SOUTH AFRICAN CIVIL AVIATION AUTHORITY

CIVIL AVIATION ACT, 2009 (ACT NO. 13 OF 2009)

AMENDMENT SA-CATS 1 of 2023

The Director of Civil Aviation has, in terms of section 163 (1) of the Civil Aviation Act, 2009 (Act No. 13 of 2009) amended South African-Civil Aviation Technical Standards as reflected in the Schedule hereto. The Amendments as contained in the Schedule shall come into operation simultaneously with promulgation of the 26th Amendment of the Regulations except for Technical Standard 67.00.2 ("SCHEDULE 13A: INSULIN DEPENDANT DIABETES MELLITUS FOR CLASS 1) and Technical Standard 135.07.1 (EDTO authorisation and requirements for operations beyond 180 minutes) which shall come into operation on the date of publication.

Poppy Khoza
Director of Civil Aviation
Date: 23 FEB 2023

GENERAL EXPLANATORY NOTE:

[ ] Words in bold type in square brackets indicate omissions from existing technical standards.

_____ Words underlined with a solid line indicate insertions in existing technical standards.

SCHEDULE

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(c) 135 .07.1

10. Amendment of Document SA CATS 139

(a) insertion of definitions

(b) 139.01.32

(c) 139.02.10

(d) 139.02.12

(e) 139.02.15

(f) 139.02.23

11. Amendment of Document SA CATS 140

(a) 140.01.2

(b) 140.01.3

12. Amendment of Document SA CATS 171

(a) 171.03.8

13 Amendment of Document SA CATS 172

(a) 172.01.2

(b) 172.01.3

(c) 172.03.12

(d) 172.03.14

(e) 172.03.15

(f) 172.03.18

AMENDMENT OF SA CATS 21

1. Document SA-CATS 21 is hereby amended by:

(a) the addition in Technical Standard 21.01.4 after paragraph (f) in subsection 5 of the following paragraphs:

"(5) When the Republic is a State of Registry, the Director shall –

(g) ensure airworthiness information relating to an engine or propeller, shall be transmitted to both the organisation responsible for engine or propeller type design and the organisation responsible for aircraft type design;

(h) where a continuing airworthiness safety issue is associated with a modification, ensure that there exists a system whereby the information referred to in paragraph (g) is transmitted to the organisation responsible for the design of the modification;

(i) ensure that sensitive aviation security information is not transmitted when distributing mandatory continuing airworthiness information; and

(j) ensure that sensitive aviation security information is securely transmitted to the appropriate authority in the State of Design.".

(b) the insertion after subsection (5) of the following subsection:

(6) When the Republic is the State of Design, the Director shall ensure that sensitive aviation security information as reflected in the security manual is:

(a) not transmitted when distributing mandatory continuing airworthiness information; and

(b securely transmitted to the appropriate authority in the State of Registry"."

AMENDMENT OF SA CATS 34

2. Document SA CATS 34 is hereby amended by:

(a) the substitution for section 1 in Technical Standard 34.02.3 of the following section:

"1. Evaluation methods

The methods for the evaluation of aircraft engine emissions are **[those]** contained in Annex 16, Volume II, from Appendices 1 to 8 **[through 6 inclusive]**.".

(b) the insertion after Technical Standard 34.02.3 of the following Technical Standards:

"34.02.4 AEROPLANE CO_2 EMISSION STANDARDS

1. Aeroplane CO_2 emission standards

The aeroplane CO_2 emission standards referred to in regulation 34.02.4 are the appropriate aeroplane CO_2 emission standards contained in ICAO Annex 16, Volume III, Part II read together with applicable definitions and symbols as contained in ICAO Annex 16, Volume III, Part I.

2. Recognition of foreign aeroplane CO_2 emission certification

(1) Other standards that apply for the recognition of foreign aircraft CO_2 emission certification by the Republic shall be no less stringent than the requirements provided in ICAO Annex 16, Volume III, Part II, "Certification Standard for Aeroplane CO_2 Emission based on the consumption of fuel" as stated at the time of original certification by an appropriate Authority and have been certified by an appropriate Authority as such.

(2) Compliance to requirements other than ICAO Annex 16, Volume III, Part II "Certification Standard for Aeroplane CO_2 Emission based on the consumption of fuel" may be accepted by the Director, if considered to be equivalent to the ICAO certification standard.

34.02.5 AEROPLANE CO_2 EMISSION EVALUATION METHODS

1. Evaluation methods

The methods for the evaluation of aeroplane CO_2 emissions are those contained in ICAO Annex 16, Volume III, Appendices 1 and 2.".

AMENDMENT OF SA CATS 61

3. Document SA-CATS 61 is hereby amended by the substitution for Appendix B of the following Appendix:

"Appendix B

FORMAT OF PILOT LICENCES
(PILOT, CABIN CREW, AIR TRAFFIC SERVICE, AIRCRAFT MAINTENANCE ENGINEER, REMOTE PILOT AND RPAS MAINTENANCE TECHNICIAN)

1. Personnel licences issued by the **[Authority]** Director shall conform to the following specifications:

1.1 Detail

1.1.1 The **[Authority]** Director shall ensure that other States are able to easily determine the licence privileges and validity of ratings.

1.1.2 The following details shall appear on the licence:

(i) Name of State "**SOUTH AFRICA**";

(ii) Title of license (If the holder has multiple FCL licences, only the highest FCL will be displayed);

(iii) Serial number of the licence, starting with **027**XXXXXXX;

(iv) Name of holder in full;

(v) Date of birth;

(vi) Address of holder (Reserved);

(vii) Nationality of holder;

(viii) Signature of holder;

(ix) South African Civil Aviation Authority logo;

(x) Certification concerning validity and authorization for holder to exercise privileges appropriate to licence; (License validity accessed by scanning the QR code on the license, which scans live to the server. The recommended application - PDF 417);

(xi) Signature of officer issuing the licence and the date of such issue;

(xii) Seal or stamp of the Authority (the Authority hologram);

(xiii) Ratings, such as category, class, type of aircraft, airframe, aerodrome control, etc;

(Additional FCL licences are displayed. License ratings are accessed by scanning the QR code on the license, which scans live to the server. The recommended application - PDF 417);

(xiv) Remarks, such as special endorsements relating to limitations and endorsements for privileges, including an endorsement of language proficiency, and other information required in pursuance to Article 39 of the Chicago Convention; and

(xv) Any other details desired by the Authority.

1.2 Material

1.2.1 First quality paper or other suitable material, including a gold, white or blue plastic card, shall be used and the details in terms of 1.1.2 shall be clearly shown thereon.

1.3 Language

1.3.1 South Africa only issues licenses in the English language.

1.4 Arrangement of items

1.4.1 Item headings on the license shall be uniformly numbered in capital roman numerals so that on any license the number will, under any arrangement, refer to the same item heading.".

AMENDMENT OF SA CATS 65

4. Document SA-CATS 65 is hereby amended by the substitution of Technical Standard 65.01.5 of the following Technical Standard:

"**65.01.5 MAXIMUM HOURS OF DUTY**

1. Maximum hours of duty

(1) The maximum hours of duty of service personnel are governed by the Basic Conditions of Employment Act, 1983 (Act No. 3 of 1983): Provided that in the case of an ATC–

(a) a shift on operational duty may not exceed eight hours including meal intervals;

(b) the aggregate periods of operational duty, including such duty in overtime, may not exceed 180 hours in any shift cycle; and

(c) the duty time referred to in paragraph (a) may be extended by a maximum of three hours of overtime to a maximum of 10 hours overtime per week.

(2) Subject to subsection (9) the number of shifts to be worked by an ATC or an air traffic service assistant in any shift cycle may not exceed 22 shifts.

(3) An ATC or an air traffic service assistant shall have been free of any duty for at least 10 hours before the commencement of any period of operational duty.

(4) The ANSP shall implement means to annotate the time in position separate from any other duties in a shift.

(5) The duration of breaks between periods of time-in-position in a duty period shall not be less than 30 minutes.

(6) Upon the conclusion of a period of night duty, an ATC or an air traffic service assistant is entitled to an interval of at least 24 hours before the commencement of the next period of operational duty.

(7) An ATC or an air traffic service assistant may not be required to work more than seven successive shifts of operational duty without an interval of at least 24 hours before the commencement of the next period of operational duty.

(8) Any deviation from the requirements shall be supported by a safety case approved by the Director.

(9) The number of shifts in any shift cycle referred to in subsection (2), may be extended by two additional shifts to 24 shifts if unforeseen circumstances require such extension: Provided that –

(a) the extension shall be reported on a prescribed form and submitted to the Director by an ATC, or the air traffic service assistant concerned and his or her employer within 30 days from the date on which the extension occurred, stating the reason for such extension: and

(b) the duration of such additional shifts may not be extended beyond eight hours per shift through overtime.

(10) If the Director is of the opinion that the extension of the number of shifts referred to in subsection (9) may jeopardise aviation safety, the Director may take the appropriate steps which he or she deems necessary to prevent the recurrence of such extension"."

AMENDMENT OF SA CATS 66

5. Document SA CATS 66 is hereby amended by the insertion in Technical Standard 66.02.4 after section 4.3 of the following section:

"4.4. Category B: Issue of Category B (Components and Parts)

An applicant for the issuing of a licence in Category B, or the addition of Category B to an existing licence for the certification of the modification, repair and overhaul of components and parts, shall have two years aeronautical engineering experience after qualifying in a relevant trade including 12 months experience of overhaul, repair of components and parts or processes detailed as follows:

TABLE 2A

1	2		3
Applications relating to components, parts and processes will be accepted for the following	Total aeronautical engineering experience after passing the appropriate trade test or trade exam		Experience in column 2 shall include periods of the practical repair and overhaul of components and parts to which the application is made
-	Without training	With training	With approved training
Components, parts, processes	3 years	2 years	12 months

Note:

An appropriate trade test or trade exam and approved course such as is approved for the purpose by the Director which includes practical training in the maintenance, modification, repair, overhaul and inspection of components and parts.".

AMENDMENT OF SA CATS 67

6. Document SA-CATS 67 is hereby amended by the insertion in Technical Standard 67.00.2 after Schedule 13 Diabetes Mellitus of the following schedule:

"SCHEDULE 13A: INSULIN DEPENDANT DIABETES MELLITUS (FOR CLASS 1)

1. Applicability:

1.1 Class 1 Medical Certificate

2. General

2.1 An application shall be assessed on a case-by-case basis and presented to a Medical Assessor and Medical Expert prior to consideration of the initial and recurrent medical certification.

2.2 A holder of a Class 1 medical certificate for a Schedule 13A protocol (pilot) shall brief his or her co-pilot fully prior to the flight regarding:

(a) nature of his or her diabetes;

(b) blood glucose testing protocol;

(c) timing and method of blood glucose testing;

(d) actions to ensure the blood glucose remains in the acceptable range;

(e) medication that may be required during the flight;

(f) symptoms of high or low blood glucose; and

(g) actions to be taken in the event of incapacitation.

2.3 A holder of a Class 1 medical certificate for a Schedule 13A protocol (pilot) shall cross check his or her blood glucose test value with his or her co- pilot and shall always announce the blood glucose results aloud so that it is recorded on the cockpit voice recorder (CVR) if installed, or an alternative approved method.

3. Restrictions to be applied

3.1 OML: Operational Multi-pilot Limitation

4. Initial certification eligibility

4.1 An applicant may be considered for an initial certification after a period of one (1) year has elapsed after the diagnosis of Type I Diabetes Mellitus.

4.2 An applicant shall have successfully completed solo flight training (i.e., towards a PPL or a higher license) and already be in possession of at least a Class 2 medical certificate.

4.3 An applicant is required to have in his or her possession a Continuous Glucose Monitoring device (CGM) approved by the South African Health Products Regulatory Authority (SAHPRA) or CE marked (Europe) or FDA (US) approved or ISO 9000 certified or device approved by other relevant authorities).

4.4 The CGM device referred to in section 4.3 shall not interfere with the aircraft avionics and a report shall be submitted to a DAME or Medical Assessor of the Authority.

4.5 An applicant who utilises an insulin pump delivery system shall submit details of his or her 'back-up' non-pump regimen in the event of pump failure.

4.6 An applicant shall demonstrate evidence of hands-on training by the diabetic team regarding insulin pump use which shall be submitted to the Authority at time of initial application.

4.7 An applicant shall demonstrate low risk of hypoglycaemia as evidenced by:

(a) previous hypoglycaemic events requiring emergency medical intervention including assistance from non-medically trained bystanders.

(b) a stable glucose control as measured by HbA1C 6% - 7.5%.

(c) submission of an Ambulatory Glucose Profile (AGP) and Time-In-Range (TIR) data over a three (3) month period preceding initial certification that reflects the following blood glucose control criteria:

(i) CGM Sensor Wear: at least 90% of the time or greater;

(ii) Time in Range (TIR) of 4,5 - 10 mmol/L: 70% or greater;

(iii) Overall glucose readings 3,9 - 13,9 mmol/L: 90% or greater;

(iv) Glucose readings < 3,9 mmol/L: less than 4%;

(v) Glucose readings < 3,0 mmol/L: less than 1%;

(vi) Glucose readings > 13,9 mmol/L: less than 5%;

(vii) Coefficient of Variation (CV): < 33%, but will consider 33 - 36%;

(viii) Glucose Management Index (GMI);

(d) an applicant shall demonstrate adequate glucose monitoring with the Continuous Glucose Monitoring (CGM) device;

(e) an applicant shall demonstrate good diabetes education and understanding as evidenced by hands on training by a diabetic team as well as a practical flight test demonstrating compliance with the Authority blood glucose testing protocol);

(f) an applicant shall not demonstrate evidence of hypoglycaemia unawareness;

(g) an applicant shall have a positive attitude towards monitoring and self-care as reported by his or her treating physician;

(h) the CGM device shall be checked pre-flight and confirmed to be in a working condition. A spare finger prick glucose monitoring device shall be carried by an applicant;

(i) a holder of a Class 1 medical certificate for a Schedule 13A protocol (pilot) with a confirmed diagnosis of a Type 1 Diabetes Mellitus medical certification shall have a validity period of one (1) year if the holder thereof is under the age of 40 years,

alternatively the requirements of regulation 67.00.6 relating to period of validity of aviation personnel shall apply;

(j) a holder of a Class 1 medical certificate for a Schedule 13A protocol (pilot) shall ensure that blood glucose monitoring is pre-planned, and alerts/reminders are set up for testing as per the relevant schedule;

(k) due to the lag in interstitial readings when blood glucose is either rising or falling rapidly, a finger prick blood glucose measuring method shall be available on all flights;

(l) a holder of a Class 1 medical certificate for a Schedule 13A protocol shall ensure that there is adequate quantity of insulin and rapidly absorbing glucose available on every flight; and

(m) a holder of a Class 1 medical certificate for a Schedule 13A protocol (pilot) shall ensure that a Glucagon pen (hypokit) is available on every flight in case of a serious hypoglycaemic event with a loss of consciousness.

5. Disqualifying conditions for initial medical certification

5.1 An applicant who presents with any history within the past two (2) years of hypoglycaemia attack requiring the intervention of another person.

5.2 An applicant who presents with hypoglycaemia in the absence of warning symptoms (hypoglycaemic unawareness).

5.3 An applicant who presents with inadequate blood glucose control as indicated by Ambulatory Glucose Profile (AGP), Time-in-Range (TIR) data and glycated haemoglobin results.

5.4 An applicant who presents with significant visual, neurological or cardiovascular complications.

6. Initial considerations: medication and blood glucose control

6.1 An applicant who presents for consideration shall be stable for a minimum of six (6) months.

6.2 An applicant's insulin pumps for drug delivery may be authorised with a precaution for the risk of over delivery in the event of a rapid decompression.

6.3 An applicant shall carry a finger prick glucose monitoring device and non-pump insulin delivery system for use during in-flight emergencies.

6.4 An applicant shall carry a back-up insulin delivery method in the event of pump failure.

6.5 An applicant shall submit an Endocrinologist assessment to a Medical Assessor and DAME with the following information:

(a) documentation of any history of being symptomatic; or

(b) biochemical hypoglycaemia in the preceding 12 months is required along with details of any ensuing intervention.

6.6 An applicant shall provide evidence of stable blood glucose control for at least 3 months as measured by:

(a) HbA1C (Generally between 6% and 7.5%);

(b) the submission of an Ambulatory Glucose Profile (AGP) and Time-In-Range (TIR) data reflecting the blood glucose control criteria as per subpart 4.6 (c) of this schedule; and

(c) having in his or her possession a CGM device approved by the South African Health Products Regulatory Authority (SAHPRA) and/or CE marked (Europe) and/or FDA (US) approved or ISO 9000 certified or device approved by other relevant authorities).

7. Specialists reports and complications of Type 1 Diabetes Mellitus

7.1 An applicant shall have no neurological or renal complications of diabetes mellitus that may result in sudden or subtle incapacitation.

7.2 Measurements of renal function such as eGFR > 90 and Albumin to Creatinine ratio < 30.

7.3 An Endocrinologist shall assess the neurology and renal system. If possible diabetic complications exist, a nephrology or neurology assessment is required.

7.4 An applicant shall have no evidence of significant diabetic retinopathy and an Ophthalmologist assessment is required.

7.5 An applicant shall have an initial cardiovascular assessment conducted by a cardiologist.

7.6 An applicant shall do an exercise electrocardiogram and shall reach 8.5 METS on the Bruce protocol.

7.7 An applicant over 40 years of age shall be screened for cardiovascular disease, unless there is a co-morbid cardiovascular risk factor, then it shall be done annually.

8. Cardiovascular risk factor control

8.1 The following cardiovascular risk control measures shall be under control.

8.2 **Lipid profile:**

(a) Total Cholesterol: < 4,5 mmol/1;

(b) LDL Cholesterol: < 1,8 mmol/1;

(c) HDL Cholesterol: > 1,0 mmol/1 (men), > 1,2 mmol/1 (women); and

(d) Triglycerides: < 1,7 mmol/1.

8.3 **Blood pressure:**

(a) The systolic blood pressure < 135 mm Hg, Diastolic Blood Pressure < 85 mm Hg

8.4 **Smoking status:**

(a) An applicant shall have a history of never smoking or smoking cessation if he or she is a former smoker. If currently smoking, initial certification shall only be considered after cessation.

8.5 **Obesity:**

(a) An applicant is required to have a Body Mass Index: < 28kg/m2

9. Blood glucose testing protocol

9.1 **Pre-flight monitoring**

(a) a holder of a Class 1 medical certificate for a Schedule 13A protocol (pilot) shall conduct a glucose test two (2) hours before commencing flight;

(b) One (1) hour before reporting for flight; and

(c) less than 30 minutes before take-off.

9.2 **During flight monitoring**

(a) a holder of a Class 1 medical certificate for a Schedule 13A protocol (pilot) shall conduct a blood glucose test at least every hour whilst flying;

(b) in the event of experiencing any diabetic symptoms; and

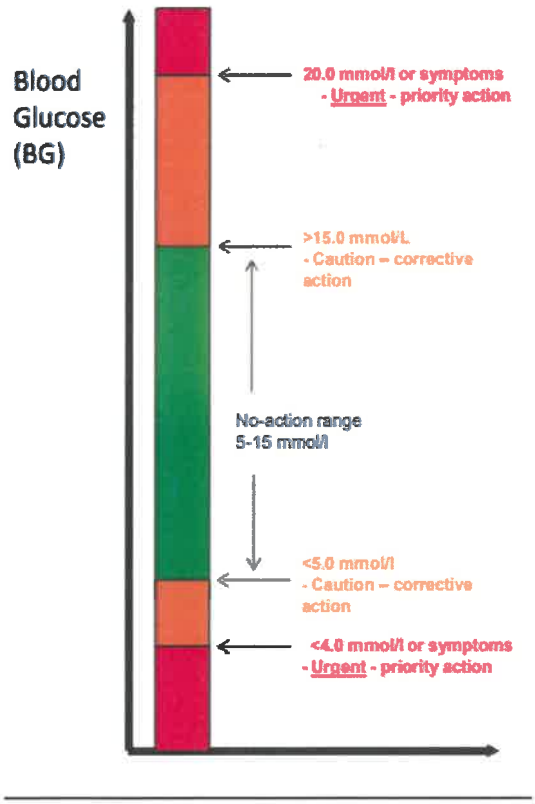
(c) prior to resuming flying after a period of rest or period after corrective action was taken for an out-of- range blood glucose result.

9.3 On approach flight approach monitoring

(a) A holder of a Class 1 medical certificate for a Schedule 13A protocol (pilot) shall within 30 minutes of anticipated landing time conduct a glucose test.

9.4 Corrective actions in the event of an out-of-range blood glucose:

The corrective actions indicated in the diagram and notes below shall be taken in the event of an out of range blood glucose level.



High readings	
Priority action (>20.0mmol/l)	**Corrective action (>15.0mmol/l)**
1. Check continuous glucose monitoring system 2. Shall hand over duties 3. take appropriate insulin and/or modify carbohydrate intake 4. Resume full duties when blood glucose <20.0mmol/l	1. Check continuous glucose monitoring system 2. If still >15.0mmol/l review insulin dosing and/or modify planned carbohydrate intake
Low readings:	
Priority action (<4.0mmol/l)	**Corrective action (<5.0mmol/l)**
1. Check continuous glucose monitoring system 2. If still <4.0mmol/l shall hand over duties 3. Ingest 10-15g readily absorbed carbohydrate and retest after 15mins 4. Review insulin dosing and/or modify carbohydrate intake 5. If test after ingestion is still <4.0 then ingest further 10-15g carbohydrate and retest after 15 min 6. Wait for 45 mins after the blood glucose returns to the 'green 'range before resuming duties.	1. Check continuous glucose monitoring system 2. If still <5.0mmol/l ingest 10-15g readily absorbed carbohydrate and retest after 30 mins 3. Review insulin dosing and/or modify carbohydrate intake

10. Insulin delivery in pumps functionality

10.1 An insulin pump system shall have an automatic function suspending insulin delivery if a rapid decrease in blood glucose value is anticipated by the CGM device and insulin pump system (also known as a "suspend before low" feature).

10.2 In the event of a rapid decompression for a pilot using insulin pump delivery systems:

(a) atmospheric pressure reduction causes unpredictable, unintended insulin delivery in pumps by bubble formation and expansion of existing bubbles;

(b) therefore, the insulin pump shall be disabled (disconnected) immediately and 15g readily absorbed carbohydrate ingested as soon as possible, within 15 minutes of the decompression;

(c) more frequent blood glucose monitoring shall be carried out thereafter;

(d) the insulin pump may be enabled (reconnected) after landing or when blood glucose levels and stability of glycaemic control can be verified; and

(e) a similar procedure shall be followed for all other emergency situations.

11. Issues of consideration

11.1 In the unlikely event of any symptoms of cognitive impairment a pilot shall not resume duties for the duration of the flight.

11.2 If crew assistance is required or a pilot becomes incapacitated, then an incidence report shall be completed and submitted to the Authority and the pilot shall be certified temporary unfit by a Medical Assessor and the pilot's medical fitness status shall be reviewed by the Aeromedical Committee to determine an applicant's medical fitness.

11.3 A holder of a Class 1 medical certificate for a Schedule 13A protocol (pilot) who hasto take action for a high or low reading shall always record an entry in his or her logbook, documenting the action taken.

11.4 The blood glucose data shall be periodically reviewed by a DAME and such data shall be submitted to the Medical Assessor against the flying/controlling log to ensure protocol compliance.

11.5 Failure to demonstrate compliance with the schedule of testing may result in suspension of the medical certificate.

11.6 A holder of a Class 1 medical certificate for Schedule 13A protocol (pilot) shall adhere to the fail-safe position which is to always take rapidly absorbed carbohydrate if unable to test.

