan. 2024 until 7 Jul. 2024. Status of Aerodrome Certification as of 22 Feb. 2024 published in CAAP Website.	A

Updated on 16 Dec. 2020

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Mongolia							
Annex 14 Volume I	**Buyant-Ukhaa Airport**	**Taxiway**	**ICAO Mission of July 2011**	provision of runway hold position lights in accordance with Para 5.3.19 of ICAO Annex 14, Volume I.	The runway hold position lights will be provided in accordance with Para 5.3.19 of ICAO Annex 14, Volume I.	Civil Aviation Authority of Mongolia	The RWY hold position marking and mandatory signs were provided to avoid runway incursions on the maneuvering area. Because of the existing International scheduled flights will be transferred to new airport in 2020, the additional runway hold position lights are unrequired to install.	A
		Apron: Airfield signage		Provision of ICAO compliant signage in accordance with section 5.4 Annex 14, Volume I and to cut the vegetation in front of the signs.	The signage will be provided in accordance with section 5.4 Annex 14, Volume I. The vegetation in front of the signs will be cut	Civil Aviation Authority of Mongolia	The work on cutting the vegetation in front of the signs was completed in 2017 within the totally 119560 m² area including, taxiway strip, glide path antenna and apron area, as per Aerodrome manual of, in scope of Aerodrome maintenance plan. [Note: Partially completed]	A

Updated on 15 June 2021

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	<u>Myanmar</u>							
Annex 14 Volume I	**Yangon International Airport**	**Runway/ Taxiway**	**ICAO mission April 2010**	Provision of RESA in accordance with Section 3.5 of Annex 14, Volume I requirements;	RESA will be provided	Yangon Aerodrome Company Limited	(Risk Assessment conducted by the operator submitted on 10 Aug 2018.) RESA for RWY 21 was completed on 15 Nov 2018. _____ Revised date- **31 Dec 2021**	A
		Bird Hazard		Establishment of a national bird committee in accordance with APANPIRG Conclusion 18/1.	Establish National Bird Committee	Department of Civil Aviation	Guideline for Wildlife Hazard Management at Aerodromes, DCA-GM-AGA 08 has been developed and published on 29 Oct 2018) Revised date- **30 Nov 2021**	B

Updated on ~~8 June 2021~~ 20 June 2024

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
Annex 14, Volume I	**<u>Nepal</u>** **Tribhuvan International Airport**	**Runway/ taxiways**	**ICAO Mission of February 2008**	Insufficient runway strip, refer recommendations given in section 3.4 of Annex 14, Volume I.	Provide runway strip as per ICAO recommendations	Air Transport Capacity Enhancement Project (ATCEP) under Civil Aviation Authority of Nepal	~~Construction works to provide sufficient strip towards runway 20 already started with target of completion in 2023~~. Construction works are in progress to improve and provide airside infrastructures in accordance with Ultimate Master Plan of Tribhuvan International Airport, which will provide sufficient runway strip with target complete implementation of the plan by 2026.	A

Updated on ~~16 Dec. 2020~~ 27 March 2024

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
Annex 14 Volume I	**Samoa** **Faleolo International Airport**	**Runway Strip**	**ICAO Mission of Oct. 2015**	Insufficient Runway Strip				A
		Aerodrome Pavements		Lack of maintenance of aerodrome pavements in accordance with Annex 14, 10.2				U
~~**Annex 14 Volume I PANS Aerodromes PANS AIM**~~	~~**AIP**~~	~~**Status of Certification of Aerodromes in AIP**~~	~~Effective from 1 Jan 2021~~	~~Status of certification of aerodromes yet to be published in AIP AD 1.5.~~			Published the status of certification in AIP AD with effect from 30 Nov. 2023. Resolved	A