12. Medical certification renewal requirements

12.1 A holder of a Class 1 medical certificate for a Schedule 13A protocol (pilot):

12.1.1 shall submit an endocrinologist report every six (6) months.

12.1.2 shall submit an HbA1C review every three (3) months for the first two (2) years, then six (6) monthly thereafter.

12.1.3 is required to submit a cardiologist review every five (5) years if a pilot is under the age of 40 years and annually if a pilot is over 40 years.

12.1.4 has cardiovascular risk factors in addition to diabetes, an annual cardiology report shall be submitted.

12.1.5 shall submit the ophthalmology report annually.

13. Requirements for change in the medical status

13.1 A holder of a Class 1 medical certificate for a Schedule 13A protocol (pilot) with changes in his or her medical status falling outside the required criteria shall be required to submit medical reports to a Medical Assessor for consideration and these changes include, but not limited to the following:

(a) an HbA1C between 8.5% -10% should trigger a diabetes review and review of treatment and a period of unfitness may be required to re-stabilise treatment;

(b) an HbA1C of greater than 10% indicates poor control and shall normally entail an unfit assessment;

(c) change of insulin regimen (including new use of pump) shall result in a pilot being declared temporary medically unfit for a minimum period of one (1) month;

(d) a medical report by an endocrinologist detailing stability, symptoms, satisfactory blood glucose and monitoring is required before return to flying;

(e) episodes of severe hypoglycaemia shall be reported and such occurrences including but not limited to severe hypoglycaemia requiring the assistance of another person shall normally entail an unfit assessment;

(f) the development of any retinopathy requires ophthalmological assessment and is likely to result in further restriction or medical unfitness if there is any field loss or reduction in visual acuity;

(g) the presence of significant nephropathy significantly increases cardiovascular risk and is likely to entail unfitness; and

(h) non-declaration of symptoms, medical history or provision of incomplete testing records/flying logbook is likely to entail unfitness"."

AMENDMENT OF SA CATS 91

7. Document SA-CATS 91 is hereby amended by the insertion after section 6 in Technical Standard 91.04.10 of the following section:

"7. Aeroplane for which voice or aural recorder is required

An owner or operator of an aeroplane shall ensure that an aeroplane used to operate a commercial air transport operation is equipped with a CVR or CaRS capable of recording the aural environment of the flight deck during flight time in accordance with the following Table .".

TABLE K1

Group See note 1.	Conditions See note 2.	Maximum Certificated Take-Off Mass (kg)	Propulsion System	Recording retained for the last 30 minutes of operation	Recording retained for the last 2 hours of operation	Recording retained for at least the last 25 hours of operation
1	Application for type certification submitted to Contracting State on or after 1 January 2016 and required to be operated by more than one pilot	> 2250 but ≤ 5700	Turbine	-	X	-
2	Individual certificate of airworthiness first issued on or after 1 January 2003	> 8618	All	-	X	-
3	Individual certificate of airworthiness first issued on or after 1 January 1987	> 8618	All	-	X	-
4	Individual certificate of airworthiness first issued	>8618> 27000	Turbine	-	X	-

	before 1 January 1987 whose types of which the prototype was certificated by the appropriate national authority after 30 September 1969					
5	individual certificate of airworthiness is first issued on or after 1 January 2022	> 27000	All	-	-	X

AMENDMENT OF SA CATS 121

8. Document SA-CATS 121 is hereby amended by:

(a) the substitution in Technical Standard 121.03.1 for section 3(7) subparagraph (iii) of the following subparagraph:

"(7) Qualifications of pilot checking personnel

A person authorised to conduct pilot skills tests shall –

(iii) in the case of line checks performed by company check pilots (CCPs) –

(aa) hold a valid ATPL;

(bb) hold a valid medical certificate;

(cc) have adequately demonstrated competency in terms of Technical Standard 121.03.3 (6).

(dd) have completed the operator's training programme, be current and qualified as a line captain on the aircraft type on which the line check will be given;

(ee) be qualified to perform PF and PNF duties while occupying a flight crew member seat;

(ff) be certified in his or her training file as authorised by an operator to conduct line checks as specified in such certification;

(gg) hold a valid Instrument Rating;

(hh) have knowledge of the Standard Operating Procedures, AFM, MEL and special equipment manuals, operations and training manuals applicable to the operation; and

(ii) have practical and theoretical knowledge of the administrative procedures and records management system applicable to the operator and approved in conjunction with the training program"."

(b) the substitution for the Table D2 in Technical Standard 121.05.17 section 6 of the following Table:

6.	**[Aeroplanes] Aeroplane for which voice or aural [recorders are] recorder is required**
	"[(1)] An operator shall ensure any aeroplane used to operate a commercial air transport operation is equipped with a CVR or CaRS capable of recording the aural environment of the flight deck during flight time in accordance with the following table:

TABLE D2

Group See note 1.	Conditions See note 2.	Maximum Certificated Take-Off Mass (kg)	Propulsion System	Recording retained for the last 30 minutes of operation	Recording retained for the last 2 hours of operation	Recording retained for at least the last 25 hours of operation
1	Application for type certification submitted to Contracting State on or after 1 January 2016 and required to be operated by more than one pilot	> 2250 but ≤ 5700	Turbine		X	
2	Individual certificate of airworthiness first issued on or after 1 January 2003	> 8618	All		X	
3	Individual certificate of airworthiness first issued on or after 1 January 1987	> 8618	All	-	X	
4	Individual certificate of airworthiness first issued	>8618 27000	Turbine	-	X	

	before 1 January 1987 whose types of which the prototype was certificated by the appropriate national authority after 30 September 1969					
5	individual certificate of airworthiness is first issued on or after 1 January **[2021]** 2022	> 27000	All			X

(c) the insertion after Technical Standard 121.06.3 of the following technical standard:

"121.06.5 Safety inspections and audits

1. Classifications of findings or non-compliance

1.1 Level 1 Finding

A level 1 non-compliance or finding poses an imminent danger, safety and security risk to persons in an aircraft or to persons or to property on the ground and shall necessitate the exercising of immediate discretionary enforcement powers vested in the inspectors, authorised officers and authorised persons in the interest of safeguarding aviation safety and security in line with section 115 and 116 of the Civil Aviation Act, 2009 (Act No.13 of 2009). A level 1 finding is in all instances a safety concern and shall require remedial action acceptable to the Director within 24 hours by an approval holder.

1.2 Level 2 Finding

A level 2 non-compliance or finding poses a serious safety or security risk to persons in an aircraft or to persons or to property on the ground and shall be resolved within a short time frame. It shall be required of an approval holder to develop action plans within agreed time frames and follow-up inspections or audits by inspectors, authorised officers or authorised persons to verify rectification of the non-compliances. A response containing a corrective action plan acceptable to the Director shall be submitted by an approval holder within 7 days.

***Note**: Previous findings, which have not been addressed (repetitive or continuous noncompliance findings or blatant disregard for the Authority findings), may be upgraded to a Level 2 or Level 1 finding.*

***Note:** A level 2 or level 1 non-compliance in one part of the operation may not necessarily affect the whole operation*

1.3 Level 3 Finding

A level 3 non-compliance or finding does not necessarily have an immediate direct impact on safety or security on its own. It is the responsibility of an approval holder to rectify the non-compliance/finding and there shall be no follow-up inspection by the Authority. An approval holder is required to notify the Authority within a specified time frame, when rectification has been effected. These findings are normally administrative in nature. Generally, a response containing corrective actions shall be received within 14 working days.

1.4 Observation

Where a practice or condition that indicates a trend that may lead to a future non-compliance, it is highly recommended that it be pointed out to an approval holder and afford the approval holder an opportunity to respond to the observation"."

(d) the substitution of Technical Standard 121.07.33 of the following Technical Standard:

"121.07.33 SEATS, SEAT SAFETY BELTS, HARNESSES AND CHILD RESTRAINT DEVICES AND CARRIAGE OF INFANTS

(1) An air service operator shall not carry an infant on board an aeroplane unless such infant is at all times properly secured in the arms or on the lap of an adult passenger, or the aeroplane is equipped with a child restraint system or a sky cot.

(2) If a sky cot is used, it shall be–

(a) secured to prevent it from moving under the maximum acceleration during flight;

(b) fitted with a restraining device to prevent an infant being thrown from such sky cot under maximum acceleration during flight;

(c) used only during noncritical phases of flight; and

(d) positioned in such a way that it does not prevent or hinder the movement of adjacent passengers or block exits.

(3) An <u>infant</u> shall not be carried behind a bulkhead during critical phases of flight and during turbulence, unless restrained in a car type infant seat.

(4) A child restraint system may be used provided that-

(a) **[infants]** <u>an infant</u> is not carried behind a bulkhead unless the child restraint device is used during critical phases of flight and during turbulence; and

(b) that car type infant seats are certified for carriage on board an aeroplane

(5) Restraining devices designed to be secured to a passenger seat by means of a single lap strap shall;

(a) be secured at critical phases of flight to the passenger seat in accordance with the manufacturer's instructions;

(b) face in the same direction as the passenger seat;

(c) does not protrude beyond the forward position of the passenger seat cushion on which it rests;

(d) be secured to the passenger seat, even when it is unoccupied by a child;

(e) be capable of being removed from the aircraft in an emergency evacuation**[, and not the infant]**;

(f) be positioned in such a way that it does not prevent or hinder the movement of adjacent passengers or block exits;

(h) where possible, is not placed in an aisle seat, depending on cabin configuration;

(i) be used in accordance with infant weight limitations specified for such device; and

(j) be fitted with a single release harness, which secures the infant's lap, torso and **[shalers]** shoulders, and is designed so that the child can easily be secured in or removed from it.

(k) not be located in the same row or row directly forward or aft of an overwing emergency exit or in the same row as any other exit unless such exit and row are separated by a bulkhead.

(6) When an infant is carried in the arms or on the lap of an adult passenger:

(a) the seat belt, when required to be worn, shall be fastened around the passenger carrying or nursing the infant but not around the infant; and

(b) the name of the infant shall be bracketed on the passenger list with the name of the person carrying or nursing the infant"."

AMENDMENT OF SA CATS 135

9. Document SA-CATS 135 is hereby amended by:

(a) the substitution in Technical Standard 135.03.1 section 5 (4) for subparagraph (iii) of the following subparagraph:

"(4) Qualifications of pilot checking personnel

A person authorised to conduct PPCs shall -

(iii) in the case of line checks performed by company check pilots (CCPs) –

(aa) for an aeroplane with an MCM less than 8618 kg, hold a valid ATPL

(bb) hold a valid medical certificate;

(cc) have adequately demonstrated competency in terms of Technical Standard 135.03.3;

(dd) have completed the operator's training programme, be current and be qualified as a line captain on the aircraft type on which the line check will be given;

(ee) be qualified to perform PF and PNF duties while occupying either flight crew member seat;

(ff) be certified in his or her training file as authorised by an operator to conduct line checks as specified in such certification;

(gg) hold a valid Instrument Rating;

(hh) have knowledge of the Standard Operating Procedures, AFM, MEL and special equipment manuals, operations, and training manuals applicable to the operation;

(ii) have practical and theoretical knowledge of the administrative procedures and records management system applicable to the operator and approved in conjunction with the training program"."

(b) the substitution for the Table G1 in Technical Standard 135.05.11 section 1 of the following Table:

1. [Aeroplanes] Aeroplane for which a voice or aural [recorders are] is required

TABLE G1

Group See note 1.	**Conditions See note 2.**	**Maximum Certificated Take-Off Mass (kg)**	**Propulsion System**	**Recording retained for the last 30 minutes of operation**	**Recording retained for the last 2 hours of operation**	**Recording retained for at least the last 25 hours of operation**
1	Application for type certification submitted to Contracting State on or after 1 January 2016 and required to be operated by more than one pilot	> 2250 but ≤ 5700	Turbine		X	

2	Individual certificate of airworthiness first issued on or after 1 January 2003	> 5700	All		X	
3	Individual certificate of airworthiness first issued on or after 1 January 1987	> 5700	All	-	X	
4	Individual certificate of airworthiness first issued before 1 January 1987 whose types of which the prototype was certificated by the appropriate national authority after 30 September 1969	>5700≥ 27000	Turbine	-	X	
5	individual certificate of airworthiness is first issued on or after 1 January **[2021]** 2022	> 27000	All			X

(c) the substitution for section 2 in Technical Standard 135.07.1 of the following section:

"2. EDTO authorisation and requirements for operations beyond 180 minutes.

NOTE — Additional guidance is contained in TGM CA AOC-032.

2.1. GENERAL

(1) An air service operator shall not operate an EDTO flight unless authorised to do so on its Ops spec by means of a specific approval issued by the Director, which considers EDTO maintenance and operational requirements.

(2) An air service operator wishing to conduct an EDTO operation shall apply to the Director for a specific approval at least 90 days prior to the operational departure date.

(d) the insertion after section 2 of the following sections:

(3) This technical standard establishes EDTO requirements for -

(a) two-engined aeroplanes operated along a planned route which contains a point further than 180 minutes flying time from an adequate airport at an approved one-engine inoperative cruise speed under standard conditions in still air.

(b) aeroplanes with more than two engines operated along a planned route which contains a point further than 180 minutes flying time from an adequate airport at an approved all engine operating cruise speed under standard conditions in still air.

(4) Aeroplanes with more than two engines shall have undergone a manufacturer's review of the time capabilities of the relevant EDTO time-limited systems (TLSs) to determine whether:

(a) these time limitations have to be considered for the dispatch of EDTO flights; and

(b) the corresponding time limitation should be provided for in relevant aircraft documentation.

(5) To conduct EDTO, the specified aircraft-engine combination must be certificated to the airworthiness standards for transport-category aircraft and each aircraft shall be approved for EDTO by the Director

6) When requesting any route, for the initial EDTO Approval, an air service operator shall demonstrate that:

(a) it is able to satisfactorily conduct operations between each required airport as defined for that route or route segment, and any required en route alternate airport; and

(b) the facilities and services specified in the applicable Part of these regulations are available and adequate for the proposed operation.

2.2 REQUIRMENTS APPLICABLE TO AEROPLANES FLOWN IN EDTO OPERATIONS

(a) All aeroplanes, regardless of the number of engines, needs a viable diversion airport in the case of an onboard fire, medical emergency or catastrophic decompression.

(b) An air service operator shall ensure:

(i) availability of en route alternate airports;

(ii) adequate firefighting coverage at these airports;

(iii) fuel planning to account for depressurization; and

(iv) that planning for the maximum allowable diversion and worst-case scenarios account for all aircraft time-critical systems.

2.3 OPERATIONS BY AEROPLANES WITH TURBINE ENGINES FOR OPERATIONS BEYOND 180 MINUTES TO AN EN-ROUTE ALTERNATE AERODROME

2.3.1 General

(1) All provisions for operations by an aeroplane with turbine engines beyond 180 minutes to an en-route alternate aerodrome applies to extended diversion time operations (EDTO).

(2) In applying these EDTO requirements for an aeroplane with turbine engines:

(a) operational control procedures shall be contained in the operations manual;

(b) flight dispatch procedures refer to the method of control and supervision of flight operations. This does not imply a specific requirement for licensed flight dispatcher or a full flight following system;

(c) operating procedures refer to the specification of organisation and methods established to exercise operational control and flight dispatch procedures in the appropriate manual(s). These procedures should cover at least a description of responsibilities concerning the initiation, continuation, termination or diversion of each flight as well as the method of control and supervision of flight operations; and

2.3. 2 Requirements to be used when converting diversion times to distances

(1) An approved one-engine-inoperative (OEI) speed or approved all-engines operative (AEO) speed is any speed within the certified flight envelope of the aeroplane.

(2) Determination of the 180-minute distance — aeroplanes with two turbine engines.

For determining whether a point on the route is beyond 180 minutes to an en-route alternate, an air service operator should select an approved OEI speed. The distance is calculated from the point of the diversion followed by cruise for 180 minutes, in ISA and still-air conditions. For the purposes of computing distances, credit for drift down may be applied.

(3) Determination of the 180-minute distance — aeroplanes with more than two turbine engines.

(a) For determining whether a point on the route is beyond 180 minutes to an en-route alternate, an air service operator shall select an approved AEO speed. The distance is calculated from the point of the diversion followed by cruise for 180 minutes, in ISA and still-air conditions.

2.3.3 Training

(1) An air service operator shall ensure that prior to conducting EDTO, each pilot, flight operations officer and despatcher has completed EDTO training in accordance with a syllabus approved by the Director and detailed in the appropriate manual. Training programmes shall contain as a minimum:-

(a) route qualification;

(b) flight preparation;

(c) concept of extended diversion time operations;

(d) criteria for diversions; and

(e) requirements for initial and recurrent training.

2.3.4 Flight dispatch and operational requirements

(1) Flight dispatch requirements contained in the applicable manual should ensure the following-

(a) identification of en-route alternate aerodromes;

(b) prior to departure and during flight, that the flight crew is provided with the most up-to-date information on the identified en-route alternate aerodromes, including operational status and meteorological conditions;

(c) methods to enable two-way communications between an aeroplane and the operator's operational control centre;

(d) that the air service operator has a means to monitor conditions along the planned route including the identified alternate aerodromes and that procedures are in place so that the flight crew are advised of any situation that may affect the safety of flight;

(e) that the intended route does not exceed the established aeroplane threshold time unless the air service operator is approved for EDTO operations;

(f) pre-flight system serviceability checking including the status of items in the minimum equipment list;

(g) communication and navigation facilities and capabilities;

(h) fuel requirements;

(i) availability of relevant performance information for the identified en-route alternate aerodrome(s); and

(j) systems degradation and reduced flight altitude.

(2) In addition, operations conducted by an aeroplane with two turbine engines, the air service operator shall ensure that-

(a) prior to departure and in flight, the meteorological conditions at identified en-route alternate aerodromes shall be at or above the aerodrome operating minima required for the operation during the estimated time of use.

(b) en-route alternate aerodromes, as required in (a) above for EDTO by aeroplanes with two turbine engines, shall be selected and specified in the operational and air traffic services (ATS) flight plans.

2.3.5 En-route alternate aerodromes

(1) The PIC shall ensure that aerodromes to which an aeroplane may proceed in the event that a diversion becomes necessary while en route:

(a) are identified and operational;

(b) the necessary services and facilities available; and

(c) aeroplane performance requirements can be met.

(2) En-route alternate aerodromes may also be the take-off or destination aerodromes.

2.4. EDTO REQUIREMENTS FOR AEROPLANES WITH TWO OR MORE TURBINE ENGINES

2.4.1 In addition to section 3, this section addresses the provisions that apply to operations by an aeroplane with two or more turbine engines where the diversion time to an en-route alternate aerodrome is greater than the established threshold time.

2.4.2 EDTO significant systems

(1) EDTO significant systems may be the aeroplanes propulsion system and any other aeroplane systems whose failure or

malfunctioning could adversely affect safety particular to an EDTO flight, or whose functioning is specifically important to continued safe flight and landing during an aeroplane EDTO diversion.

(2) An air service operator shall ensure that the redundancy level and reliability of the aeroplane systems are adequate to support the safe conduct of EDTO

(3) The maximum diversion time shall not exceed the value of the EDTO significant system limitation, if any, for extended diversion time operations identified in an aeroplane flight manual, directly or by reference, reduced by an operational safety margin of 15 minutes.

(4) The specific safety risk assessment required from the air service operator to approve operations beyond the time limits of an EDTO significant time limited system should be in accordance with provisions as prescribed in Part 140 and shall consider at least the following:

(a) the capabilities of such air service operator in so far as they relate to the operator's quantifiable in-service experience, compliance record, aeroplane capability and overall operational reliability that:

(i) are sufficient to support operations beyond the time limits of an EDTO significant time-limited system;

(ii) demonstrates the ability of the air service operator to monitor and respond to changes in a timely manner; and

(iii) the air service operator's established processes, necessary for successful and reliable extended

diversion time operations, can be successfully applied to such operations;

(b) For the purposes of sub-section (2), overall reliability of the aeroplane refers to:

(i) quantifiable standards of reliability taking into account the number of engines, aircraft EDTO significant systems and any other factors that may affect operations beyond the time limits of a particular EDTO significant time-limited system; and

(ii) relevant data from the aeroplane manufacturer and data from an operator reliability programme used as a basis to determine overall reliability of the aeroplane and its EDTO significant systems;

(iii) For the purposes of sub-paragraph (ii), relevant information from the aeroplane manufacturer refers to technical data and characteristics of the aeroplane and worldwide fleet operational data provided by the manufacturer and used as a basis to determine overall reliability of the aeroplane and its EDTO significant systems; and

(c) For the purposes of sub-section (2), reliability of each time-limited system refers to quantifiable standards of design, testing and monitoring that ensure the reliability of each particular EDTO significant time-limited system;

(d) specific mitigation measures refer to the safety risk management mitigation strategies implemented in terms of the safety risk assessment, which have documented manufacturer concurrence, that ensure an equivalent

level of safety is maintained. These specific mitigations shall be based on:

(i) technical expertise such as data or evidence, proving the operator's eligibility for an approval of operations beyond the time limit of the relevant EDTO significant system; and

(ii) an assessment of relevant hazards, their probability and the severity of the consequences that may adversely impact the safety of the operation of an aeroplane operated beyond the limit of a particular EDTO significant time-limited system.

2.4.3 Threshold time and maximum diversion time

In considering an EDTO approval, the Director shall consider that –

(a) the established threshold time is not an operating limit. It is a flight time to an en-route alternate aerodrome, which is established as being the EDTO threshold beyond which particular consideration should be given to the aeroplane capability as well as the operator's relevant operational experience;

(b) the approved maximum diversion time shall take into consideration the most limiting EDTO significant system time limitation, if any, indicated in the aeroplane flight manual (directly or by reference) for a particular aeroplane type and the operator's operational and EDTO experience, if any, with an aeroplane type or, if relevant, with another aeroplane type or model.

2.5 EDTO for aeroplanes with more than two turbine engines

2.5.1 In addition to the provisions in section 2.2, this section addresses the provisions that apply in particular to aeroplanes with more than two turbine engines.

2.5.2 Operational and diversion planning principles

When planning or conducting an EDTO, an air service operator and the PIC shall ensure that:

(a) the MEL, the communications and navigation facilities, fuel and oil supply, en-route alternate aerodromes and aeroplane performance are appropriately considered;

(b) if no more than one engine is shut down, a PIC may elect to continue beyond the nearest en-route alternate aerodrome (in terms of time) if a PIC determines that it is safe to do so. In making this decision, a PIC shall consider all relevant factors; and

(c) in the event of a single or multiple failure of an EDTO significant system or systems (excluding engine failure), the aircraft can proceed to and land at the nearest available en-route alternate aerodrome where a safe landing can be made unless it has been determined that no substantial degradation of safety will result from any decision made to continue the planned flight.

2.5.3 EDTO critical fuel

(1) An aeroplane with more than two engines engaged in EDTO operations shall carry enough fuel to fly to an en-route alternate aerodrome. This EDTO critical fuel should correspond to the additional fuel that may be required to comply with Part 135.

(2) The following shall be considered, using the anticipated mass of an aeroplane, in determining the corresponding EDTO critical fuel:

(a) fuel sufficient to fly to an en-route alternate aerodrome, considering at the most critical point of the route, simultaneous engine failure and depressurization or depressurization alone, whichever is more limiting;

NOTE: the speed selected for the diversions be it depressurization, combined or not with an engine failure, may be different from the approved AEO speed used to determine the EDTO threshold and maximum diversion distance.