Updated on ~~16 Dec. 2020~~ 27 March 2024

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
Annex 14 Volume I	**Solomon Islands** **Honiara International Airport/Henderson Field**	**Runway Strip**	**ICAO Mission of Oct. 2015**	Insufficient Runway Strip				A
		RESA		RESA at both ends of runway not provided				U
		Aerodrome Pavements		Lack of maintenance of aerodrome pavements in accordance with Annex 14, 10.2				U
~~**Annex 14 Volume I PANS-Aerodromes PANS-AIM**~~	~~**AIP**~~	~~**Status of Certification of Aerodromes in AIP**~~	~~Effective from 1 Jan 2021~~	~~Status of certification of aerodromes yet to be published in AIP AD 1.5.~~			Published the status of certification in AIP AD 1.1.5 with effect from 8 Sep. 2022. **Resolved**	~~A~~

Updated on 15 June 2022

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Sri Lanka							
Annex 14 Volume I	**Bandaranaike International Airport**	**Runway/ Taxiway**	**ICAO mission April 2010**	Provision of 280m strip width for the full length of precision approach CAT I runway in accordance with the standard 3.4.3, Annex 14, Volume I; remove obstacles from runway strip; flush the strip with the adjacent runway shoulder.	runway strip in accordance with Annex 14, Volume I will be provided, obstacles from strip will be removed and flush strip with adjacent runway shoulder.	CAASL	Statistical analysis submitted by AASL has been accepted in 2021. Request made to submit the improved risk assessment with necessary amendments within 2022.	A
				Establishment of a national bird committee in accordance with APANPIRG Conclusion 18/1.	National Bird Committee will be established.		A meeting to be held with all stakeholders to establish the Committee and to ratify the TOR by end of September 2022.	A

Updated on ~~1 June 2023~~ 28 June 2024

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Thailand							
Annex 14, Volume I	**Phuket International Airport**	**Runway**	**AGA mission of July 2009**	RESA to satisfy Section 3.5 of Annex 14, Volume I requirements.	RESA will be provided at the end of both RWY09 and RWY27 to satisfy Section 3.5 of Annex 14, Volume I requirements. Remark: - Dimension of RESA RWY09 is 150x190 m. - Dimension of RESA RWY27 is 150x120 m.	Airports of Thailand Public Company Limited	The construction is expected to be completed in 2024. Airports of Thailand Public Company Limited already has had the contractor for this construction's project and the safety assurance and project management documentation has been approved by the Civil Aviation Authority of Thailand to ensure that the aerodrome can continue to operate safely during the project. Currently, the construction progress is ~~44.67%~~ 81.23%	U
				Runway strip width insufficient (280m runway strip for precision approach runways in accordance with Para 3.4.3 of Annex 14, Volume I.	300m runway strip width will be made available. Except 111.4m length at the beginning of RWY09 (60m strip length before RWY09 threshold plus 51.4m length beyond the threshold), the runway strip width will be extended 150m on the right	Airports of Thailand Public Company Limited	The construction is expected to be completed in 2024. Airports of Thailand Public Company Limited already has had the contractor for this construction's project and the safety assurance and project management documentation has been approved by the Civil	A

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
					side of RWY09 centre line and 90.27m on the left side of the runway centre line (due to the marsh near the runway).		Aviation Authority of Thailand to ensure that the aerodrome can continue to operate safely during the project. Currently, the construction progress is ~~44.67%~~ 81.23%	
	Krabi Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.	Certify the aerodrome in accordance with aerodrome certification requirements	The Civil Aviation Authority of Thailand and Department of Airports	31 December ~~2023~~ 2024	A
	Surat Thani Airport	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.	Certify the aerodrome in accordance with aerodrome certification requirements	The Civil Aviation Authority of Thailand and Department of Airports	31 December ~~2023~~ 2024	A

Updated on ~~14 June 2023~~ 17 June 2024

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	<u>Timor-Leste</u>							
Annex 14 Volume I	**Commander-in-Chief of the FALINTIL – Kay Rala Xanana Gusmão International Airport, Suai**	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.	~~To be certify for its designed category (3C) the significant safety issue relating to AD strip (local houses and habitants must be relocated!) should be resolved. Currently AD is occasionally in use for domestic general aviation and helicopters only.~~ To be certify for its designed category (3C) the significant safety issue relating to AD strip (local houses and habitants must be relocated!) should be resolved. • There is ongoing process of reallocation of the houses and habitants within the AD strip; • There is a process of the establishment of the manuals, SOPs, various Airport	Gov. TL and ANATL as AD operator	Estimated date: ~~31 December 2023~~ 31 December 2024	A

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
					committees (ASC-RSCA, ERC) • Currently AD is occasionally in use for domestic general aviation and helicopters only.			