(b) fuel to account for icing;

(c) fuel to account for errors in wind forecasting;

(d) fuel to account for holding an instrument approach and landing at the en-route alternate aerodrome;

(e) fuel to account for deterioration in cruise fuel-burn performance; and

(f) fuel to account for APU use (if required).

(3) The following factors may be considered in determining if a landing at a given aerodrome is the more appropriate course of action:

(a) aeroplane configuration, mass, systems status and fuel remaining;

(b) wind and weather conditions en-route at the diversion altitude, minimum altitudes en-route and fuel consumption to the en-route alternate aerodrome;

(c) runways available, runway surface condition and weather, wind and terrain in the proximity of the en-route alternate aerodrome;

(d) instrument approaches and approach/runway lighting available and rescue and fire fighting services (RFFS) at the en-route alternate aerodrome;

(e) the pilot's familiarity with that aerodrome and information about that aerodrome provided to a pilot by an operator; and

(f) facilities for passenger and crew disembarkation and accommodation.

2.5.4. Threshold time

(1) In establishing the appropriate threshold time and to maintain the required level of safety, the Director shall consider that -:

(a) the airworthiness certification of the aeroplane type does not restrict operations beyond the threshold time, taking into account the aeroplane system design and reliability aspects;

(b) specific flight dispatch requirements are met;

(c) necessary in-flight operational procedures are established; and

(d) the operator's previous experience and operating record on similar aircraft types and routes is satisfactory.

(2) For determining whether a point on a route is beyond the EDTO threshold to an en-route alternate aerodrome, an operator shall use the approved speed as described in this subpart.

2.5.5 Maximum diversion time

(1) In approving the maximum diversion time, the Director will consider the aeroplanes EDTO significant systems (e.g. limiting time limitations, if any, and relevant to that particular operation) for:

(a) a particular aeroplane type; and

(b) the air service operators operational and EDTO experience with the aeroplane type; or

(c) if relevant, with another aeroplane type or model.

(2) An air service operator's approved maximum diversion time should not exceed the most limiting EDTO significant system time limitation identified in the aeroplane flight manual, reduced by an operational safety margin of 15 minutes.

(3) For determining the maximum diversion distance to an en-route alternate the approved speed as described in this technical standard shall be used.

2.5.6 EDTO significant systems

(1) In addition to the provisions in section 4, this section addresses particular provisions for an aeroplane with more than two turbine engines.

(2) Consideration of time limitations:

(a) For operations beyond the EDTO threshold, an operator shall consider, at time of dispatch and as outlined below, the most limiting EDTO significant system time limitation, if any, indicated in the aeroplane flight manual (directly or by reference) and relevant to that particular operation.

(b) An operator shall check that from any point on the route, the maximum diversion time does not exceed the most limiting EDTO significant system time limitation, reduced by an operational safety margin of 15 minutes.

(c) The maximum diversion time subject to cargo fire suppression time limitations are considered part of the most limiting EDTO significant time limitations.

(d) For that purpose, an operator shall consider the approved speed as described in this technical standard or consider adjusting that speed with forecast wind and temperature conditions for operations with threshold times beyond 180 minutes.

2.5.7 En-route alternate aerodromes

In addition to the en-route alternate aerodrome provisions prescribed elsewhere in these technical standards, the following shall apply:

(a) for route planning purposes, identified en-route alternate aerodromes, which may be used if necessary, needs to be located at a distance within the maximum diversion time from the route;

(b) in extended diversion time operations, before an aeroplane crosses its threshold time during flight, the conditions at the en-route alternate aerodrome within the approved maximum diversion time will be at or above the operator's established aerodrome operating minima for the operation during the estimated time of use;

(c) if any conditions, such as weather below landing minima, are identified that would preclude a safe approach and landing at that aerodrome during the estimated time of use, an alternative course of action shall be determined such as selecting another en-route alternate aerodrome within an operator's approved maximum diversion time; and

(d) En-route alternate aerodromes may also be the take-off and destination aerodromes.

2.5.8 Operational approval procedure

(1) In approving an operator with a particular aeroplane type for extended diversion time operations, the appropriate threshold time and maximum diversion time should be established and, in addition to the requirements previously set forth in this technical standard, the Director shall ensure that:

(a) the air service operator's past experience and compliance record is satisfactory and an air service operator has

established the processes necessary for successful and reliable extended diversion time operations and shown that such processes can be successfully applied throughout such operations;

(b) an operator's procedures are acceptable based on certified aeroplane capability and adequate to address continued safe operation in the event of degraded aeroplane systems;

(c) the air service operator's crew training programme is adequate for the proposed operation;

(d) documentation accompanying the authorization covers all relevant aspects;

(e) it has been shown (e.g. during the EDTO certification of the aeroplane) that the flight can continue to a safe landing under the anticipated degraded operating conditions which would arise from the most limiting EDTO significant system time limitation, if any, for extended diversion time operations is identified in the aeroplane flight manual, directly or by reference; and

(f) any other condition which the State of the Operator considers to be equivalent in airworthiness and performance risk.

2.5.9 Conditions for converting diversion times to distances in determining the geographical area beyond threshold and within maximum diversion distances

(1) An approved AEO speed is any all-engines-operative speed within the certified flight envelope of an aeroplane.

(2) An air service operator, when applying for an EDTO specific approval, shall identify, for the Director's approval, the AEO speed considering ISA and still-air conditions used to calculate the threshold and maximum diversion distances.

NOTE: the speed used to calculate the maximum diversion distance may be different from the speed used to determine the 180 minute and EDTO thresholds.

(3) For determining whether a point on the route is beyond the EDTO threshold to an en-route alternate, an air service operator shall:

(a) use the approved speed as provided in this technical standard; and

(b) calculate the distance from the point of the diversion followed by the cruise for the determined threshold time.

(4) For determining the maximum diversion time distance to an en-route alternate, an air service operator shall use:

(a) the approved speed as prescribed in this technical standard;
(b) the distance calculated from the point of the diversion followed by the cruise for the approved maximum diversion time.

2.5.10 (1) For an aeroplane with more than two engines, there are no additional EDTO airworthiness certification requirements. This means that the configuration and maintenance standards defined through the basic type certification of such an aeroplane are considered as adequate for EDTO operations.

(2) Nevertheless, a review of the TLS, if any, on aeroplanes with more than two engines should be performed by the aircraft manufacturer. The objective of this review is to confirm whether these time limitations have to be considered for the dispatch of EDTO flights and if the corresponding time limitation should be provided in relevant aircraft documentation.

(3) As in subparagraph (1), there are no additional EDTO maintenance procedures or maintenance programme requirements for aeroplanes with more than two engines. Notwithstanding that ICAO

Standards do not require EDTO certification for aeroplanes with more than two engines, where a State has implemented standards for EDTO certification of these aeroplanes, the following should be considered:

(a) existing ETOPS certifications granted prior to the implementation of the new EDTO Standards in the regulations and these technical standards remain valid and do not require recertification for EDTO;

(b) the EDTO certification is reflected by the issuance of an EDTO CMP document. The EDTO CMP document gathers the required configuration standards and maintenance tasks, and as applicable, the flight crew procedures and dispatch standards. For EDTO operations, the aircraft should be configured, maintained and operated according to the EDTO CMP document requirements; and

c) the EDTO CMP document is approved by the State of Design. It is issued for the initial EDTO certification. It may be revised to reflect the conclusions of the in-service experience review (reliability surveillance performed by the State of Design) through the airworthiness directive process.

(4) The most limiting EDTO significant system time limitation, if any, must be indicated in the aircraft flight manual (directly or by reference) and relevant to that particular operation.

2.5.11 Maintaining operational approval

In order to maintain the required level of safety on routes where an aeroplane is permitted to operate beyond the established threshold time, an air service operator shall ensure that:

(a) specific flight dispatch requirements are met;

(b) in-flight operational procedures are established; and

(c) specific operational approval is granted by the Director.

2.6 EDTO FOR AN AEROPLANE WITH TWO TURBINE ENGINES

2.6.1 General

(1) In addition to the provisions in sections 2.2 and 2.5, this section addresses the provisions that apply in particular to an aeroplane with two turbine engines.

(2) EDTO provisions for aeroplanes with two turbine engines do not differ from the previous provisions for extended range operations by aeroplanes with two turbine engines (ETOPS). Therefore, EDTO may be referred to as ETOPS in some documents.

2.6.2 Operational and diversion planning principles

2.6.2.1 When planning or conducting EDTO, the air service operator and the PIC shall ensure that:

(a) the minimum equipment list, the communications and navigation facilities, fuel and oil supply, en-route alternate aerodromes and aeroplane performance are appropriately considered;

(b) in the event of an aeroplane engine shutdown, an aeroplane can proceed to and land at the nearest en-route alternate aerodrome, in terms of the least flying time, where a safe landing can be made; and

(c) in the event of a single or multiple failure of an EDTO significant system or systems (excluding engine failure), the aeroplane can proceed to and land at the nearest available en-route alternate aerodrome where a safe landing can be made unless it has been determined that no substantial degradation of safety will result from any decision made to continue the planned flight.

2.6.2.2 EDTO critical fuel

(1) The PIC of an aeroplane with two engines engaged in EDTO operations shall ensure that sufficient fuel is carried to fly to an en-route alternate aerodrome. This EDTO critical fuel corresponds to the additional fuel that may be required.

(2) The following shall be considered, using the anticipated mass of the aeroplane, in determining the corresponding EDTO critical fuel:

(a) fuel sufficient to fly to an en-route alternate aerodrome, considering at the most critical point of the route, failure of one engine or simultaneous engine failure and depressurization or depressurization alone, whichever is more limiting:

(i) the speed selected for the all-engines-operative diversion which may be depressurization alone, may be different from the approved OEI speed used to determine the EDTO threshold and maximum diversion distance;

(ii) the speed selected for the OEI diversions, which may be engine failure alone or combined engine failure and depressurization, shall be the approved OEI speed used to determine the EDTO threshold and maximum diversion distance;

(b) fuel to account for icing;

(c) fuel to account for errors in wind forecasting;

(d) fuel to account for holding an instrument approach and landing at the en-route alternate aerodrome;

(e) fuel to account for deterioration in cruise fuel-burn performance; and

(f) fuel to account for APU use (if required).

2.6.2.3 The following factors shall be considered by a PIC in determining if a landing at a given aerodrome is the more appropriate course of action:

(1) Aeroplane configuration, mass, systems status and fuel remaining;

(2) Wind and weather conditions en route at the diversion altitude, minimum altitudes en route and fuel consumption to the en-route alternate aerodrome;

(3) Runways available, runway surface condition and weather, wind and terrain in the proximity of the en-route alternate aerodrome;

(4) Instrument approaches and approach/runway lighting available and rescue and fire fighting services (RFFS) at the en-route alternate aerodrome;

(5) Familiarity with that aerodrome and information about that aerodrome provided to the pilot by the operator; and

(6) Facilities for passenger and crew disembarkation and accommodation.

2.6.2.4 Threshold time

(1) In establishing the appropriate threshold time and to maintain the required level of safety, the Director shall consider:

(a) an airworthiness certification of the aeroplane type specifically permits operations beyond the threshold time, taking into account the aeroplane system design and reliability aspects;

(b) a reliability of the propulsion system is such that the risk of double engine failure from independent causes is extremely remote;

(c) any necessary special maintenance requirements are fulfilled;

(d) specific flight dispatch requirements are met;

(e) necessary in-flight operational procedures are established; and

(f) the operator's previous experience on similar aircraft types and routes is satisfactory.

(2) For determining whether a point on a route is beyond the EDTO threshold to an en-route alternate aerodrome, an operator shall use the approved speed as described in this technical standard.

2.6.2.5 Maximum diversion time

(1) In approving the maximum diversion time, the Director shall consider the EDTO certified capability of an aeroplane, the aeroplane's EDTO significant systems for example limiting time limitation, if any, and relevant to that particular operation) for a particular aeroplane type and the operator's operational and EDTO experience with the aeroplane type or, if relevant, with another aeroplane type or model.

(2) For determining the maximum diversion distance to an en-route alternate, an operator shall use the approved speed as described in this technical standard.

(3) An air service operator's approved maximum diversion time shall not exceed the EDTO certified capability of the aeroplane or the most limiting EDTO significant system time limitation identified in the aeroplane flight manual, reduced by an operational safety margin of 15 minutes.

2.7 EDTO SIGNIFICANT SYSTEMS

In addition to the provisions of section 2.2, this section addresses particular provisions for an aeroplane with two turbine engines.

2.7.1 The reliability of the propulsion system for the aeroplane/engine combination being certified is such that the risk of double engine failure from independent causes shall be assessed and found acceptable to support the diversion time being approved by the Director.

2.7.2 **Consideration of time limitations**

(a) For all operations beyond the EDTO threshold, as determined by the Director, an air service operator should consider, at time of dispatch and as outlined below, the EDTO certified capability of the aeroplane and the most limiting EDTO significant system time limitation, if any, indicated in the AFM (directly or by reference) and relevant to that particular operation.

(2) An air service operator shall check that from any point on the route, the maximum diversion time at the approved speed as described in this technical standard does not exceed the most limiting EDTO significant system time limitation, other than the cargo fire suppression system, reduced by an operational safety margin, of not less than 15 minutes.

(3) The air service operator shall check that from any point on the route, the maximum diversion time at all-engines operating cruise speed, considering ISA and still-air conditions, does not exceed the cargo fire suppression system time limitation, reduced by an operational safety margin, of not less than 15 minutes.

(4) The air service operator shall consider the approved speed as described in this technical standard or consider adjusting that speed with forecast wind and temperature conditions for operations with threshold times beyond 180 minutes.

2.7.3 En-route alternate aerodromes

(1) In addition to the en-route alternate aerodrome provisions described in this technical standard, the air service operator and the PIC shall apply the following:

(a) for route planning purposes, identified en-route alternate aerodromes, which may be used if necessary, need to be located at a distance within the maximum diversion time from the route;

(b) during EDTO, before an aeroplane crosses its threshold time during flight, an en-route alternate aerodrome shall be nominated within the approved maximum diversion time whose conditions shall be at or above the air service operator's established aerodrome operating minima for the operation during the estimated time of use.

(c) if any conditions, such as weather below landing minima, are identified that would preclude a safe approach and landing at that aerodrome during the estimated time of use, an alternative course of action shall be determined such as selecting another en-route alternate aerodrome within the operator's approved maximum diversion time.

(2) During flight preparation and throughout the flight the air service operator shall provide the means to the flight crew to obtain the most up-to-date information on the identified en-route alternate aerodromes, including operational status and meteorological conditions.

(3) En-route alternate aerodromes may also be the take-off or destination aerodromes.

2.7.4 Operational approval procedure

(1) The Director shall establish an appropriate threshold time and in addition to approving a maximum diversion time for an air service operator, the Director shall ensure that the air service operator has:

(a) a satisfactory compliance record and past experience;

(b) established the processes necessary for successful and reliable extended diversion time operations and shown that such processes can be successfully applied throughout such operations;

(c) procedures that are acceptable based on certified aeroplane capability and adequate to address continued safe operation in the event of degraded aeroplane systems;

(d) a crew training programme that is adequate for the proposed operation;

(e) documentation accompanying the authorization application that covers all relevant aspects; and

(f) shown (e.g. during the EDTO certification of the aeroplane) that the flight can continue to a safe landing under the anticipated degraded operating conditions which could arise from:

(i) the most limiting EDTO significant system time limitation, if any, for extended diversion time operations identified in the aeroplane flight manual, directly or by reference;

(ii) total loss of engine-generated electric power;

(iii) total loss of thrust from one engine; or

(iv) any other condition which the Director considers to be equivalent in airworthiness and performance risk.

2.7.5 Conditions to be used by an air service operator when converting diversion times to distances for the determination of the geographical area beyond threshold and within maximum diversion distances

(1) For the purpose of this technical standard, an approved OEI speed is any one-engine-inoperative speed within the certified flight envelope of an aeroplane.

(2) **EDTO OEI speed**

(a) when applying for EDTO, the air service operator should identify, and the Director shall approve, the OEI speed(s), considering ISA and still-air conditions, that will be used to calculate the threshold and maximum diversion distances; and

(b) the air service operator shall ensure that the identified speed that will be used to calculate the maximum diversion distance shall be the same one used to determine fuel reserves for OEI diversions.

(3) **Determination of the EDTO threshold**

(a) for determining whether a point on the route is beyond the EDTO threshold to an en-route alternate, the air service operator shall use the approved speeds as described in this technical standard.

(b) the distance is calculated from the point of the diversion followed by the cruise for the determined threshold time.

(c) for the purposes of computing distances, credit for driftdown may be taken.

(4) Determination of the maximum diversion time distance

(a) for determining the maximum diversion time distance to an en-route alternate, the air service operator shall use the approved speed as described in this technical standard.

(b) the distance is calculated from the point of the diversion followed by the cruise for the approved maximum diversion time.

(c) for the purposes of computing distances, credit for driftdown may be taken.

2.8 AIRWORTHINESS CERTIFICATION REQUIREMENTS FOR EDTO BEYOND THE THRESHOLD TIME

(1) During the airworthiness certification procedure for an aeroplane type intended for EDTO, the air service operator shall ensure that the required level of safety shall be maintained under conditions which may be encountered during such operations, such as flight for extended periods following failure of an engine and the aeroplane's EDTO significant systems.

(2) Information or procedures specifically related to extended diversion time operations shall be incorporated into the AFM, the maintenance manual, the EDTO configuration, maintenance and procedure document (CMP) or other appropriate documentation.

(3) The air service operator shall provide aeroplane manufacturer documentation that specifies the aeroplane's EDTO significant systems and, where appropriate, any time-limiting factors associated with those systems.

2.9 MAINTAINING OPERATIONAL APPROVAL

(1) In order to maintain the required level of safety on routes where aeroplanes are permitted to operate beyond 180 minutes, an air service operator shall ensure that:

(a) the airworthiness certification of the aeroplane type specifically permits operations beyond the threshold time, taking into account the aeroplane's system design and reliability aspects;

(b) the reliability of the propulsion system is such that the risk of double engine failure from independent causes is extremely remote, and found acceptable to support the diversion time being approved;

(c) any special maintenance requirements are fulfilled;

(d) specific flight dispatch requirements are met;

(e) the necessary in-flight operational procedures are established; and

(f) specific operational approval is granted by the Director.

(2) The Director shall determine that:

(a) the air service operator has the capability to achieve and maintain an acceptable level of propulsion system reliability based on the operator's past experience or a process review;

(b) for an air service operator with past experience, this determination shall include trend comparisons of the air service operator's data with other air service operators, as well as the world fleet average values and the application of a qualitative judgement that considers all of the relevant factors. The air service operator's past record of propulsion system reliability with related types of engines shall be reviewed, as well as its record of achieved systems reliability with the airframe-engine

combination for which authorisation is sought to conduct EDTO;

(c) an air service operator without such experience, has established a programme that results in a high degree of confidence that the propulsion system reliability appropriate to the EDTO would be maintained;

(d) the air service operator has developed a system for reporting the events as listed in technical standard 43.02.19.2(4);

(e) following EDTO operational approval, the air service operator continues to monitor the propulsion system reliability for the aircraft - engine combination used in EDTO, and takes action as required for the specified IFSD rates.

2.10 AIRWORTHINESS MODIFICATIONS AND MAINTENANCE PROGRAMME REQUIREMENTS

(1) An air service operator's maintenance programme shall ensure that:

(a) the titles and numbers of all airworthiness modifications, additions and changes which were made to qualify aeroplane systems for EDTO are provided for;

(b) any changes to maintenance and training procedures, practices or limitations established in the qualification for EDTO are submitted to the Director before such changes are adopted;

(c) a reliability monitoring and reporting programme is developed and implemented prior to approval and continued after approval;

(d) prompt implementation of required modifications and inspections which may affect propulsion system reliability is undertaken;

(e) procedures are established which prevent an aeroplane from being dispatched for an extended diversion time operation after engine shutdown or EDTO significant system failure on a previous flight until the cause of such failure has been positively identified and the necessary corrective action has been completed. Confirmation that such corrective action has been effective may require the successful completion of a subsequent flight prior to dispatch on an extended diversion time operation;

(f) a procedure is established to ensure that the airborne equipment will continue to be maintained at the level of performance and reliability required for extended diversion time operations; and

(g) a procedure is established to minimize scheduled or unscheduled maintenance during the same maintenance visit on more than one parallel or similar EDTO significant system. Minimization can be accomplished by staggering maintenance tasks, performing and supervising maintenance by a different technician, or verifying maintenance corrective actions prior to the aeroplane entering an EDTO threshold.

3. REQUIREMENTS FOR OPERATIONS BEYOND 120 MINUTES AND UP TO 180 MINUTES, TO AN EN-ROUTE ALTERNATE AERODROME

(1) An air service operator conducting operations beyond 120 minutes and up to 180 minutes, from a point on a route to an en-route alternate aerodrome, shall ensure that—

(a) for all aeroplanes—

(i) en-route alternate aerodrome is identified and appear on the ATS flight plan; and

(ii) the most up-to-date information is obtained by the flight crew on identified en-route alternate aerodromes, including operational status and meteorological conditions;

(b) for an aeroplane with two turbine engine, the current and up-to-date information provided to the flight crew indicates that conditions at identified en-route alternate aerodromes shall be at or above the operator's established aerodrome operating minima for the operation at the estimated time of use.

(2) In addition to the requirements in subparagraph (1), an air service operator shall ensure that the following are taken into account and provide the overall level of safety intended by the provisions of this technical standard—

(a) operational control and flight dispatch procedures

(i) operational control as defined in Part 1 of the regulations;

(ii) flight dispatch procedures refer to the method of control and supervision of flight operations. This does not imply a specific requirement for licensed flight dispatchers or a full flight following system;

(b) operating procedures

(i) operating procedures refer to the specification of the organisation and methods established to exercise operational control and flight dispatch procedures in the appropriate manual(s) and

shall cover at least a description of responsibilities concerning the initiation, continuation, termination or diversion of each flight as well as the method of control and supervision of flight operations.

(c) training programmes

(i) training programmes refer to the training for pilots and flight operations officers or flight dispatchers in operations covered by this technical standard and the following sections.

(3) Converting diversion times to distances

(a) Air service operators conducting operations beyond 120 minutes and up to 180 minutes, from a point on a route to an en-route alternate aerodrome, shall satisfy the Director that the aircraft's approved one-engine-inoperative (OEI) speed or approved all-engines operative (AEO) speed allows such operations to be undertaken safely.

(b) Conditions to be used by the air service operator when converting diversion times to distances:

(i) for the purpose of this technical standard, an approved one-engine-inoperative (OEI) speed or approved all-engines operative (AEO) speed is any speed within the certified flight envelope of the aeroplane;

(ii) to determine whether a point on the route is beyond 180 minutes to an en-route alternate for an aeroplane with two engines, the air service operator shall select an approved OEI speed. The distance is calculated from the point of the diversion followed by

cruise for 180 minutes, in ISA and still-air conditions. For the purposes of computing distances, credit for the driftdown may be taken; and

(iii) to determine whether a point on the route is beyond 180 minutes to an en-route alternate for an aircraft with more than two engines, the air service operator shall select an approved AEO speed. The distance is calculated from the point of the diversion followed by the cruise for 180 minutes, in ISA and still-air conditions. For the purposes of computing distances, credit for the driftdown may be taken.