Updated on ~~27 June 2023~~ 27 March 2024

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Tonga							
Annex 14 Volume I	**Fua'amotu International Airport**	**Runway Strip**	**ICAO Mission of Oct. 2015**	Insufficient Runway Strip	1. File of difference to ICAO Annex 14 Volume I 3.4.4 through CMA-OLF and the publication of significant difference in the AIP Tonga - CAR 139.C.2.2 details that the strip width for aerodrome reference code number 4, non-precision runway must extend laterally on each side of the centre line of the runway and its extended centre line throughout the length of the strip to the minimum distance of 75m. 2. Provide 240m runway strip width at Fuaámotu International Airport.	CAD Office	1. 28 December 2023 2. 31 December 2030	A

AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
~~**Annex 14 Volume I PANS-Aerodromes PANS-AIM**~~	~~**AIP**~~	~~**Status of Certification of Aerodromes in AIP**~~	~~Effective from 1 Jan 2021~~	~~Status of certification of aerodromes yet to be published in AIP AD 1.5.~~	~~1. Collate and update status of certification of Aerodromes in Tonga into the AIP Tonga.~~	~~TAL~~	~~28 December 2023 (AIRAC Effective Date)~~ Published the status of certification in AIP AD 1.5 with effect from 2 Nov. 2023. **Resolved**	A

Updated on 1 Nov. 2022

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
Annex 14 Volume I	**<u>Tuvalu</u> Funafuti International Airport**	**Aerodrome Certification**	Effective from 1 Jan 2021	Aerodrome yet to be certified.	Aerodrome yet to be certified.		Part 139 Aerodrome Certification in progress for 2023	A
Annex 14 Volume I PANS-Aerodromes PANS-AIM	**AIP**	**Status of Certification of Aerodromes in AIP**	Effective from 1 Jan 2021	Status of certification of aerodromes yet to be published in AIP AD 1.5.	Status of certification of aerodromes yet to be published in AIP AD 1.5.		Update Tuvalu AIP Info	A

Updated on ~~16 Dec. 2020~~ 27 May 2024

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
~~**Annex 14 Volume I PANS-Aerodromes PANS-AIM**~~	~~**Vanuatu**~~ ~~AIP~~	~~**Status of Certification of Aerodromes in AIP**~~	~~Effective from 1 Jan 2021~~	~~Status of certification of aerodromes yet to be published in AIP AD 1.5.~~			Published the status of certification in AIP AD 1.5 with effect from 30 Nov. 2023. **Resolved**	~~A~~

Updated on ~~02 April 2024~~ 05 June 2024

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	~~**Viet Nam**~~							
~~**Annex 14 Volume I PANS-Aerodromes PANS-AIM**~~	~~AIP~~	~~**Status of Certification of Aerodromes in AIP**~~	~~Effective from 1 Jan 2021~~	~~Status of certification of one of the aerodromes used for international operations yet to be published in AIP AD 1.5.~~	~~Certify aerodromes used for international operations~~	~~CAAV~~	~~**WORK IN PROGRESS**~~ ~~Lien Khuong is a domestic aerodrome used for international operation under the Article 80 of the revised Civil Aviation Law of Vietnam. Up to now, CAAV only permits charter flights to Lien Khuong aerodrome. CAAV does not permit to operate scheduled commercial flights to Lien Khuong aerodrome because the aerodrome has not been recognized as an international aerodrome.~~ ~~CAAV published the status of certification of 13 domestic aerodromes in AIP, AD 1.5 in the AIP Amendment No 03/2020, issued on November 30th 2020 (including Lien Khuong aerodrome).~~ ~~**Corrective Action Plan (CAP):** The Prime Minister agreed on adding Lien Khuong aerodrome in the list of international aerodromes of master planning of network of aerodromes of Viet Nam (Decision 648/QD-TTg dated June 07th 2023).~~ ~~CAAV approved a plan of Airports Corporation of VietNam (ACV) to upgrade Lien Khuong into an international aerodrome (Document~~	~~A~~