(4) When considering airworthiness requirements, an air service operator shall ensure that:

(a) the aircraft configuration and overall aircraft reliability for operations beyond 120 minutes and up to 180 minutes, to an en-route alternate aerodrome have been established by the Type Certificate holder;

(b) the aircraft configuration and overall aircraft reliability shall have a type design approval;

(c) the capability of the time limited system, if any, must be indicated in the aeroplane flight manual (directly or by reference) relevant to operations beyond 120 minutes and up to 180 minutes, to an en-route alternate aerodrome;

(d) they maintain the aircraft in an airworthy condition in accordance with procedures contained in the MCM; and

(e) an approved AMP and MEL for the aircraft are established

(5) The written submission to the Authority as stated in regulation 135.07.1(7) should be accompanied by the following supporting documents:

(a) a safety case in accordance with the TGM: Safety Case;

(b) evidence of compliance with 3. (1), (2) (3) and (4) of this technical standard;

(c) evidence of a safety risk assessment in accordance with SA-CATS 140, conducted by the operator covering at least the following:

(i) the capabilities of the operator in conducting such operations;

(ii) the overall reliability of the aeroplane to be operated under such operations;

(iii) the reliability of each time-limited system, if any, of the aeroplane to be operated for such operations;

(iv) information from the aeroplane manufacturer relevant to such operations; and

(v) any specific mitigation measures to be taken by the operator.

(d) An acceptable Management of Change;

(6) Submissions will be considered on a case by case basis in order to determine the operator's operational capability up to 180 minutes.

(7) Where the air service operator has been authorised through their written submission, to conduct operations within the 120-180min segment, and has already conducted operations in accordance with regulation 135.07.1(7) shall provide a reliability programme report every 4 months to the Director of the following, as applicable:

(a) the type of aeroplane used for such operations;

(b) interruption, delay or cancellation due to a technical reason;

(c) all aircraft systems controlled by the reliability programme;

(d) any system defect summary report where the significant system defect rate exceeds the alert level established in the operator's approved reliability programme;

(e) every usage of a minimum equipment list for significant systems; and

(f) every unscheduled removal of a significant system component from an aeroplane.

AMENDMENT OF SA CATS 139

10. Document SA CATS 139 is hereby amended by:

(a) the insertion after the definition of "displaced threshold" of the following definition:

"**"effective Intensity"** means the effective intensity of a flashing light that is equal to the intensity of a fixed light of the same colour which will produce the same visual range under identical conditions of observation;";

(b) the insertion after the definition of "licensed aerodromes" of the following definition:

"**"lighting system reliability"** means the probability that the complete installation operates within the specified tolerances and that the system is operationally usable;";

(c) the insertion after the definition of "protected flight zones" of the following definitions:

""**runway condition assessment matrix**" means a matrix allowing the assessment of the runway condition code, using associated procedures, from a set of observed runway surface condition(s) and pilot report(s) of braking action;";

""**Runway condition code**" means a number describing the runway surface condition to be used in the runway condition report;"; and

""**Runway condition report**" means a comprehensive standardized report relating to runway surface condition(s) and its effect on the aeroplane landing and take-off performance;";

(d) the insertion after Technical Standard 139.01.10 of the following Technical Standard:

"139.01.18 Movement of aircraft on apron on direction of holder of aerodrome license

1. Monitoring of aircraft stands on the apron

(1) The apron management services shall visually monitor the aircraft stand to ensure that the required clearance distances are complied with by the aircraft using the stand." by -

(a) Monitoring all aircraft stands at all times through the apron management Services office.

(b) Installing surveillance cameras for aircraft stands that are not visible to the apron management services office"."

(e) the substitution for Technical Standard 139.01.32 of the following Technical Standard:

"139.01.32 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM

1. Taxiway centre line lights

(1) Taxiway centre line lights shall be provided on an exit taxiway, taxiway, de-icing/anti-icing facility and apron intended for use in runway visual range conditions less than a value of 350m in such a manner as to provide continuous guidance between the runway centre line and aircraft stands, except that these lights need not be provided where the traffic density is light and taxiway edge lights and centre line marking provide adequate guidance.

(2) Taxiway centre line lights shall be provided on a runway forming part of a standard taxi-route and intended for taxiing in runway visual range conditions less than a value of 350m, except that these lights need not be provided where the traffic density is light and taxiway edge lights and centre line marking provide adequate guidance.

(3) Taxiway centre line lights on a taxiway other than an exit taxiway and on a runway forming part of a standard taxi-route shall be fixed lights showing green with beam dimensions such that the light is visible only from an aeroplane on or in the vicinity of the taxiway.

(4) Taxiway centre line lights on an exit taxiway shall be fixed lights. Alternate taxiway centre line lights shall show green and yellow from their beginning near the runway centre line to the perimeter of the ILS/MLS critical/sensitive area or the lower edge of the inner transitional surface, whichever is farthest from the runway; and thereafter all lights shall show green. The first light in the exit centre line shall always show green, and the light nearest to the perimeter shall always show yellow.

(5) Taxiway centre line lights shall be located on the taxiway centre line marking, except that they may be offset by not more than 30cm where it is not practicable to locate them on the marking.

(6) Taxiway centre line lights on a straight section of a taxiway shall be spaced at longitudinal intervals of not more than 30m, except that:

(a) larger intervals not exceeding 60m may be used where, because of the prevailing meteorological conditions, adequate guidance is provided by such spacing;

(b) at intervals less than 30m should be provided on short straight sections; and

(c) on a taxiway intended for use in RVR conditions of less than a value of 350m, the longitudinal spacing shall not exceed 15m.

(7) On a taxiway intended for use in RVR conditions of less than a value of 350m, the lights on a curve shall not exceed a spacing of 15m, and on a curve of less than 400m radius the lights shall be spaced at intervals of not greater than 7.5m. This spacing shall extend for 60m before and after the curve.

(8) Spacings on curves that have been found suitable for a taxiway intended for use in RVR conditions of 350m or greater are as per Table 1:

Curve radius	**Light spacing**
up to 400 m	7.5 m
401 m to 899 m	15 m
900 m or greater	30 m

Table 1

(9) Taxiway centre line lights on a rapid exit taxiway shall commence at a point at least 60m before the beginning of the taxiway centre line curve and continue beyond the end of the curve to a point on the centre line of the taxiway where an aeroplane can be expected to reach normal taxiing speed. The lights on that portion parallel to the

runway centre line shall always be at least 60cm from any row of runway centre line lights.

(10) The lights shall be spaced at longitudinal intervals of not more than 15m, except that, where runway centre line lights are not provided, a greater interval not exceeding 30m shall be used.

(11) Taxiway centre line lights on exit taxiways other than rapid exit taxiways shall commence at the point where the taxiway centre line marking begins to curve from the runway centre line and follow the curved taxiway centre line marking at least to the point where the marking leaves the runway. The first light shall be at least 60cm from any row of runway centre line lights. As shown in diagram 1:

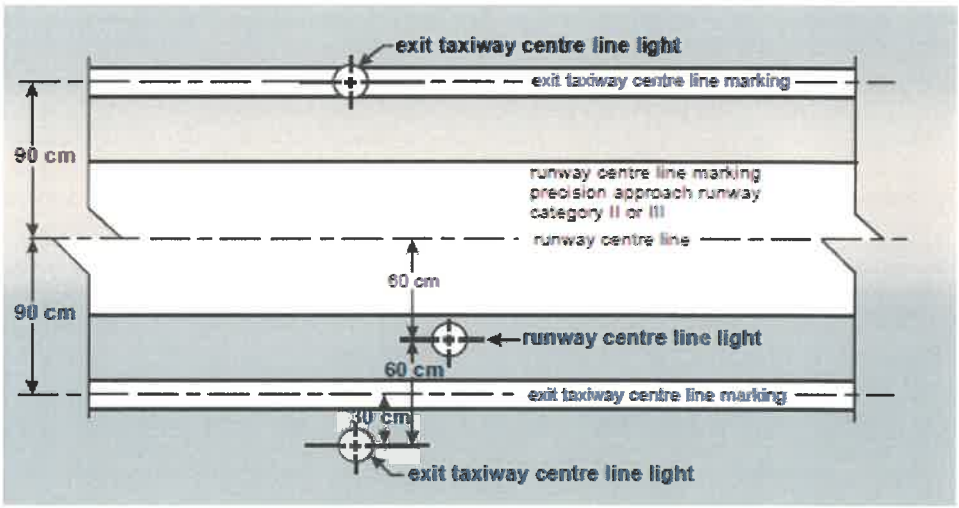
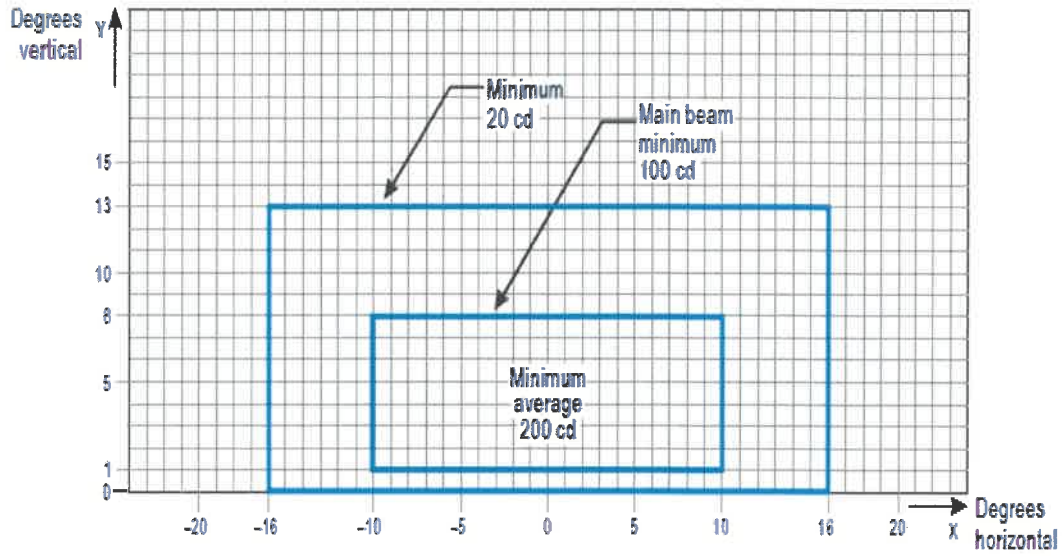


Diagram 1

(12) The lights shall be spaced at longitudinal intervals of not more than 7.5m.

(13) Taxiway centre line lights on runways forming part of a standard taxi-route and intended for taxiing in runway visual range conditions less than a value of 350m shall be spaced at longitudinal intervals.

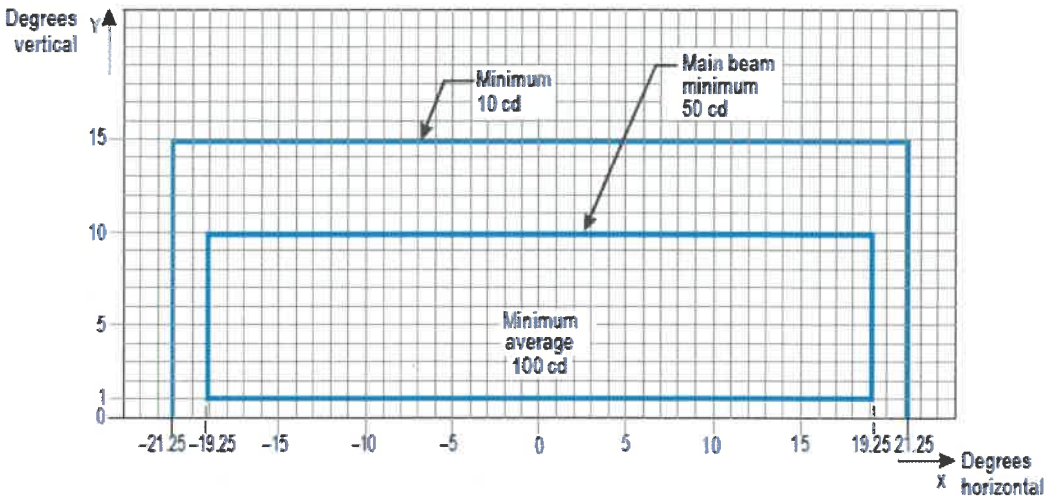
(14) Taxiway centre line lights for taxiways intended for use in runway visual range conditions of less than a value of 350m shall be in accordance with the specifications of diagrams 2, 3 and 4:



Notes:

1. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m and are intended for use before and after curves.

Diagram 2

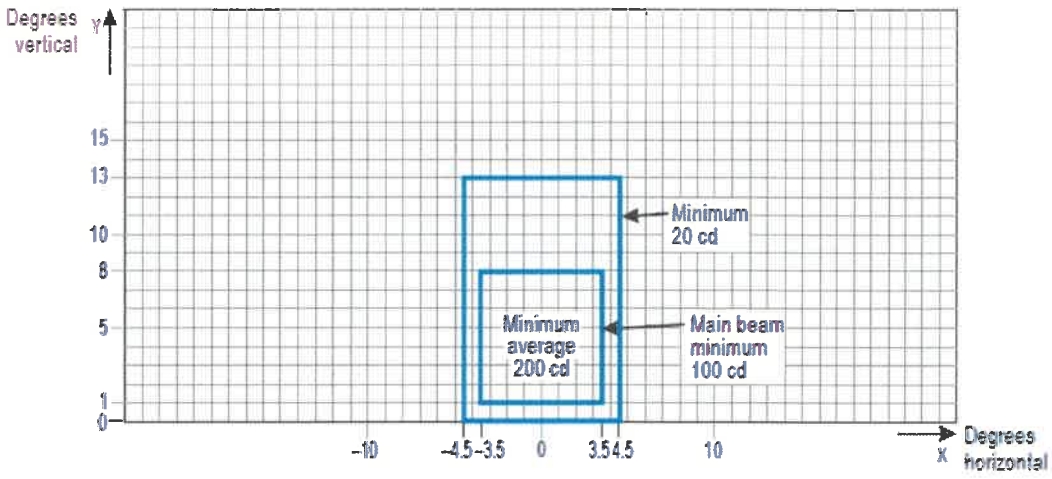


Notes:

1. Lights on curves to be toed-in 15.75 degrees with respect to the tangent of the curve. This does not apply to runway entrance lights (RELs)

2. Increased intensities for RELs shall be twice the specified intensities, i.e., minimum 20 cd, main beam minimum 100 cd and minimum average 200 cd.

Diagram 3

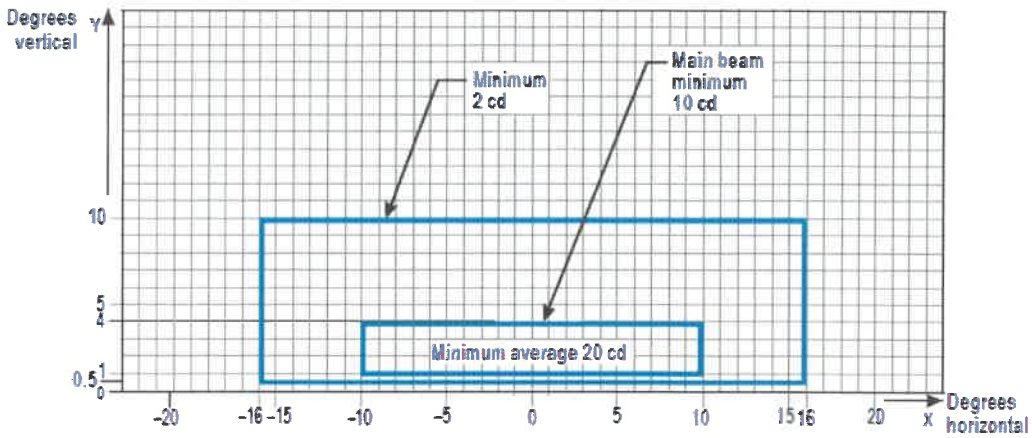


Notes:

1. These beam coverages are generally satisfactory and cater for a normal displacement of the cockpit from the centre line of approximately 3 m.

Diagram 4

(15) Other taxiways shall be in accordance with the specifications of diagrams 5 and 6:

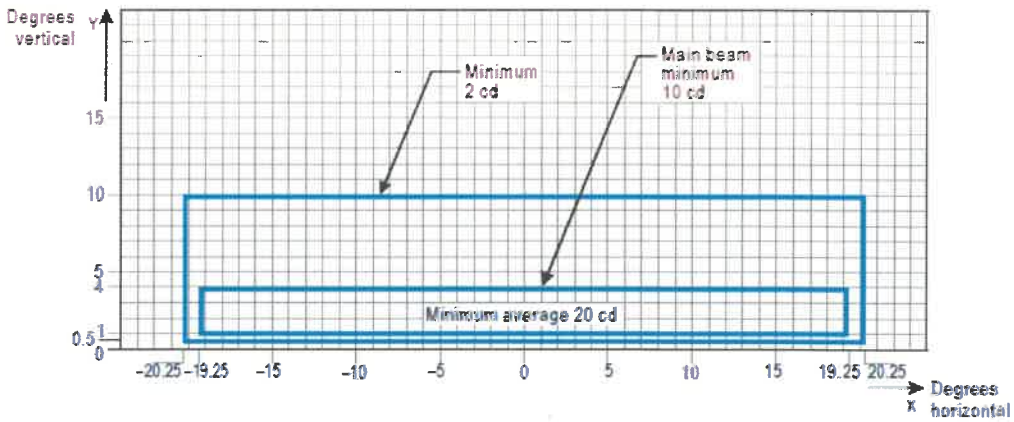


Notes:

1. At locations where high background luminance is usual and where deterioration of light output resulting from dust, snow and local contamination is a significant factor, the cd-values should be multiplied by 2.5.

2. Where omnidirectional lights are used they shall comply with the vertical beam requirements in this figure.

Diagram 5



Notes:

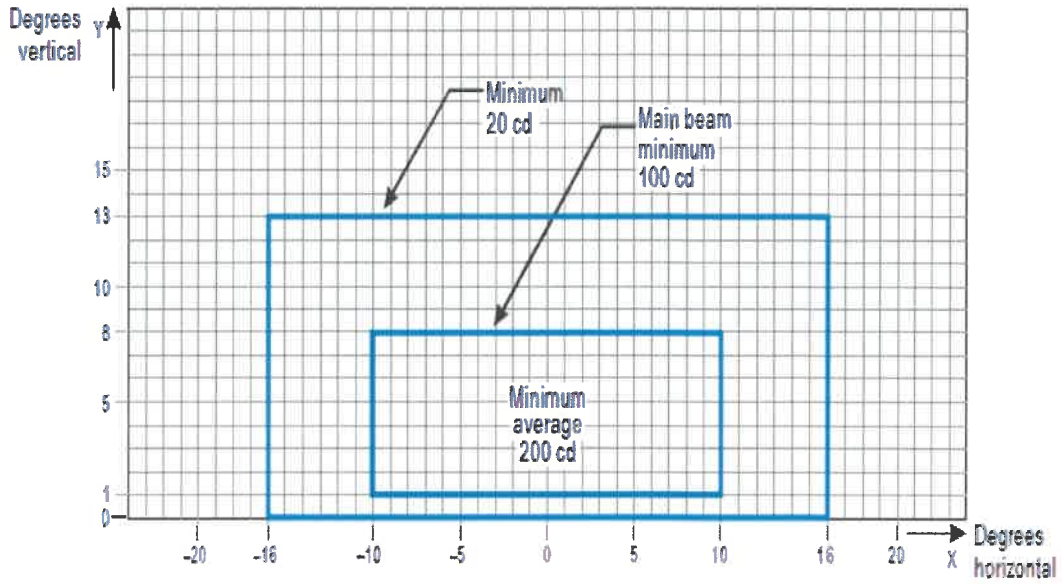
1. Lights on curves to be toed-in 15.75 degrees with respect to the tangent of the curve.

2. At locations where high background luminance is usual and where deterioration of light output resulting from dust, snow and local contamination is a significant factor, the cd-values should be multiplied by 2.5.

3. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m as could occur at the end of curves.

Diagram 6

(16) Where higher intensities are required, from an operational point of view, taxiway centre line lights on rapid exit taxiways intended for use in runway visual range conditions less than a value of 350m shall be in accordance with the specifications of diagram 7:

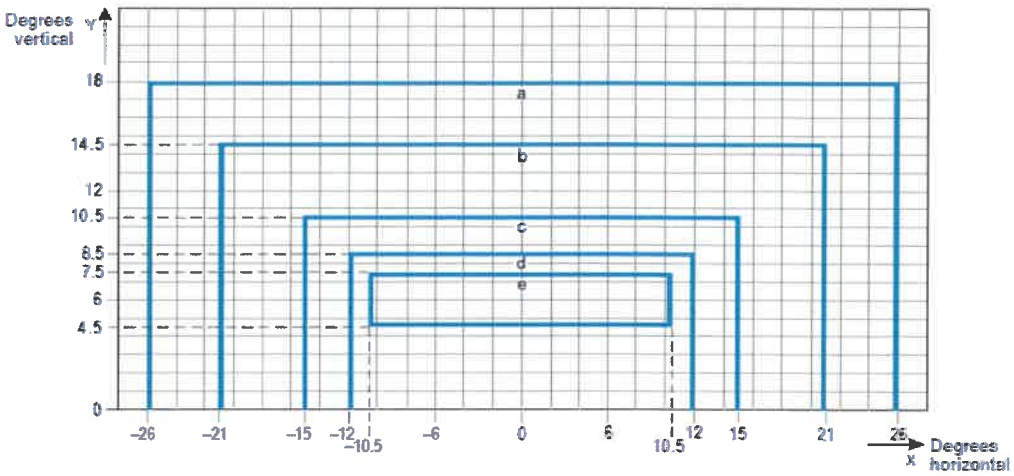


Notes:

1. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m and are intended for use before and after curves.

Diagram 7

(17) Where taxiway centre line lights are specified as components of an advanced surface movement guidance and control system and where, from an operational point of view, higher intensities are required to maintain ground movements at a certain speed in very low visibilities or in bright daytime conditions, taxiway centre line lights shall be in accordance with the specifications of diagrams 8, 9 and 10:

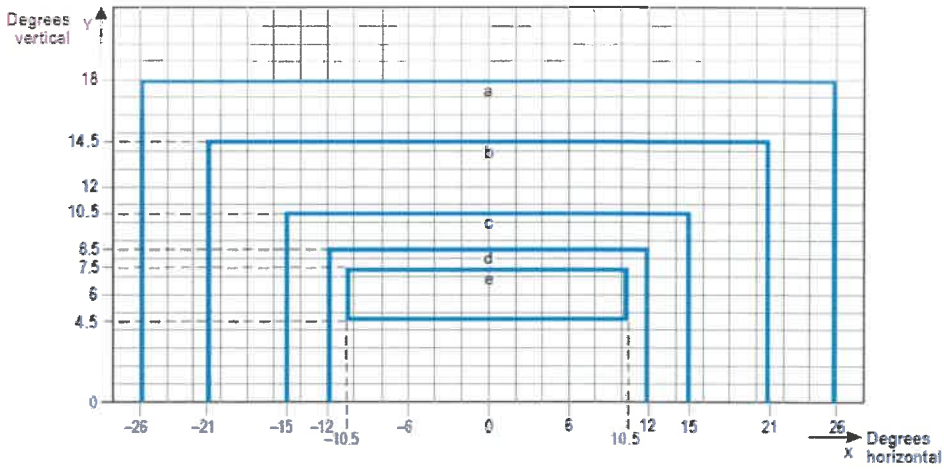


Curve	a	b	c	d	e
Intensity (cd)	8	20	100	450	1 800

Notes:

1. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m and are intended for use before and after curves.

Diagram 8

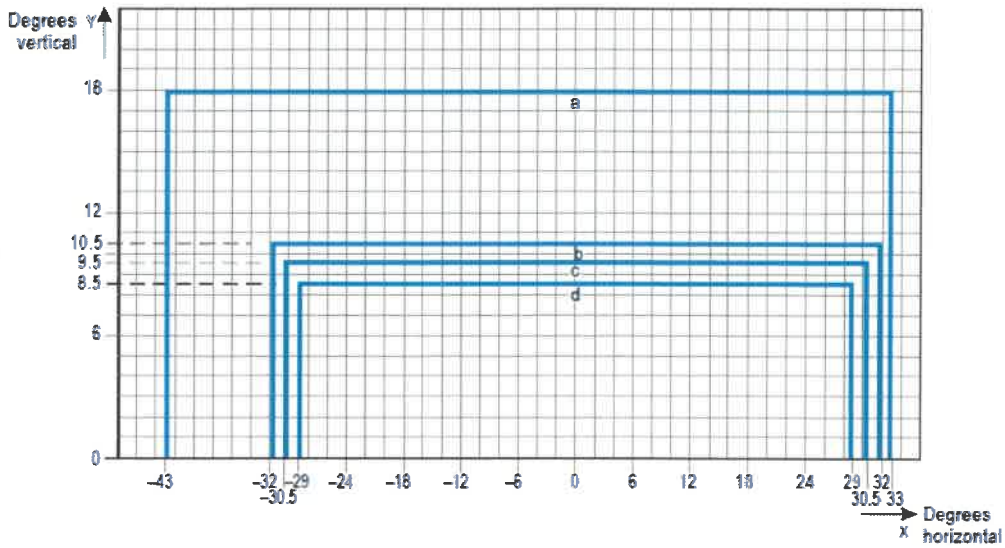


Curve	a	b	c	d	e
Intensity (cd)	8	20	100	450	1 800

Notes:

1. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m and are intended for use before and after curves.

Diagram 9



Curve	a	b	c	d
Intensity (cd)	8	100	200	400

Notes:

1. Lights on curves to be toed-in 17 degrees with respect to the tangent of the curve.

Diagram 10

2. Taxiway edge lights

(1) Taxiway edge lights shall be provided at the edges of a runway turn pad, holding bay, de-icing/anti-icing facility, apron, etc, intended for use at night and on a taxiway not provided with taxiway centre line lights and intended for use at night, except that taxiway edge lights need not be provided where, considering the nature of the operations, adequate guidance can be achieved by surface illumination or other means.

(2) Taxiway edge lights shall be provided on a runway forming part of a standard taxi-route and intended for taxiing at night where the runway is not provided with taxiway centre line lights.

(3) Taxiway edge lights on a straight section of a taxiway and on a runway forming part of a standard taxi-route shall be spaced at

uniform longitudinal intervals of not more than 60m. The lights on a curve shall be spaced at intervals less than 60m so that a clear indication of the curve is provided.

(4) Taxiway edge lights on a holding bay, de-icing/anti-icing facility, apron, etc, shall be spaced at uniform longitudinal intervals of not more than 60m.

(5) Taxiway edge lights on a runway turn pad shall be spaced at uniform longitudinal intervals of not more than 30m.

(6) The lights shall be located as near as practicable to the edges of the taxiway, runway turn pad, holding bay, de-icing/anti-icing facility, apron or runway, etc., or outside the edges at a distance of not more than 3m.

(7) Taxiway edge lights shall be fixed lights showing blue. The lights shall show up to at least 75° above the horizontal and at all angles in azimuth necessary to provide guidance to a pilot taxiing in either direction. At an intersection, exit or curve the lights shall be shielded as far as practicable so that they cannot be seen in angles of azimuth in which they may be confused with other lights.

(8) The intensity of taxiway edge lights shall be at least 2 cd from 0° to 6° vertical, and 0.2 cd at any vertical angles between 6° and 75°.

3. Stop bars

(1) A stop bar shall be provided at every runway-holding position serving a runway when it is intended that the runway will be used in runway visual range conditions less than a value of 350m.

(2) A stop bar shall be provided at every runway-holding position serving a runway when it is intended that the runway will be used in runway visual range conditions of values between 350m and 550m.

(3) Where there is more than one stop bar associated with a taxiway/runway intersection, only one shall be illuminated at any given time.

(4) Stop bars shall be located across the taxiway at the point where it is desired that traffic stop. Where a pair of elevated lights are provided, these lights shall be located not less than 3m from the taxiway edge.

(5) Stop bars shall consist of lights spaced at uniform intervals of no more than 3 m across the taxiway, showing red in the intended direction(s) of approach to the intersection or runway-holding position.

(6) A pair of elevated lights shall be added to each end of the stop bar where the in-pavement stop bar lights might be obscured from a pilot's view, for example, by snow or rain, or where a pilot may be required to stop the aircraft in a position so close to the lights that they are blocked from view by the structure of an aircraft.

(7) Stop bars installed at a runway-holding position shall be unidirectional and shall show red in the direction of approach to the runway.

(8) Where a pair of elevated lights are provided, these lights shall have the same characteristics as the lights in the stop bar but shall be visible to approaching aircraft up to the stop bar position.

(9) The lighting circuit shall be designed so that stop bars:

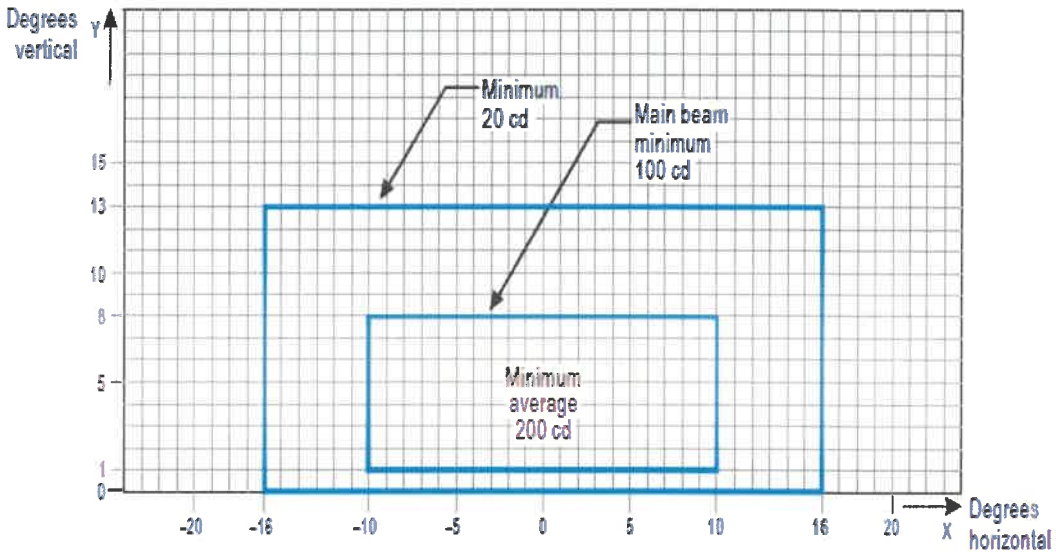
(a) located across entrance taxiways are selectively switchable;

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

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

(d) 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.

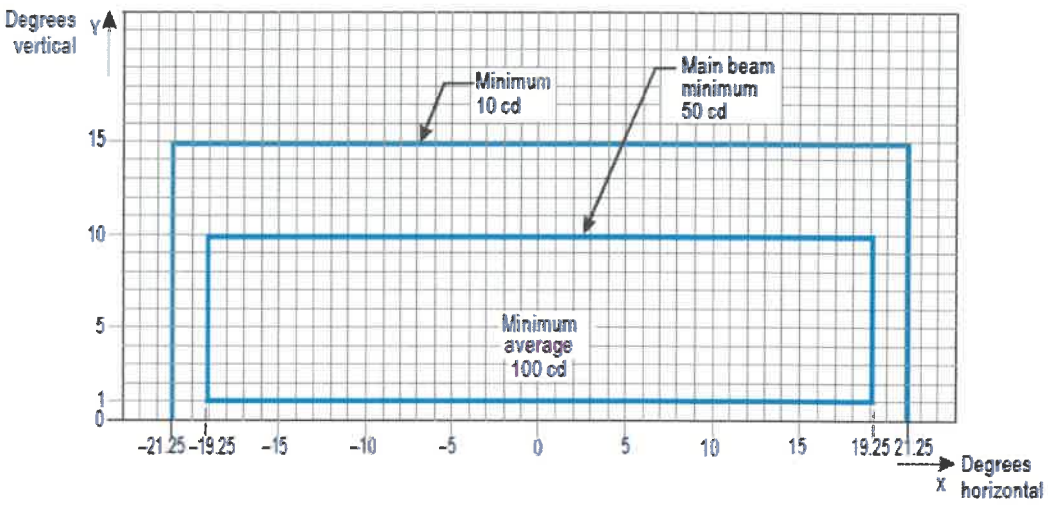
(10) The intensity in red light and beam spreads of stop bar lights shall be in accordance with the specifications of diagrams 11 – 15:



Notes:

1. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m and are intended for use before and after curves.

Diagram 11

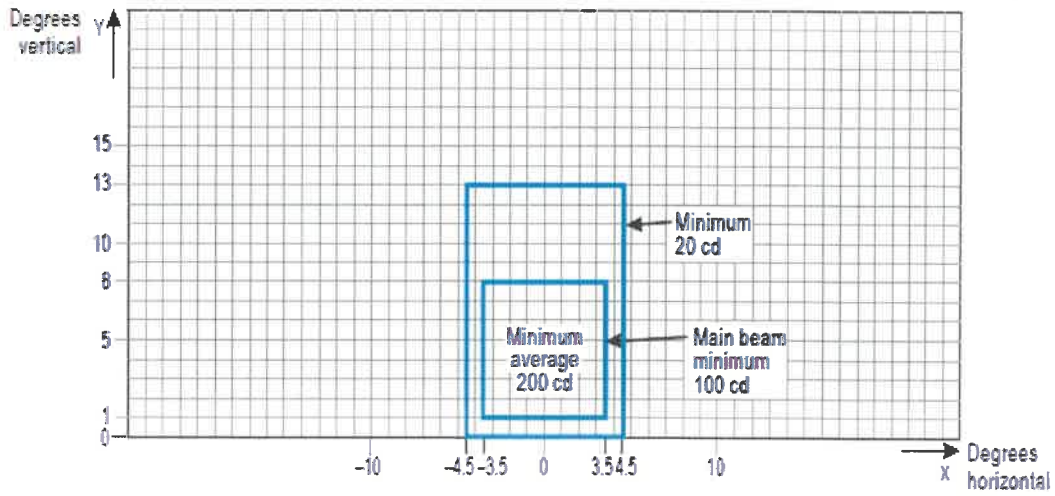


Notes:

1. Lights on curves to be toed-in 15.75 degrees with respect to the tangent of the curve. This does not apply to runway entrance lights (RELs)

2. Increased intensities for RELs shall be twice the specified intensities, i.e., minimum 20 cd, main beam minimum 100 cd and minimum average 200 cd.

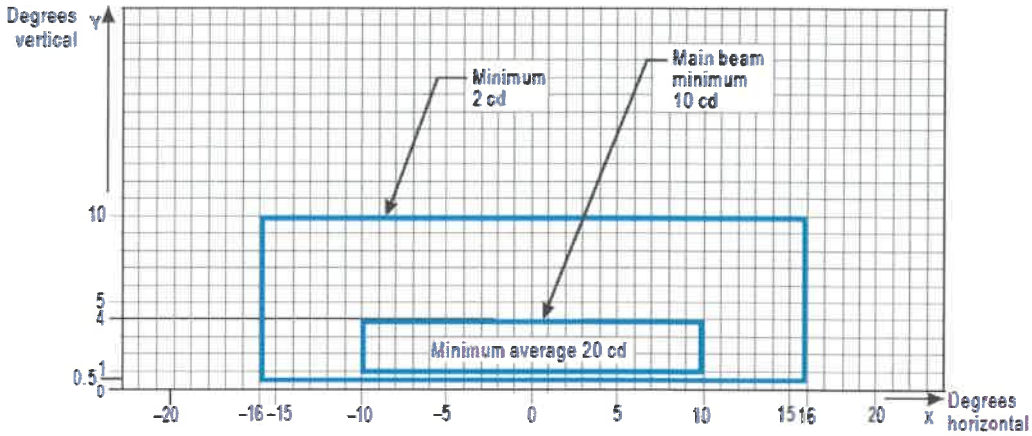
Diagram 12



Notes:

1. These beam coverages are generally satisfactory and cater for a normal displacement of the cockpit from the centre line of approximately 3 m.

Diagram 13

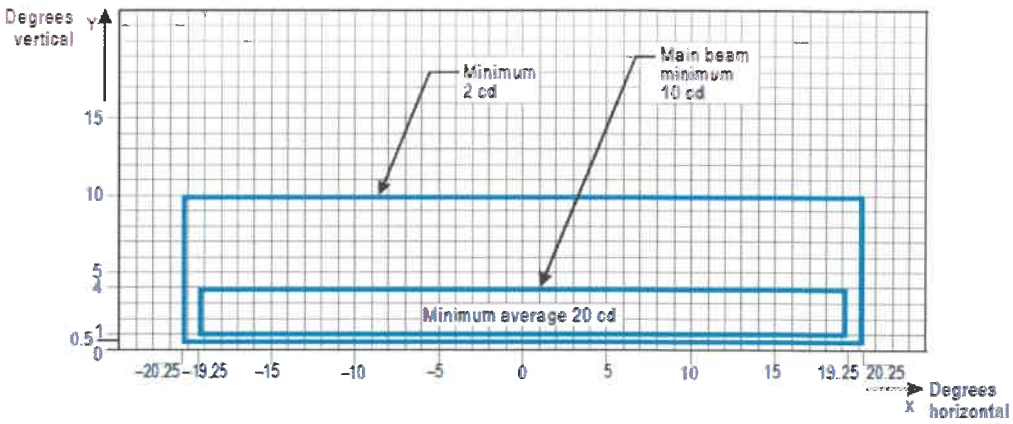


Notes:

1. At locations where high background luminance is usual and where deterioration of light output resulting from dust, snow and local contamination is a significant factor, the cd-values should be multiplied by 2.5.

2. Where omnidirectional lights are used they shall comply with the vertical beam requirements in this figure.

Diagram 14



Notes:

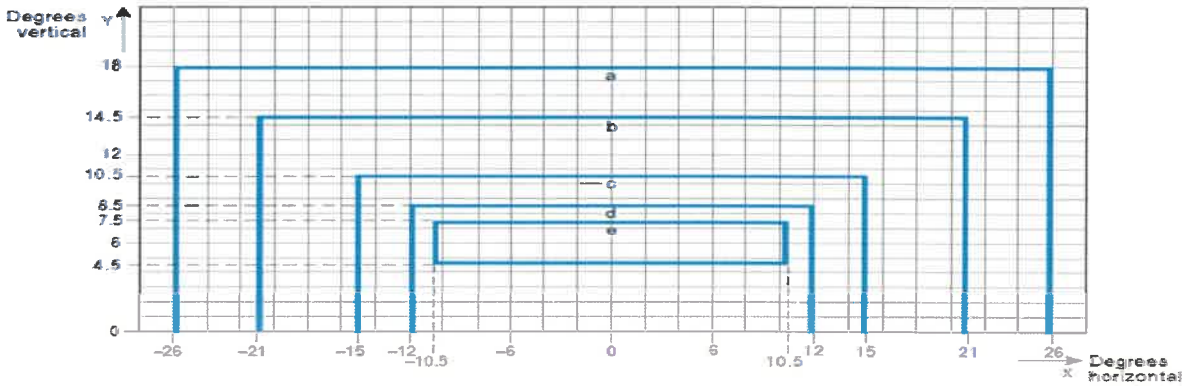
1. Lights on curves to be toed-in 15.75 degrees with respect to the tangent of the curve.

2. At locations where high background luminance is usual and where deterioration of light output resulting from dust, snow and local contamination is a significant factor, the cd-values should be multiplied by 2.5.

3. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m as could occur at the end of curves.

Diagram 15

(11) Where stop bars are specified as components of an advanced surface movement guidance and control system and where, from an operational point of view, higher intensities are required to maintain ground movements at a certain speed in very low visibilities or in bright daytime conditions, the intensity in red light and beam spreads of stop bar lights shall be in accordance with the specifications of diagrams 16 – 18:

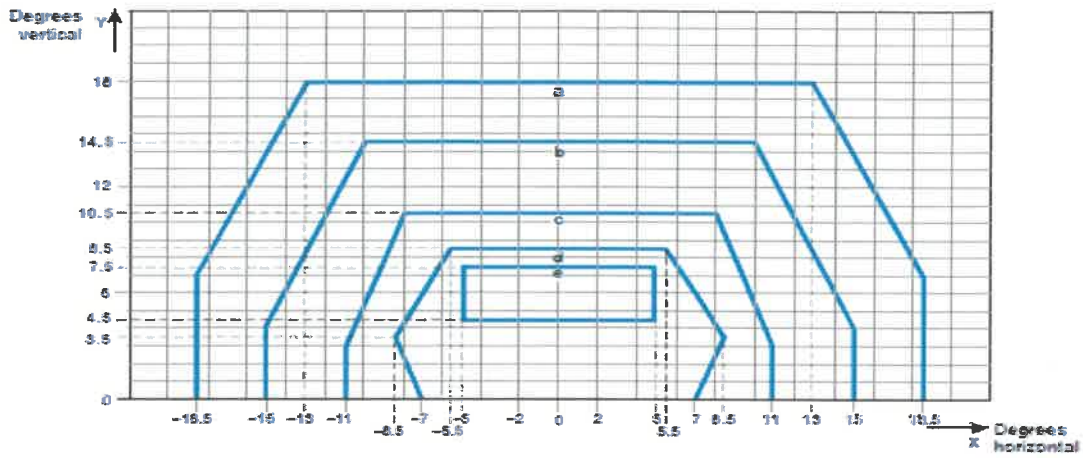


Curve	a	b	c	d	e
Intensity (cd)	8	20	100	450	1 800

Notes:

1. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m and are intended for use before and after curves.

Diagram 16

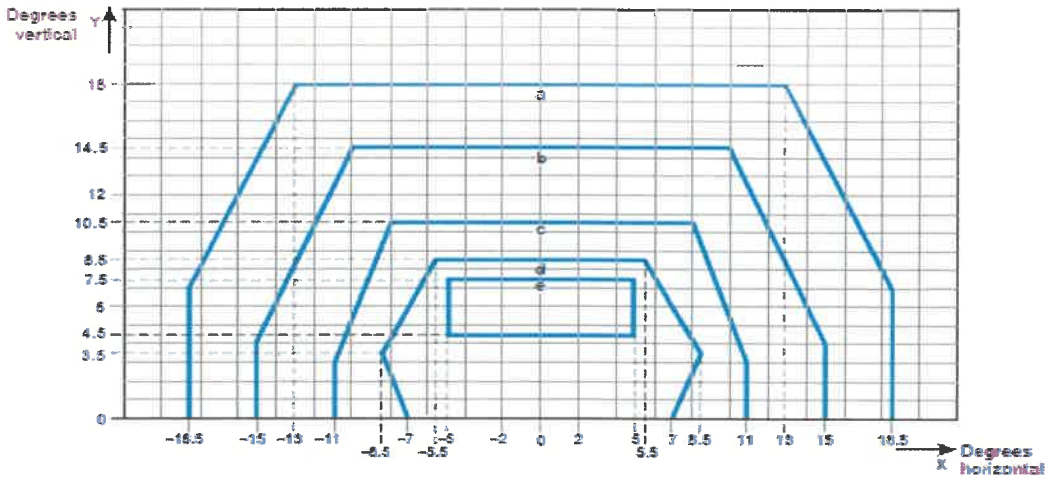


Curve	a	b	c	d	e
Intensity (cd)	8	20	100	450	1 800

Notes:

1. These beam coverages are generally satisfactory and cater for a normal displacement of the cockpit corresponding to the outer main gear wheel on the taxiway edge.

Diagram 17



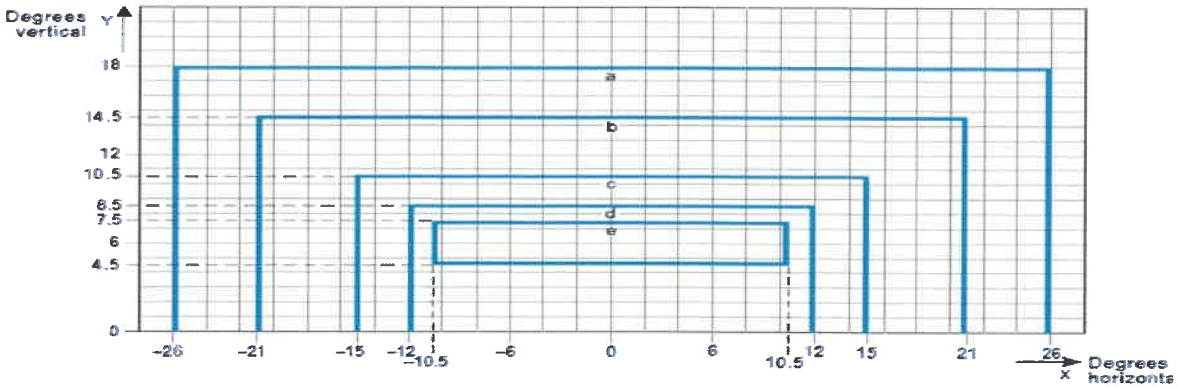
Curve	a	b	c	d	e
Intensity (cd)	8	20	100	450	1 800

Notes:

1. These beam coverages are generally satisfactory and cater for a normal displacement of the cockpit corresponding to the outer main gear wheel on the taxiway edge.

Diagram 18

(12) Where a wide beam fixture is required, the intensity in red light and beam spreads of stop bar lights shall be in accordance with the specifications of diagram 19:



Curve	a	b	c	d	e
Intensity (cd)	6	20	100	450	1 800

Notes:

1. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m and are intended for use before and after curves.

Diagram 19

4. Intermediate holding position lights

(1) Except where a stop bar has been installed, intermediate holding position lights shall be provided at an intermediate holding position intended for use in runway visual range conditions less than a value of 350m.

(2) Intermediate holding position lights shall be provided at an intermediate holding position where there is no need for stop-and-go signals as provided by a stop bar.

(3) Intermediate holding position lights shall be located along the intermediate holding position marking at a distance of 0.3m prior to the marking.

(4) Intermediate holding position lights shall consist of three fixed unidirectional lights showing yellow in the direction of approach to the intermediate holding position with a light distribution similar to

taxiway centre line lights if provided. The lights shall be disposed symmetrically about and at right angle to the taxiway centre line, with individual lights spaced 1.5m apart.

5. Runway guard lights

(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 550m where a stop bar is not installed; and

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

(2) As part of runway incursion prevention measures, runway guard lights, Configuration A or B, shall 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.

(3) Configuration B runway guard lights shall not be colocated with a stop bar.

(4) Runway guard lights, Configuration A, shall be located at each side of the taxiway at a distance from the runway centre line not less than that specified for a take-off runway in Table 1 and diagram 20.