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
							~~100/CHK-QLC dated 05/01/2023).~~ ~~It is intended to complete the procedure for upgrading, publishing Lien Khuong as an international aerodrome in AIP by the Quarter II of 2024.~~ ~~**Target date of completion:** Quarter II of 2024~~ **CORRECTIVE ACTION PLAN (CAP):** The CAAV has issued the Aerodrome Certificate No. 1830/GCNKT-CHK dated April 15th 2024 to grant Lien Khuong Airport used for international operation. The effective date of Aerodrome Certificate of Lien Khuong International Airport is from June 13th 2024. The CAAV has published the status of Aerodrome Certificate of Lien Khuong International Airport in AD 1.5 of the AIP published on May 04th 2024 and effective from June 13th 2024. **Target date of completion:** June 13th 2024 **Resolved**	

* Priority for action to remedy the shortcoming is based on the following safety assessments:

"U" priority = Urgent requirements having a direct impact on safety and requiring immediate corrective actions. Urgent requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is urgently required for air navigation safety.

"A" priority = Top priority requirements necessary for air navigation safety. Top priority requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is considered necessary for air navigation safety.

"B" priority = Intermediate requirements necessary for air navigation regularity and efficiency. Intermediate priority requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is considered necessary for air navigation regularity and efficiency.

APANPIRG
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AOP/SG WORK PROGRAMME AND TASK LIST
[Updated by AOP/SG/8]

The priorities assigned in the list have the following connotation:
High = Tasks of a high priority on which work should be expedited;
Medium = Tasks of medium priority on which work should be under taken as soon as possible but not to the detriment of the High tasks; and
Low = Tasks of medium priority on which work should be undertaken as time and resources permit but not to the detriment of High and Medium priority tasks.

TOR = Terms of Reference of the AOP Sub-Group

Task No.	Ref	Associated ICAO Strategic Objective	Task	Priority	Action Proposed	Action by	Target Date	Status
AOP/SG/1 (14 – 16 June 2017):								
AOP/SG/1/1	APANPIRG 18 Conclusion 18/62 APANPIRG 21 Conclusion 21/54	Safety	AOP Air Navigation Deficiencies Assist States to establish action plans with fixed target dates for resolution of safety related deficiencies	High	1) Monitor resolution of AOP air navigation deficiencies *Please refer to the Task AOP/SG/2/2*	AOP/SG	December 2021	*Moved to Task* AOP/SG/2/2 **[COMPLETED]**
AOP/SG/1/2	APANPIRG 27 TOR of AOP/SG	Safety, Capacity & Efficiency	Assist in and monitor the implementation of Airport Collaborative Decision Making (A-CDM) at aerodromes used for international operations in APAC Region through APA-CDM/TF.	High	Monitor the status of implementation of A-CDM at aerodromes used for international operations	AOP/SG and APA-CDM/TF	Nov. 2021	AOP/SG/5-WP/05: - Dissolution of the Task Force and remaining works will be taken care by other APANPIRG Contributory body (ATFM/SG) **[COMPLETED]**

Task No.	Ref	Associated ICAO Strategic Objective	Task	Priority	Action Proposed	Action by	Target Date	Status
AOP/SG/1/3	APANPIRG 27	Safety	Develop regional guidelines on aerodrome operations personnel competency (AOPC) requirements through AOPC Working Group	Medium	Develop regional guidance material	AOP/SG and AOPC SWG	May 2019	Refer to AOP/SG/4 WP/08 **[COMPLETED]**
AOP/SG/1/4	APANPIRG 27/34	Safety	Monitor States provide updated information about airport´s Obstacle Limitation Surface (OLS) in AIP	High	Monitor OLS of airports through AP-ADO/TF	States, AOP/SG	Continuous	Ongoing
					(Please refer to the Task AOP/SG/2/3)			
AOP/SG/2 (27 - 29 June 2018):								
AOP/SG/2/1	APANPIRG/18 Conclusion 18/1 APANPIRG Conclusion 21/2 RAN meeting –Asia/PAC/3, rec 4/6	Safety	Wildlife strike hazard reduction programme	High	Establish Wildlife Hazard Management Working Group (WHM WG)	AOP/SG, ICAO APAC Office AP-WHM/WG	Continuous	Established AP-WHM/WG. **[COMPLETED]** AOP/SG/6 – WP/07: – Draft Conclusion AP–WHM/WG/4–1: State Action Plan for Establishment and Implementation of WHMP - Generic Template (Appendix D to AOP/SG/6 Report) Ongoing

Task No.	Ref	Associated ICAO Strategic Objective	Task	Priority	Action Proposed	Action by	Target Date	Status
								– Developed Asia Pacific Regional Guidance on Development and Implementation of Wildlife Hazard Management Programme (Appendix E to AOP/SG/6 Report) **[COMPLETED]**
AOP/SG/2/2	Beijing Declaration 2018 APANPIRG APAC ANP, Doc 9673, Volume I		1) Assist States in implementation of ICAO aerodrome certification requirement and resolution of air navigation deficiencies;	High	Establish an Asia/Pacific Aerodrome Assistance Working Group (AP-AA WG) Monitor resolution of AOP air navigation deficiencies	AOP/SG; ICAO APAC Office AP-AA/WG	31 October 2018 Continuous	Established AP-AA/WG. **[COMPLETED]** Ongoing

Task No.	Ref	Associated ICAO Strategic Objective	Task	Priority	Action Proposed	Action by	Target Date	Status
AOP/SG/2/3	TOR of AOP/SG Asia Pacific Air Navigation Plan		(1) Review and monitor provisions of facilities, installations and services at international aerodromes: - visual aids; - rescue and firefighting services and emergency planning; - measurement and reporting by States of the surface condition and unevenness on runway; - preventive maintenance programme; - runway safety programme. (2) Review and monitor the content of the Table AOP I - 1 and, where necessary, after coordination with users and operators, and introduce the respective	High	Establish Asia/Pacific Aerodrome Design and Operation Task Force (AP-ADO/TF) Tasks to be carried out by AP-ADO/TF	AOP/SG; ICAO APAC Office AP-ADO/TF	31 October 2018 Continuous Continuous	Established AP-ADO/TF. **[COMPLETED]** Ongoing Ongoing WP/05 – APAC ANP
AOP/SG/3 (24 - 26 June 2019):								
AOP/SG/3/1	55th DGCA Action Item 55/42	Safety	Certification of aerodromes used for international operations by 2020 (Beijing Declaration's Commitment)	High	Monitor the progress of certification and report to DGCA through APANPIRG	AOP/SG through AP-AA/WG	~~By 2020~~ Continuous	Ongoing AOP/SG/7-WP/09: – 325 out of 355 certified – 91.95%

Task No.	Ref	Associated ICAO Strategic Objective	Task	Priority	Action Proposed	Action by	Target Date	Status
AOP/SG/4 (10 – 13 November 2020):								
AOP/SG/4/1	Draft Conclusion AOP/SG/4-10	Safety	States/Administrations to develop and implement GRF Implementation Action Plan	High	Monitor the GRF Implementation Action Plan developed by States/Administrations	States AOP/SG	~~28 February 2021~~ Continuous	Ongoing AOP/SG/7 – WP/18: GRF – 12 States have yet to submit their GRF Implementation Action Plan to ICAO APAC Office – 11 States published procedures for assessment and reporting of RCR runway and the issuance of SNOWTAM in AIP