(5) Runway guard lights, Configuration B, shall be located across the taxiway at a distance from the runway centre line not less than that specified for a take-off runway in Table 2 and diagram 20:

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

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

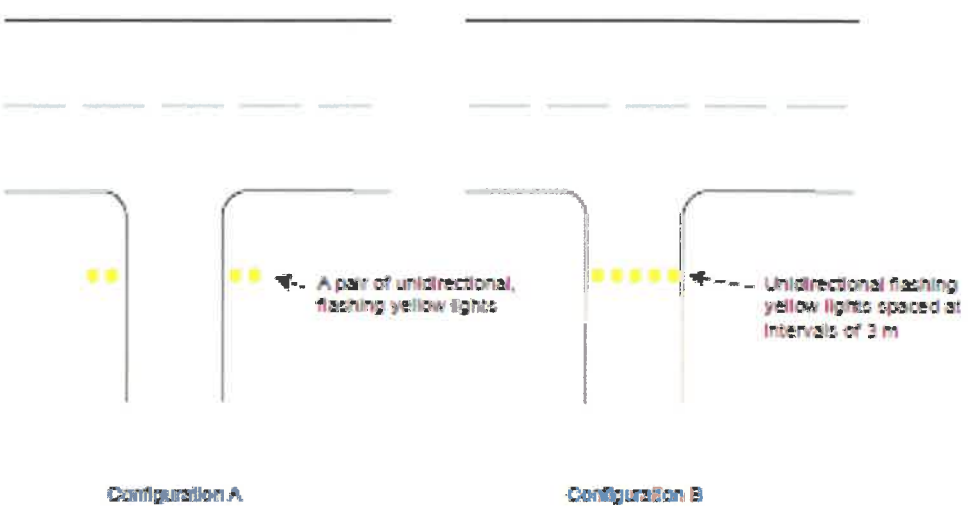


Diagram 20: Runway guard lights

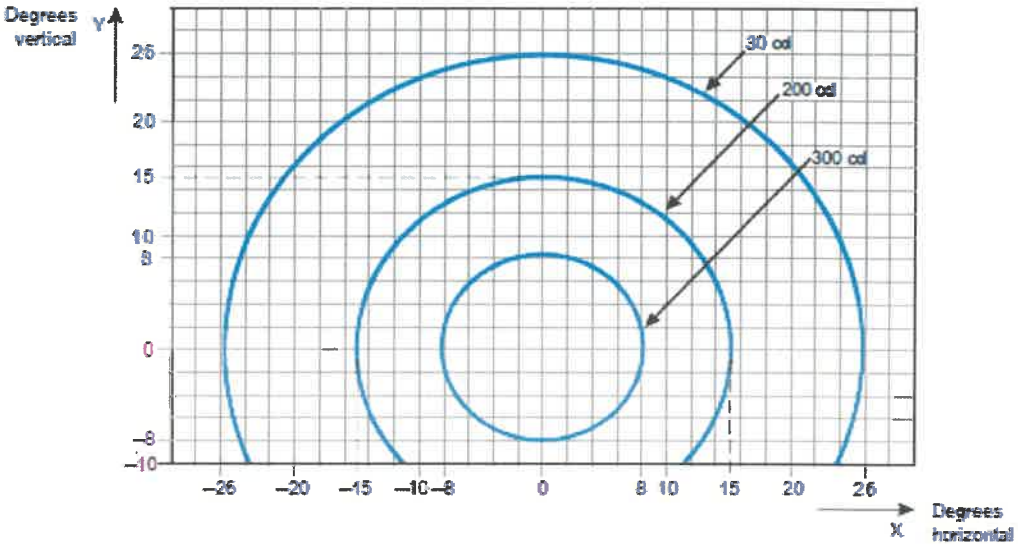
(6) Runway guard lights, Configuration A, shall consist of two pairs of yellow lights.

(7) Where there is a need to enhance the contrast between the on and off state of runway guard lights, Configuration A, intended for use during the day, a visor of sufficient size to prevent sunlight from entering the lens without interfering with the function of the fixture shall be located above each lamp.

(8) Runway guard lights, Configuration B, shall consist of yellow lights spaced at intervals of 3 m across the taxiway.

(9) The light beam shall be unidirectional and aligned so as to be visible to the pilot of an aeroplane taxiing to the holding position.

(10) The intensity in yellow light and beam spreads of lights of Configuration A shall be in accordance with the specifications of diagram 21 below:



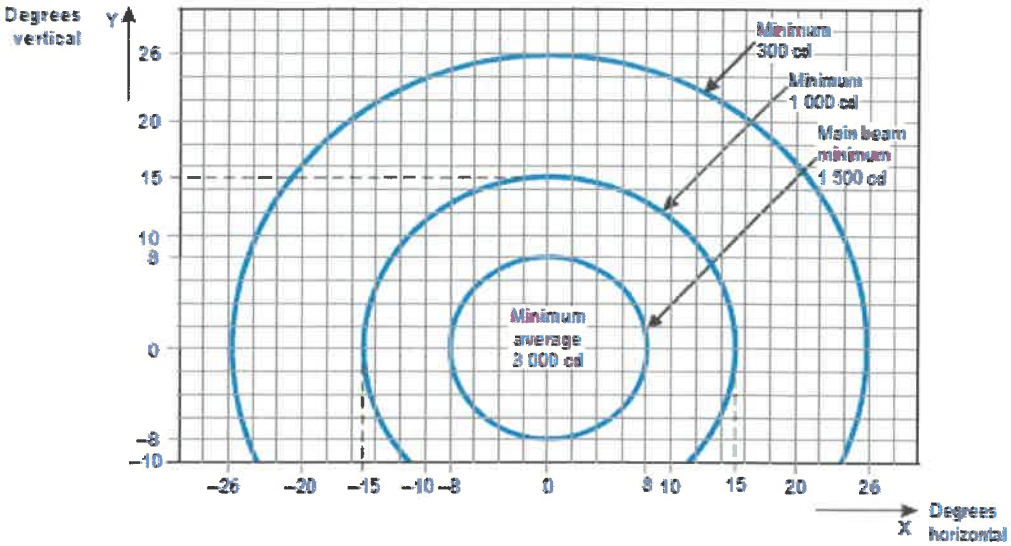
Notes:

1. Although the lights flash in normal operation, the light intensity is specified as if the lights were fixed for incandescent lamps.

2. The intensities specified are in yellow light.

Diagram 21

(11) Where runway guard lights are intended for use during the day, the intensity in yellow light and beam spreads of lights of Configuration A shall be in accordance with the specifications of diagram 22:



Notes:

1. Although the lights flash in normal operation, the light intensity is specified as if the lights were fixed for incandescent lamps.

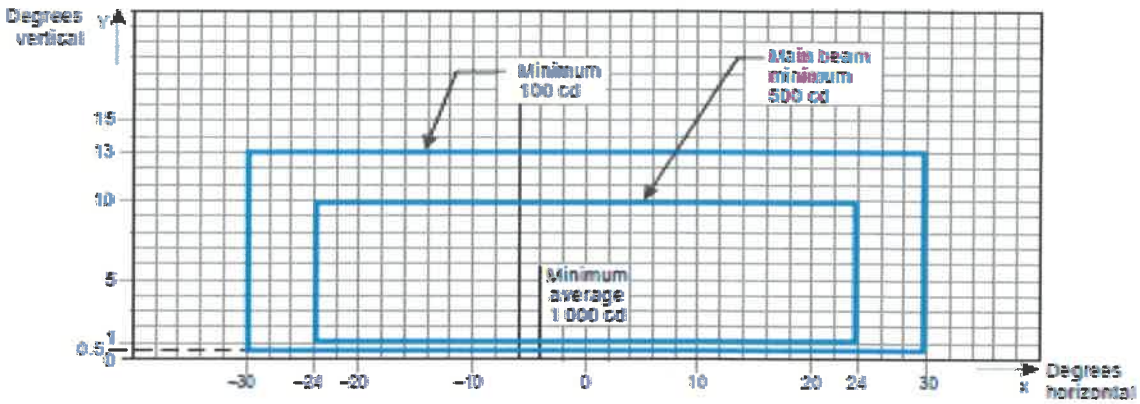
2. The intensities specified are in yellow light.

Diagram 22

(12) Where runway guard lights are specified as components of an advanced surface movement guidance and control system where higher light intensities are required, the intensity in yellow light and beam spreads of lights of Configuration A shall be in accordance with the specifications of diagram 22.

(13) The intensity in yellow light and beam spreads of lights of Configuration B shall be in accordance with the specifications of diagram 11.

(14) Where runway guard lights are intended for use during the day, the intensity in yellow light and beam spreads of lights of Configuration B shall be in accordance with the specifications of diagram 23:



Notes:

1. Although the lights flash in normal operation, the light intensity is specified as if the lights were fixed for incandescent lamps.

Diagram 23

(15) Where runway guard lights are specified as components of an advanced surface movement guidance and control system where higher light intensities are required, the intensity in yellow light and beam spreads of lights of Configuration B shall be in accordance with the specifications of diagram 23.

(16) The lights in each unit of Configuration A shall be illuminated alternately.

(17) For Configuration B, adjacent lights shall be alternately illuminated, and alternative lights shall be illuminated in unison.

(18) The lights shall be illuminated between 30 and 60 cycles per minute and the light suppression and illumination periods shall be equal and opposite in each light"."

(f) the deletion in Technical Standard 139.02.10.1(1.1) (25) for paragraph 25 (k).

(g) the addition in Technical Standard 139.02.10 after subparagraph 1(1.1)(f) of the following paragraphs:

"(g) a runway shoulder shall be prepared or constructed so as to resist erosion and the ingestion of the surface material by aeroplane engines; and

(h) runway shoulders for code letter F aeroplanes shall be paved to a minimum overall width of runway and shoulder of not less than 60m"."

(h) the addition in Technical Standard 139.02.10 after subparagraph 1.(1.1)(15)(b) of the following subparagraph:

"(c) When a taxiway is used by a turbine-engined aeroplane, the surface of the taxiway shoulders shall be maintained so as to be free of any loose stones or other objects that could be ingested by an aeroplane"."

(i) the insertion below Table 10 in Technical Standard 139.02.10 for subparagraph 1.(1.1)(25)(f) of items (i), (ii), and (iii) as follows :

"(i) a runway designation marking shall consist of a two-digit number and on parallel runways shall be supplemented with a letter. On a single runway, dual parallel runways and triple parallel runways the two-digit number shall be the whole number nearest the one-tenth of the magnetic North when viewed from the direction of approach. On four or more parallel runways, one set of adjacent runways shall be numbered to the nearest one-tenth magnetic azimuth and the other set of adjacent runways numbered to the next nearest one-tenth of the magnetic azimuth. When the above rule shall give a single digit number, it shall be preceded by a zero;

(ii) in the case of parallel runways, each runway designation number shall be supplemented by a letter as follows, in the order shown from left to right when viewed from the direction of approach:

(aa) for two parallel runways: "L" "R";

(bb) for three parallel runways: "L" "C" "R";

(cc) for four parallel runways: "L" "R" "L" "R";

(dd) for five parallel runways: "L" "C" "R" "L" "R" or "L" "R" "L" "C" "R"; and

(ee) for six parallel runways: "L" "C" "R" "L" "C" "R".

(iii) the numbers and letters shall be in the form and proportion shown on diagram 1. The dimensions shall be not less than those shown on diagram 1 but where the numbers are incorporated in the threshold marking, larger dimensions shall be used in order to fill adequately the gap between the stripes of the threshold marking.

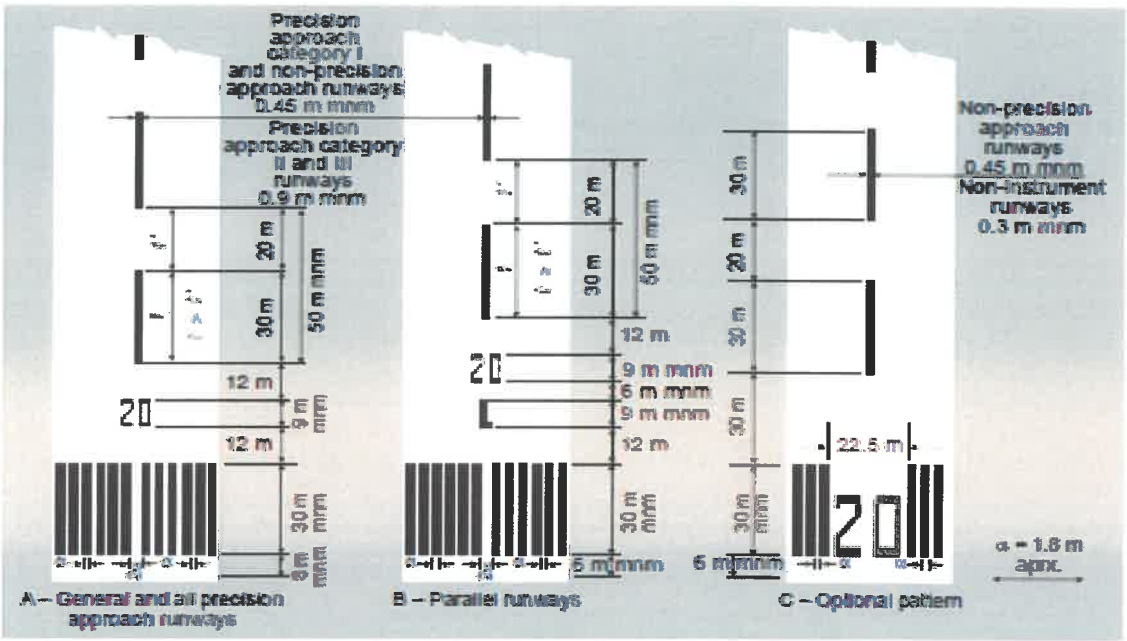


Diagram 1: Runway designation, centre line and threshold markings"

(j) the substitution in Technical Standard 139.02.10 for subparagraph 1(1.1)(25)(j) of the following subparagraph:

"(j) Runway turn pad marking:

(aa) where a paved runway turn pad is provided, a runway turn pad marking shall be provided for continuous guidance to enable the aircraft to complete a 180 degree turn and align with the runway centre line; and

(bb) (runway turn pad marking shall be at least 15cm in width and continuous in length."

(k) the substitution in Technical Standard 139.02.10 for subsection (1.1) (26) for the following subsection:

"(26) **Taxiway Marking**

(a) **Taxiway centre line marking**

(i) Taxiway centre line marking shall be provided on a paved taxiway and apron where the aerodrome reference code number is 3 or 4, in such a way as to provide continuous guidance between the runway centre line and aircraft stands.

(ii) Taxiway centre line marking shall be provided on a paved runway when the runway is part of a standard taxi-route where –

(aa) there is no runway centre line marking; or

(bb) the taxiway centre line is not coincident with the runway centre line.

(iii) Where provided, enhanced taxiway centre line marking shall be installed at each taxiway and runway intersection.

(iv) An enhanced taxiway centre line marking shall extend from the runway-holding position Pattern A to a distance of up to 47m in the direction of travel away from the runway.

(v) If the enhanced taxiway centre line marking intersects another runway-holding position marking, such as for a precision approach category II or III runway, which is located within 47m of the first runway-holding position marking, the enhanced taxiway centre line marking shall be interrupted 0.9m prior to and after the intersected runway-holding position marking.

(vi) The enhanced taxiway centre line marking shall continue beyond the intersected runway-holding position marking for at least three dashed line segments or 47m from start to finish, whichever is greater.

(b) **Runway holding position marking**

(i) A runway-holding position marking shall be displayed along a runway-holding position.

(ii) At an intersection of a taxiway and a non-instrument, non-precision approach or take-off runway, the runway holding position marking shall be as shown in diagram 2 pattern A.

(iii) Where a single runway-holding position is provided at an intersection of a taxiway and a precision approach category I, II or III runway, the runway-holding position marking shall be as shown in diagram 2, pattern A. Where two or three runway-holding positions are provided at such an intersection, the runway-holding position marking closer (closest) to the runway shall be as shown as, pattern A and the markings farther from the runway shall be as shown as pattern B.

(iv) The runway-holding position marking displayed at a runway-holding position established in accordance with regulation number 4 shall be as shown as, pattern A.

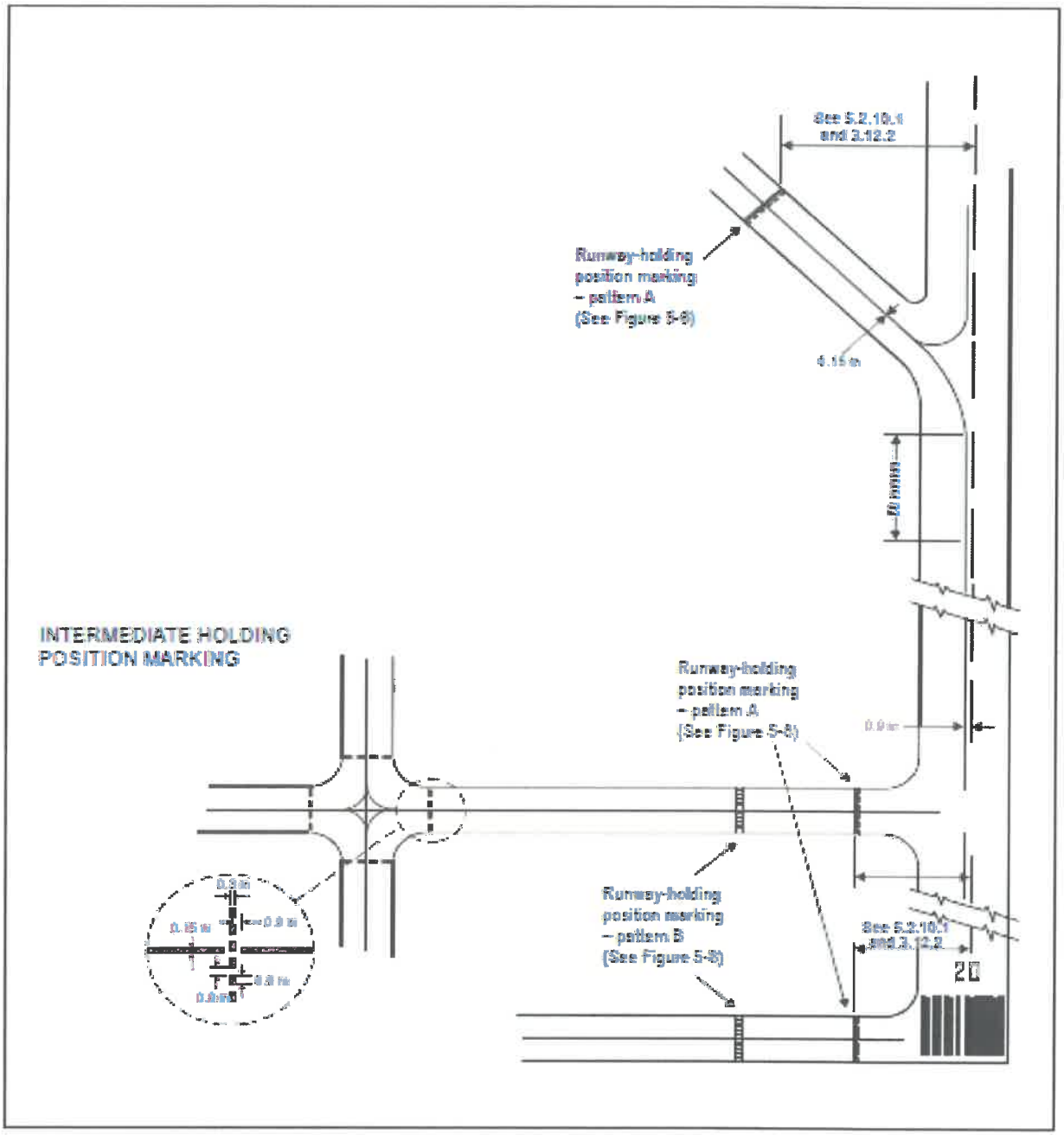


Diagram 2

(c) **Intermediate holding position marking**

(i) An intermediate holding position marking shall be displayed along an intermediate holding position.

(ii) Where an intermediate holding position marking is displayed at an intersection of two paved taxiways, it shall be located across the taxiway at sufficient distance from the near edge of the intersecting taxiway to ensure safe clearance between taxiing aircraft. It shall be coincident with a stop bar or intermediate holding position lights, where provided.

(iii) An intermediate holding position marking shall consist of a single broken line as shown in Diagram 2"."

(l) the substitution in Technical Standard 139.02.10 for subsection 1(1.1)(29) of the following subsection:

"(29) Mandatory instruction marking

(a) Where impracticable to install a mandatory instruction sign, a mandatory marking shall be provided on the surface of the pavement.

(b) The mandatory instruction marking on taxiways where the code letter is A, B, C or D shall be located across the taxiway equally placed about the taxiway centre line and on the holding side of the runway-holding position marking. The distance between the nearest edge of the marking and the runway-holding position marking or the taxiway centre line marking shall be not less than 1m.

(c) The mandatory instruction marking on taxiways where the code letter is E or F shall be located on both sides of the taxiway centre line marking and on the holding side of the runway-holding position marking as shown in Diagram 4(B). The distance between the nearest edge of the marking and the runway-holding position marking or the taxiway centre line marking shall be not less than 1m.

(d) The Mandatory instruction marking shall consist of an inscription in white on a red background. Except for a "NO ENTRY" marking, the inscription shall provide information identical to that of the associated mandatory instruction sign.

(e) A "NO ENTRY" marking shall consist of an inscription in white reading NO ENTRY on a red background.

(f) Where there is insufficient contrast between the marking and the pavement surface, the mandatory instruction marking shall include an appropriate border, preferably white or black."

(m) the substitution in Technical Standard 139.02.10 for subsection 1(1.1)(30) of the following subsection:

"**(30) Information marking**

(a) Where an information sign shall normally be installed and it is impracticable to install, an information marking shall be displayed on the surface of the pavement.

(b) An information marking shall consist of:

(i) an inscription in yellow upon a black background, when it replaces or supplements a location sign; and

(ii) an inscription in black upon a yellow background, when it replaces or supplements a direction or destination sign.

(c) Where there is insufficient contrast between the marking background and the pavement surface, the marking shall include:

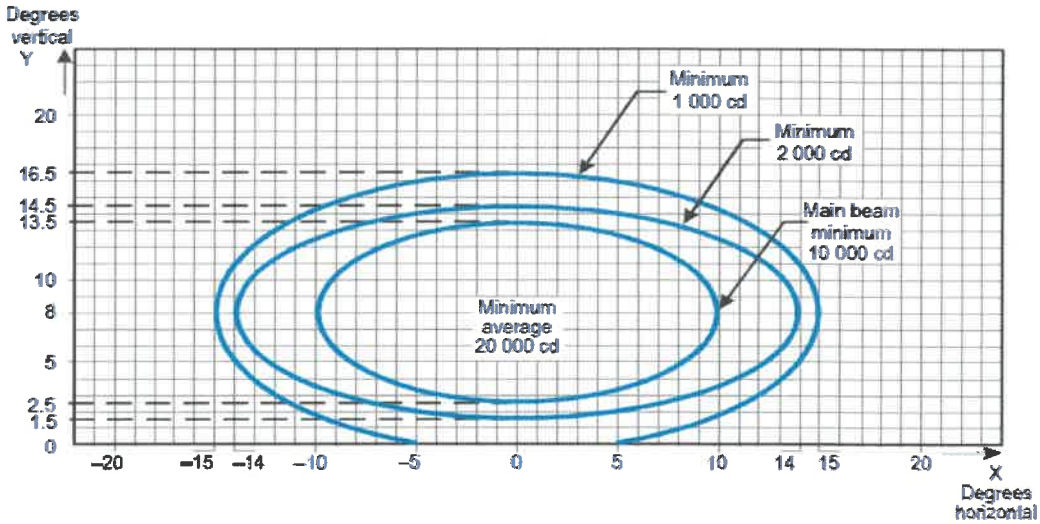
(i) a black border where the inscriptions are in black; and

(ii) a yellow border where the inscriptions are in yellow"."