Task No.	Ref	Associated ICAO Strategic Objective	Task	Priority	Action Proposed	Action by	Target Date	Status
AOP/SG/4/2	AOP/SG/4 Report on WP/12	Safety	States to arrange necessary resources to recruit, train and retain qualified and experienced technical staff to effectively perform safety oversight of aerodromes to enhance USOAP Effective Implementation score to at least 75% in AGA area by 2024	High	Provide technical assistance to States with limited resources and low AGA EI	States AP-AA/WG	Continuous	AOP/SG/5-IP/11: – Fiji: iPack – Aerodrome Restart (2021) AOP/SG/6-IP/09: – Timor-Leste: iPack – Aerodrome Restart (2021) Aerodrome Assistance Go-Team Methodology
AOP/SG/4/3	AOP/SG/4 Report on WP/11	Safety	Assist States in certification of aerodromes used for international operations	High	Provide technical assistance to States with aerodromes yet to be certified through Aerodrome Assistance Go-Team and other appropriate methods as agreed with the States concerned	AP-AA/WG assisted by ACI	By 2025	Ongoing AOP/SG/7: IP/11 – Lao PDR – Timor-Leste Under COSCAP-SEA/EASA Aerodrome Assistance Go-Team Methodology
AOP/SG/5 (29 June – 2 July 2021):								
AOP/SG/5/1		Safety, Capacity & Efficiency, ENV	Aerodromes Seminar	Medium	Asia/Pacific Aerodromes Seminar (duration 2 – 3 Days) hosted by States/Industries Theme topic of the Seminar to be proposed by the host in consultation with	States/ Industries (Supported by the Secretariat)	December 2022	Organized Aerodrome Seminar on Airport Master Planning on 29 – 30 June 2023 **[COMPLETED]**

Task No.	Ref	Associated ICAO Strategic Objective	Task	Priority	Action Proposed	Action by	Target Date	Status
AOP/SG/6 (27 – 30 June 2022):								
AOP/SG/6/1	Task AP-ADO/TF/3/2	Safety	GRF Seminar	Medium	Organise a GRF Webinar	On behalf of AP-ADO/TF by China (Lead), ACI & ICAO	Q3, 2022	Organized GRF Webinar on 29 Sep. 2022 **[COMPLETED]**
AOP/SG/7 (3 – 6 July 2023):								
AOP/SG/7/1	Task of AP-ADO/TF/4	Safety	Workshop on Aerodrome Pavement Design and Evaluation including ICAO ACR-PCR Method in Reporting Pavement Strength for Asia and Pacific Regions	High	Organize a Workshop on Aerodrome Pavement Design and Evaluation including ACR-PCR Method in Reporting Pavement Strength for Asia and Pacific Regions	Secretariat with FAA support	Q1, 2024	Three days workshop, tentatively the week of 5-9 February 2024. **[COMPLETED]**
AOP/SG/7/2	AOP/SG/7-WP/12	Safety	Strength assessment and classification for grass and unpaved runway	Medium	Assign the task to AP-ADO/TF	AP-ADO/TF	2025	Ongoing
AOP/SG/7/3	AOP/SG/7-WP/12	Safety	WP on UAS operations at existing Airports	Medium	Present a WP to share the experiences of Pakistan on UAS operations at existing Airports	Pakistan	AOP/SG/~~8~~ 9	

Task No.	Ref	Associated ICAO Strategic Objective	Task	Priority	Action Proposed	Action by	Target Date	Status
AOP/SG/8 (15 - 19 July 2024):								
AOP/SG/8/1	Task 5/3 of AP-ADO/TF	Safety	Organize workshops for States and aerodrome operators to share experience in AGA audit area of USOAP CMA especially on alternative means of compliance with AGA related SARPs as advocated for in DGCA/58/DP3/01	High		Pakistan (Lead), Australia, China, India, Secretariat	In conjunction with AOP/SG/9 in July 2025	

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NOTES ON THE AMENDMENT OF ABOVE TABLE TO ENDORSE AS AOP/SG WORK PROGRAMME

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

~~Text to be deleted is shown with a line through it.~~ text to be deleted

New text to be inserted is highlighted with grey shading. new text to be inserted

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

—END—