(n) the insertion in Technical Standard 139.02.10 after subsection 1.(1.1)(34) paragraph (c) of the following paragraphs:

"(d) On the perimeter of and within the ellipse defining the main beam in diagrams 3 to 13 the maximum light intensity value shall not be greater

than three times the minimum light intensity value measured in accordance with diagrams 3 to 14:



Notes:

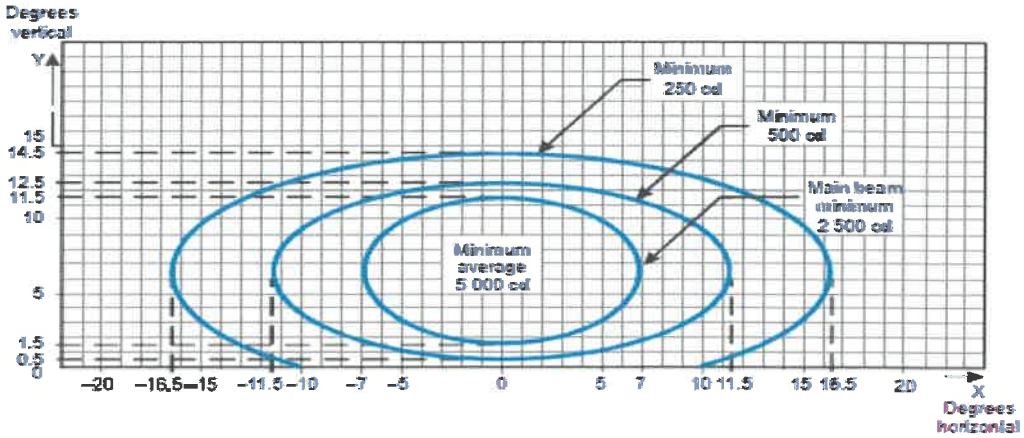
1. Curves calculated on formula $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

a	10	14	15
b	5.5	6.5	8.5

2. Vertical setting angles of the lights shall be such that the following vertical coverage of the main beam will be met:

distance from threshold	vertical main beam coverage
threshold to 315 m	0° — 11°
316 m to 475 m	0.5° — 11.5°
476 m to 640 m	1.5° — 12.5°
641 m and beyond	2.5° — 13.5° (as illustrated above)

Diagram 3



Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

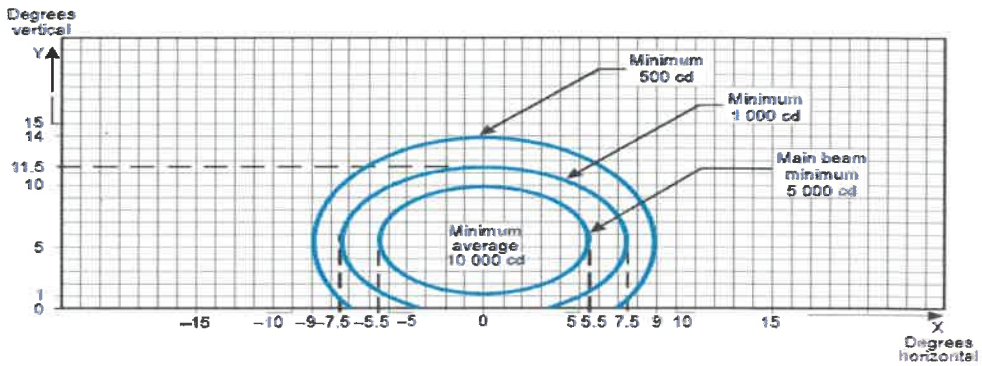
a	7.0	11.5	16.5
b	5.0	6.0	8.0

2. Toe-in 2 degrees

3. Vertical setting angles of the lights shall be such that the following vertical coverage of the main beam will be met:

distance from threshold	vertical main beam coverage
threshold to 115 m	0.5° — 10.5°
116 m to 215 m	1° — 11°
216 m and beyond	1.5° — 11.5° (as illustrated above)

Diagram 4



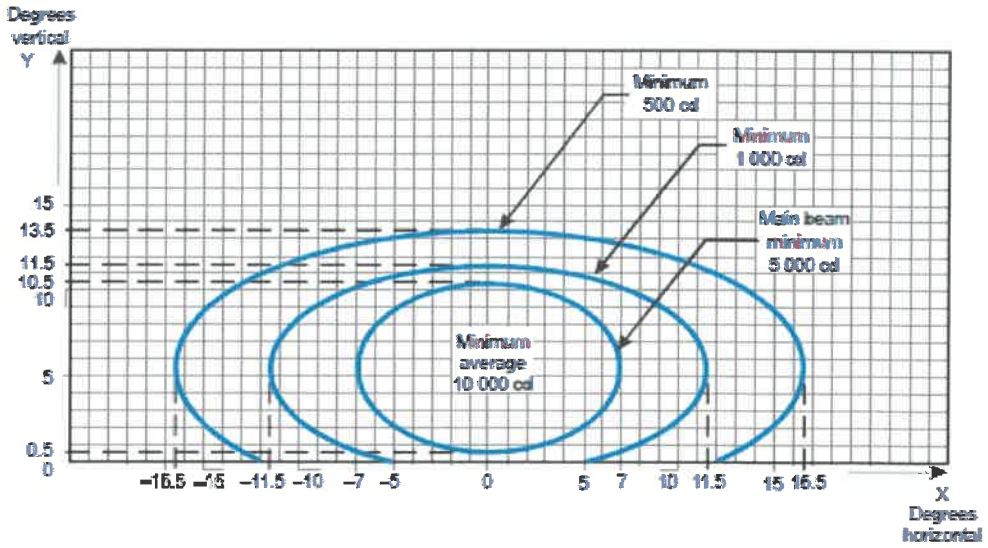
Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

a	5.5	7.5	9.0
b	4.5	6.0	8.5

2. Toe-in 3.5 degrees

Diagram 5



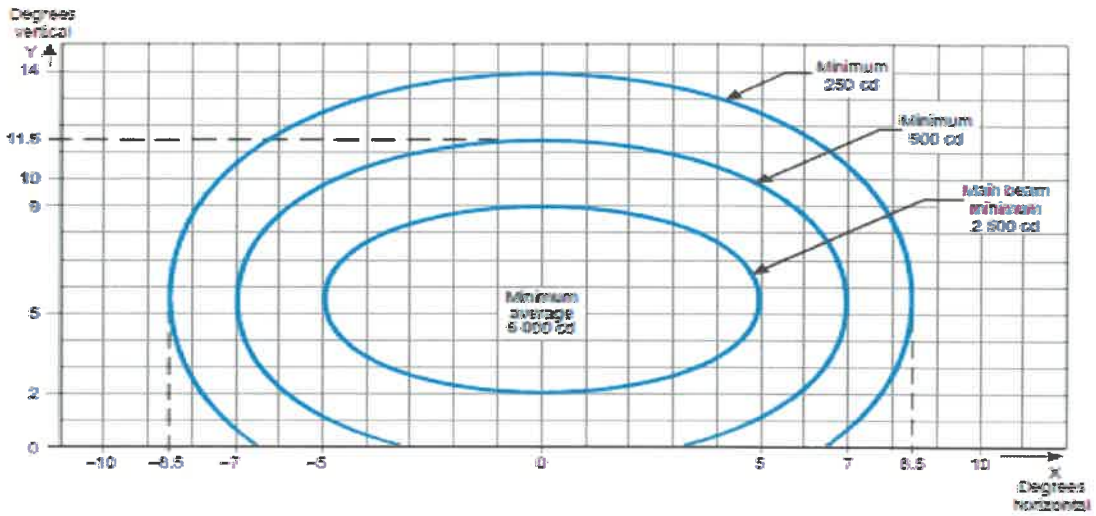
Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

a	7.0	11.5	16.5
b	5.0	6.0	8.0

2. Toe-in 2 degrees

Diagram 6



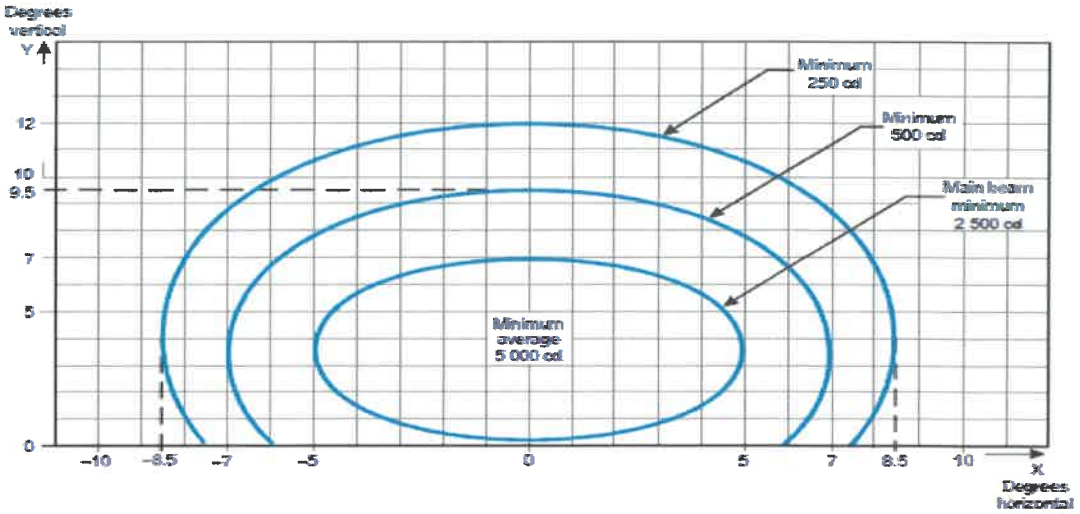
Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

a	5.0	7.0	8.5
b	3.5	6.0	8.5

2. Toe-in 4 degrees

Diagram 7



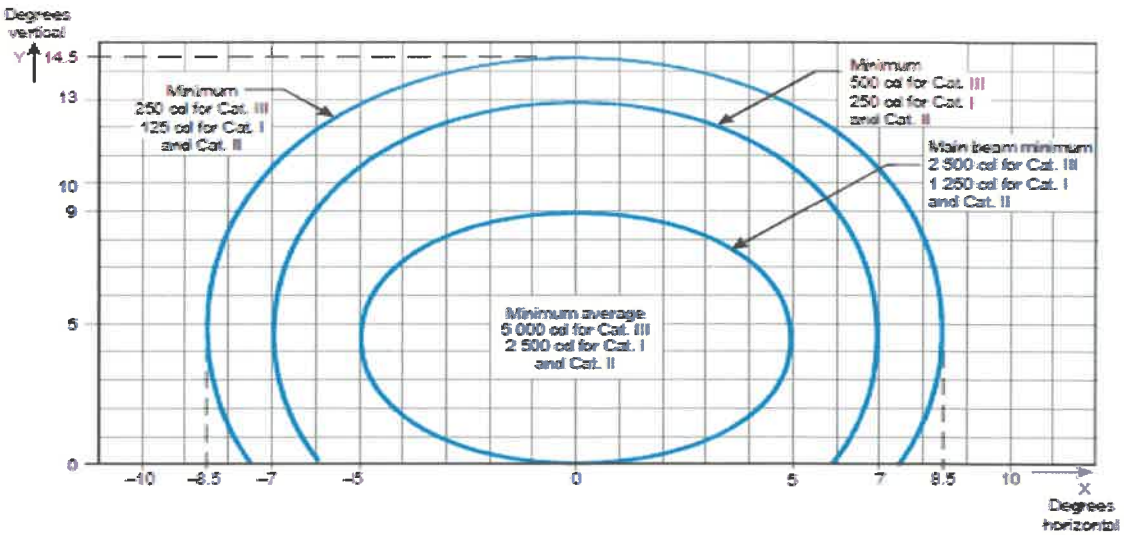
Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

a	5.0	7.0	8.5
b	3.5	6.0	8.5

2. For red light, multiply values by 0.15.
3. For yellow light, multiply values by 0.40.

Diagram 8



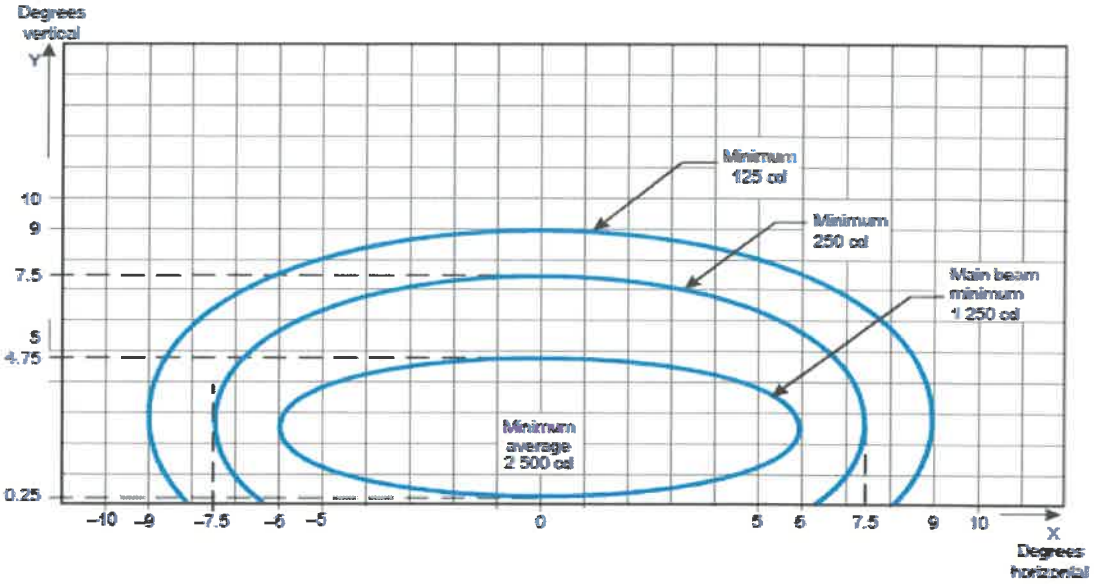
Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

a	5.0	7.0	8.5
b	4.5	8.5	10

2. For red light, multiply values by 0.15.
3. For yellow light, multiply values by 0.40.

Diagram 9

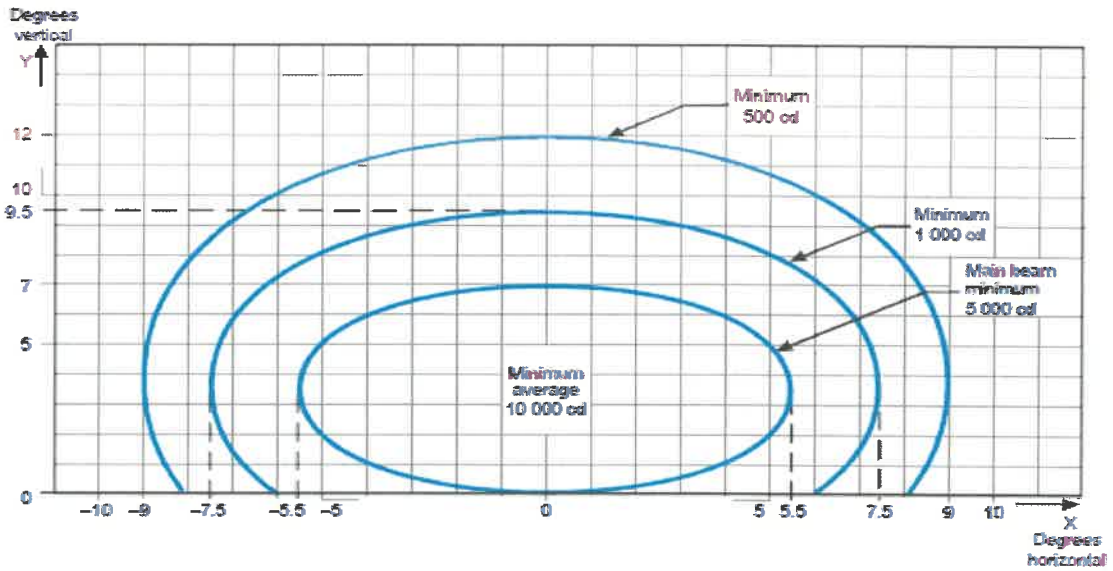


Notes:

1. Curves calculated on formula $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

a	6.0	7.5	9.0
b	2.25	5.0	6.5

Diagram 10



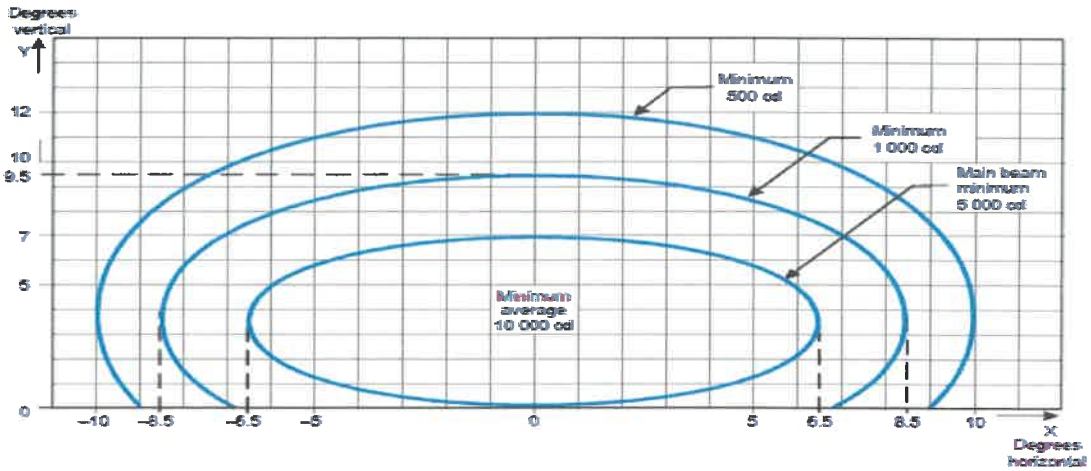
Notes:

1. Curves calculated on formula $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

a	5.5	7.5	9.0
b	3.5	6.0	8.5

2. Toe-in 3.5 degrees
3. For red light, multiply values by 0.15.
4. For yellow light, multiply values by 0.40.

Diagram 11



Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

a	6.5	8.5	10.0
b	3.5	6.0	8.5

2. Toe-in 4.5 degrees
3. For red light, multiply values by 0.15.
4. For yellow light, multiply values by 0.40.

Diagram 12

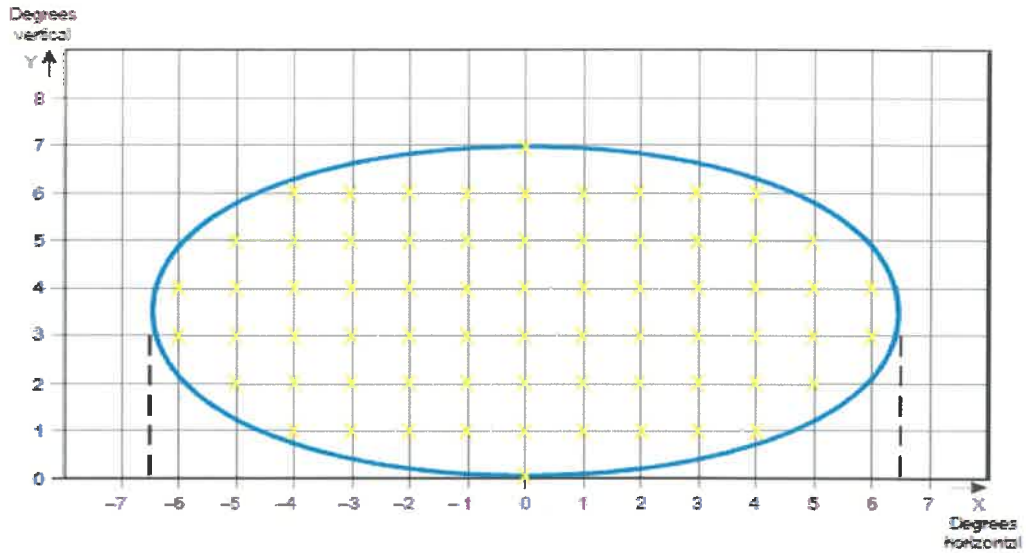
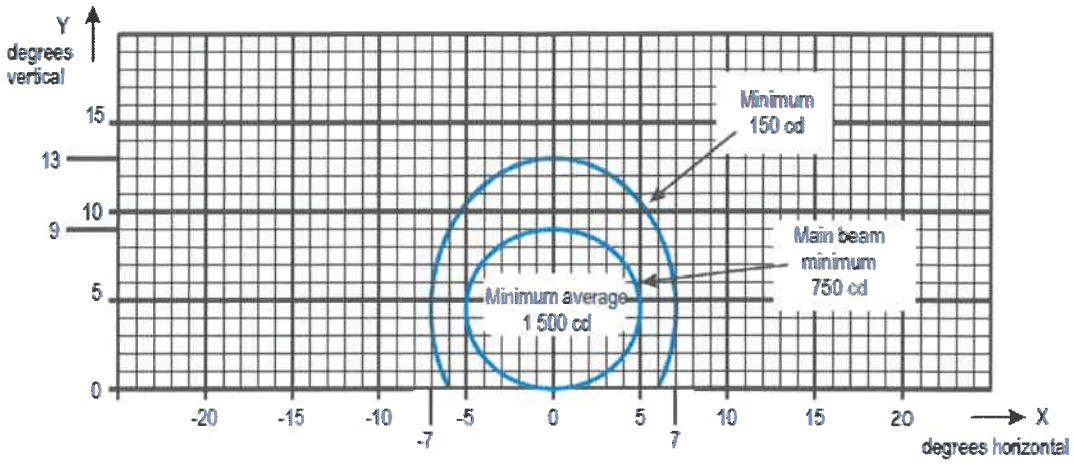


Diagram 13



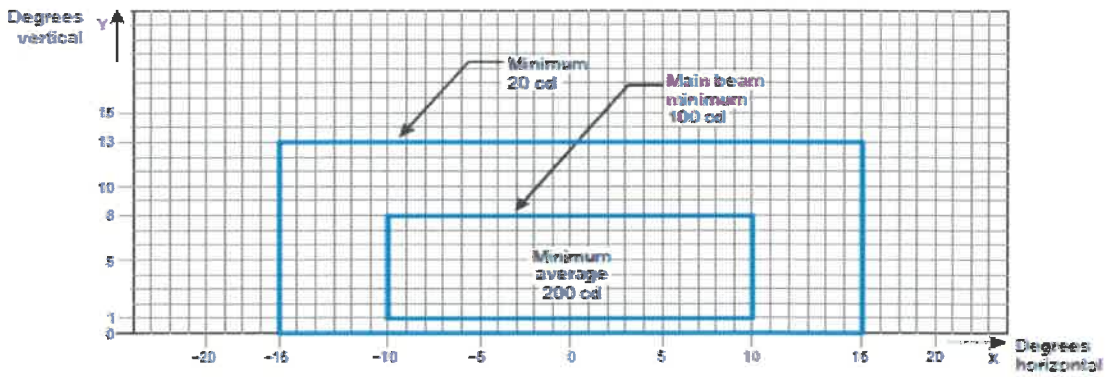
Notes:

1. Curves calculated on formula $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

a	5.0	7.0
b	4.5	8.5

Diagram 14

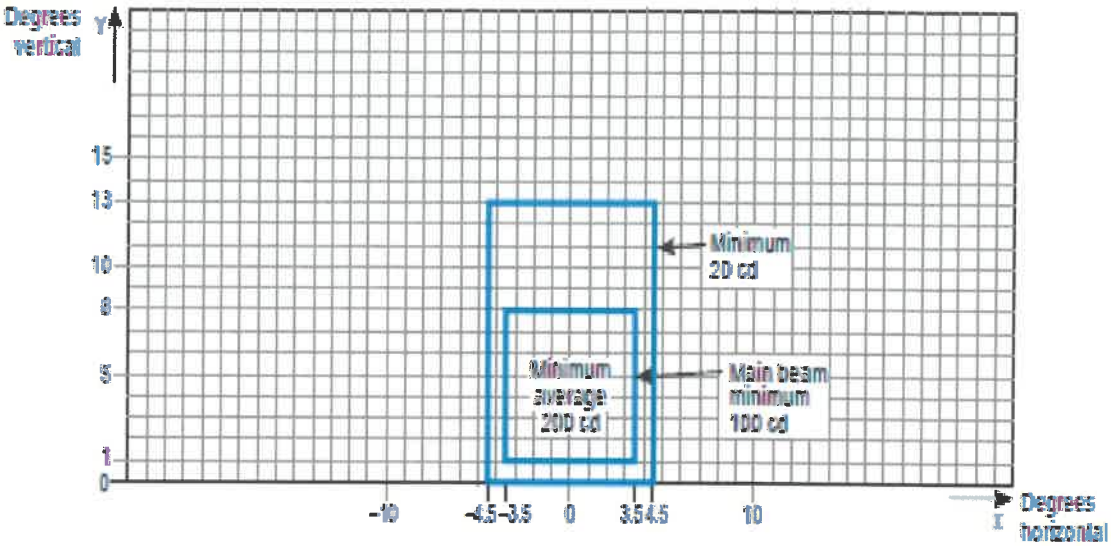
"(e) On the perimeter of and within the rectangle defining the main beam in diagrams 15 to 23, the maximum light intensity value shall not be greater than three times the minimum light intensity value measured in accordance with diagrams 15 to 24.



Notes:

1. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m and are intended for use before and after curves.
2. See collective notes for Figures A2-12 to A2-21.
3. Increased intensities for enhanced rapid exit taxiway centre line lights as recommended in 5.3.16.9 are four times the respective intensities in the figure (i.e. 800 cd for minimum average main beam).

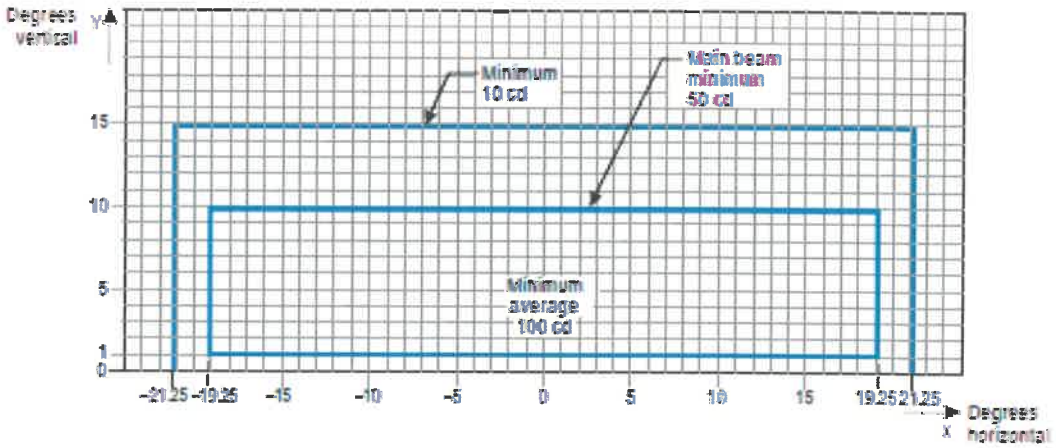
Diagram 15



Notes:

1. These beam coverages are generally satisfactory and cater for a normal displacement of the cockpit from the centre line of approximately 3 m.

Diagram 16

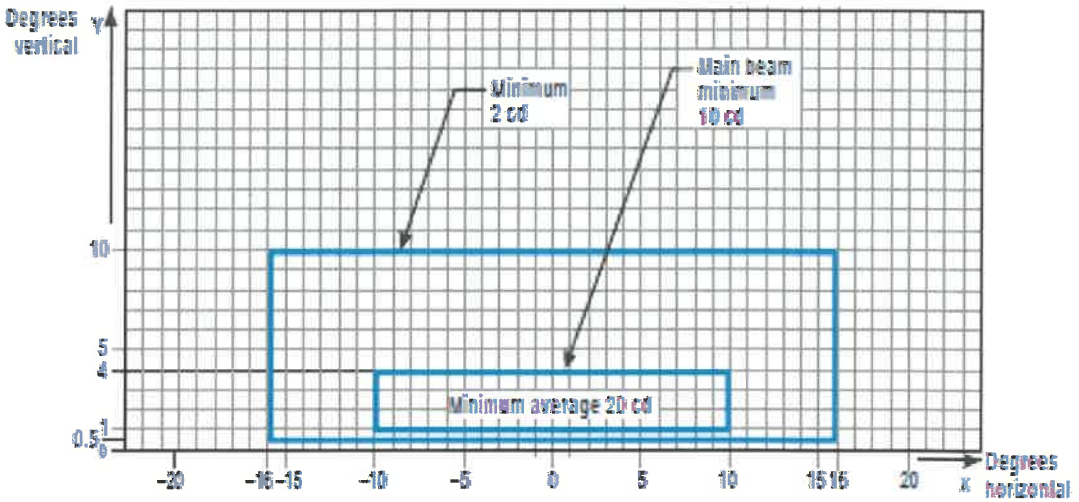


Notes:

1. Lights on curves to be toed-in 15.75 degrees with respect to the tangent of the curve. This does not apply to runway entrance lights (RELs)

2. Increased intensities for RELs shall be twice the specified intensities, i.e., minimum 20 cd, main beam minimum 100 cd and minimum average 200 cd.

Diagram 17

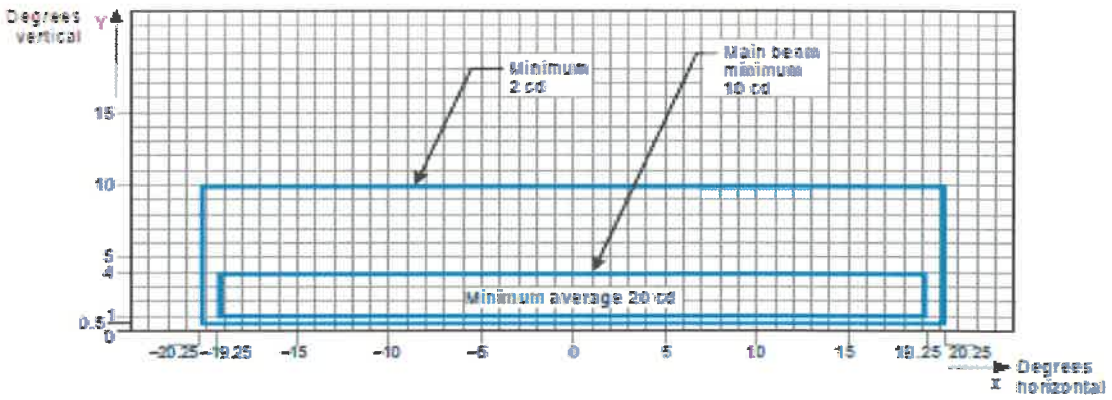


Notes:

1. At locations where high background luminance is usual and where deterioration of light output resulting from dust, snow and local contamination is a significant factor, the cd-values should be multiplied by 2.5.

2. Where omnidirectional lights are used they shall comply with the vertical beam requirements in this figure.

Diagram 18



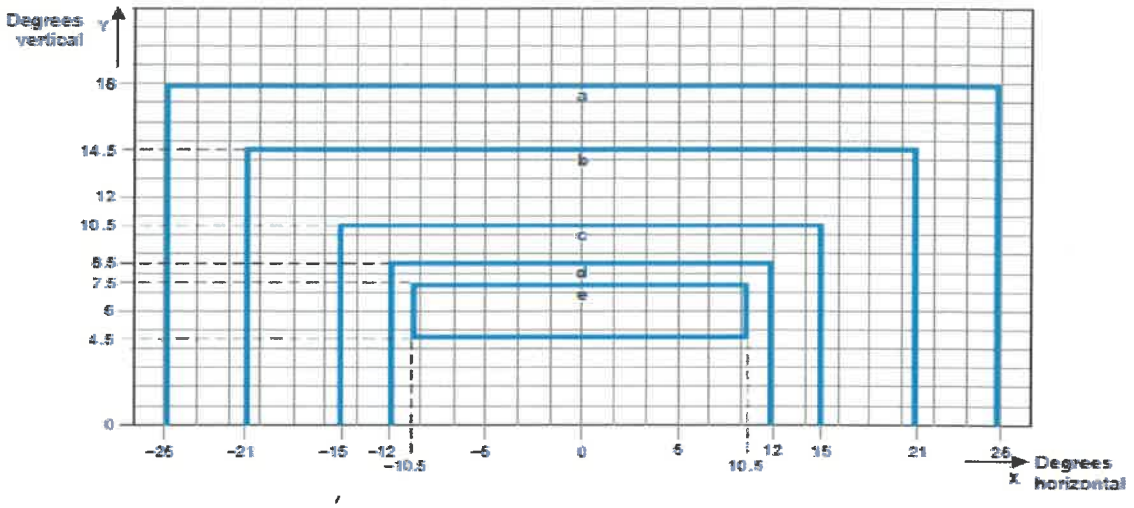
Notes:

1. Lights on curves to be toed-in 15.75 degrees with respect to the tangent of the curve.

2. At locations where high background luminance is usual and where deterioration of light output resulting from dust, snow and local contamination is a significant factor, the cd-values should be multiplied by 2.5.

3. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m as could occur at the end of curves.

Diagram 19

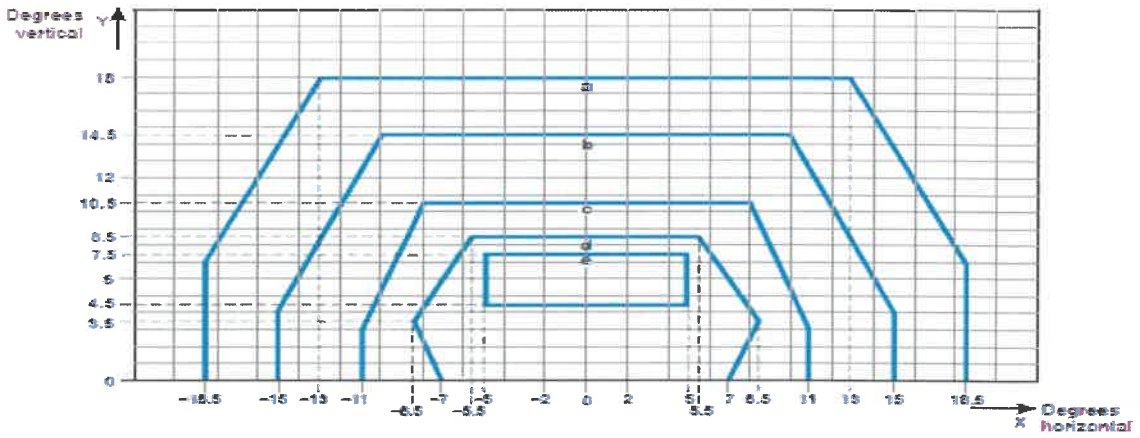


Curve	a	b	c	d	e
Intensity (cd)	8	20	100	450	1 800

Notes:

1. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m and are intended for use before and after curves.

Diagram 20

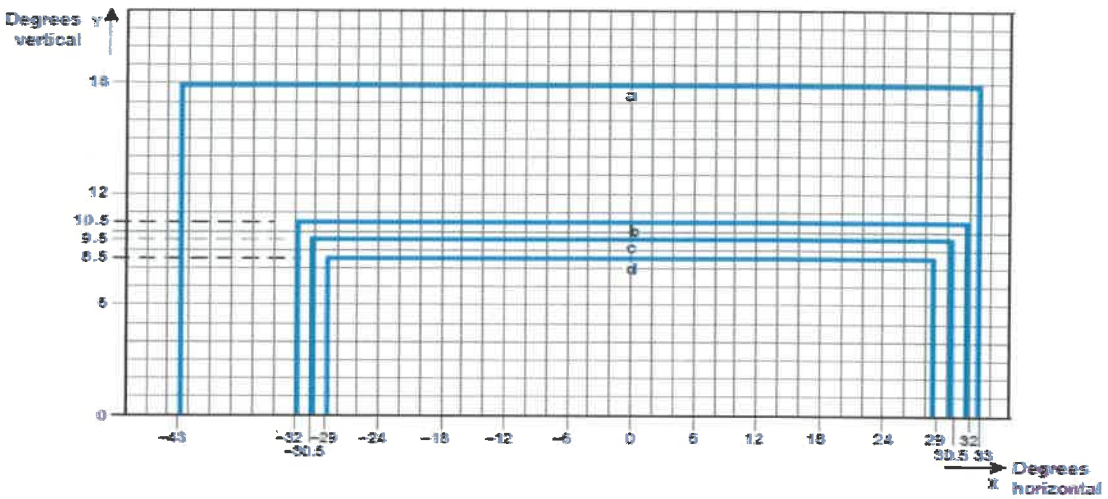


Curve	a	b	c	d	e
Intensity (cd)	8	20	100	450	1 800

Notes:

1. These beam coverages are generally satisfactory and cater for a normal displacement of the cockpit corresponding to the outer main gear wheel on the taxiway edge.

Diagram 21

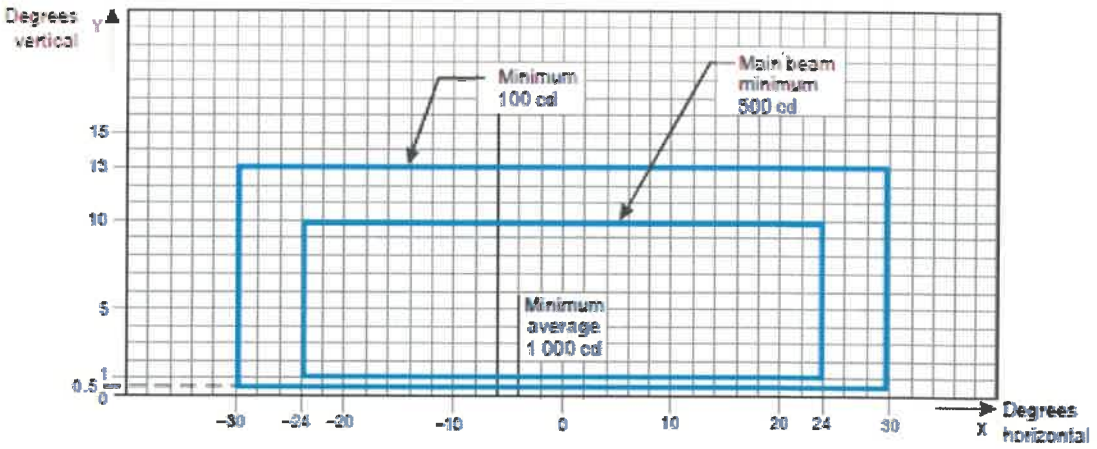


Curve	a	b	c	d
Intensity (cd)	8	100	200	400

Notes:

1. Lights on curves to be toed-in 17 degrees with respect to the tangent of the curve.

Diagram 22



Notes:

1. Although the lights flash in normal operation, the light intensity is specified as if the lights were fixed for incandescent lamps.

Diagram 23

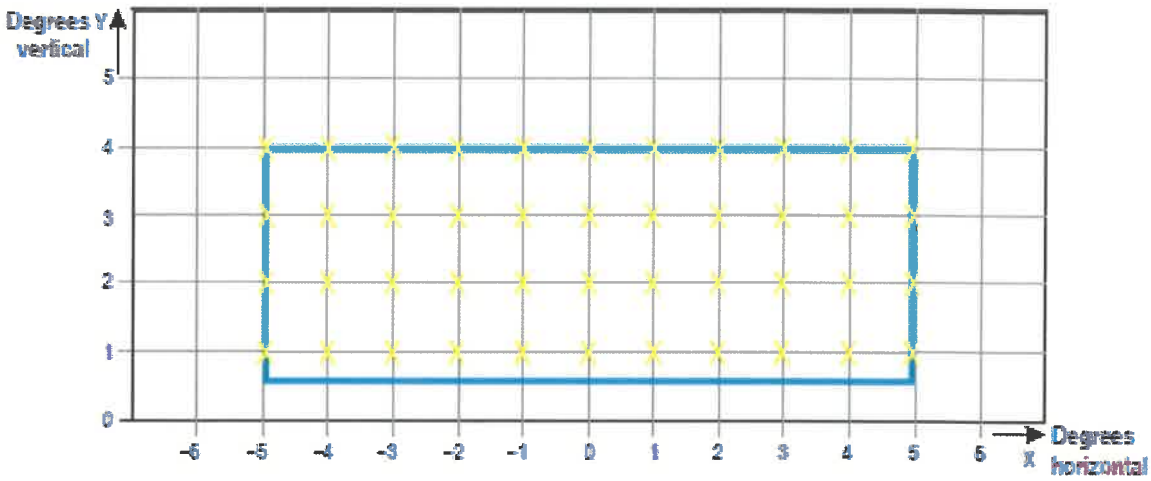


Diagram 24

(o) the substitution in Technical Standard 139.02.10 for subsection 1.(1.1)(39) of the following subsection:

"**(39) Runway threshold and wing bar lights**

(a) **Runway Edge Lights**

(i) Runway edge lights shall be provided for a runway intended for use at night or for a precision approach runway intended for use by day or night.

(ii) Runway edge lights shall be provided on a runway intended for take-off with an operating minimum below an RVR of the order of 800 m by day.

(iii) Runway edge lights shall be placed along the full length of the runway and shall be in two parallel rows equidistant from the centre line.

(iv) Runway edge lights shall be placed along the edges of the area declared for use as the runway or outside the edges of the area at a distance of not more than 3m.

(v) Where the width of the area which is declared as runway exceeds 60m, the distance between the rows of lights shall be determined considering the nature of the operations, the light distribution characteristics of the runway edge lights, and other visual aids serving the runway.

(vi) The lights shall be uniformly spaced in rows at intervals of not more than 60m for an instrument runway, and at intervals of not more than 100m for a non-instrument runway. The lights on opposite sides of the runway axis shall be on lines at right angles to that axis. At intersections of runways, lights may be spaced irregularly or omitted, provided that adequate guidance remains available to a pilot.

(vii) Runway edge lights shall be fixed lights showing variable white, except that:

(aa) in the case of a displaced threshold, the lights between the beginning of the runway and the displaced threshold shall show red in the approach direction; and

(bb) a section of the lights 600m or one-third of the runway length, whichever is the less, at the remote end of the runway from the end at which the take-off run is started, may show yellow.

(viii) The runway edge lights shall show at all angles in azimuth necessary to provide guidance to a pilot landing or taking off in either direction. When the runway edge lights are intended to provide circling guidance, they shall show at all angles in azimuth.

(ix) In all angles of azimuth required in subparagraph (viii), runway edge lights shall show at angles up to 15° above the horizontal with an intensity adequate for the conditions of visibility and ambient light in which use of the runway for take-off or landing is intended. In any case, the intensity shall be at least 50 cd except that at an

aerodrome without extraneous lighting, the intensity of the lights may be reduced to not less than 25 cd to avoid dazzling a pilot.

(x) Runway edge lights on a precision approach runway shall be in accordance with the specifications of diagram 11 and 12.

(b) **Runway End Lights**

(i) Runway end lights shall be placed on a line at right angles to the runway axis as near to the end of the runway as possible and, in any case, not more than 3m outside the end.

(ii) Runway end lighting shall consist of at least six lights. The lights shall be either:

(aa) equally spaced between the rows of runway edge lights; or

(bb) symmetrically disposed about the runway centre line in two groups with the lights uniformly spaced in each group and with a gap between the groups of not more than half the distance between the rows of runway edge lights.

(cc) For a precision approach runway category III, the spacing between runway end lights, except between the two innermost lights if a gap is used, shall not exceed 6m.

(dd) Runway end lights shall be fixed unidirectional lights showing red in the direction of the runway. The intensity and beam spread of the lights shall be adequate for the conditions of visibility and ambient light in which use of the runway is intended.

(ee) Runway end lights on a precision approach runway shall be in accordance with the specifications of diagram 10"."

(p) the substitution in Technical Standard 139.02.10 for subsection 1.(1.1)(40) of the following of subsection:

"**(40) Runway threshold and wing bar lights**

(a) When a threshold is at the extremity of a runway, the threshold lights shall be placed in a row at right angles to the runway axis as near to the extremity of the runway as possible and, in any case, not more than 3m outside the extremity.

(b) When a threshold is displaced from the extremity of a runway, threshold lights shall be placed in a row at right angles to the runway axis at the displaced threshold.

(c) Threshold lighting shall consist of:

(i) on a non-instrument or non-precision approach runway, at least six lights;

(ii) on a precision approach runway category I, at least the number of lights that shall be required if the lights were uniformly spaced at intervals of 3m between the rows of runway edge lights; and

(iii) on a precision approach runway category II or III, lights uniformly spaced between the rows of runway edge lights at intervals of not more than 3m.

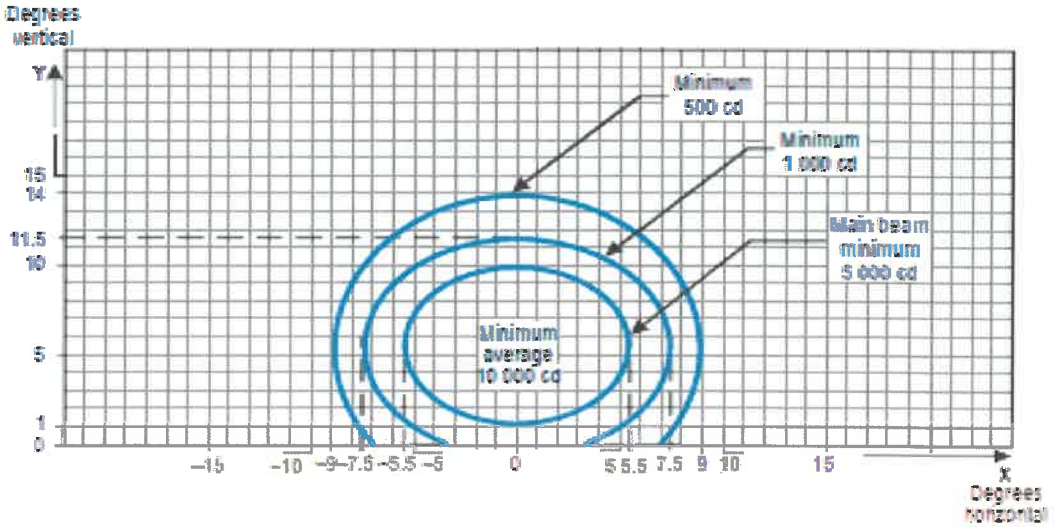
(40).1 Runway wing bar lights

(a) Wing bar lights shall be provided on a non-instrument or non-precision approach runway where the threshold is displaced and runway threshold lights are required but are not provided.

(b) Wing bar lights shall be symmetrically disposed about the runway centre line at the threshold in two groups i.e wing bars. Each wing bar shall be formed by at least five lights extending at least 10m outward from, and at right angles to, the line of the runway edge lights, with the innermost light of each wing bar in the line of the runway edge lights.

(c) Runway threshold and wing bar lights shall be fixed unidirectional lights showing green in the direction of approach to the runway. The intensity and beam spread of the lights shall be adequate for the conditions of visibility and ambient light in which use of the runway is intended.

(d) Runway threshold lights on a precision approach runway shall be in accordance with the specifications for diagram 25 below:



Notes:

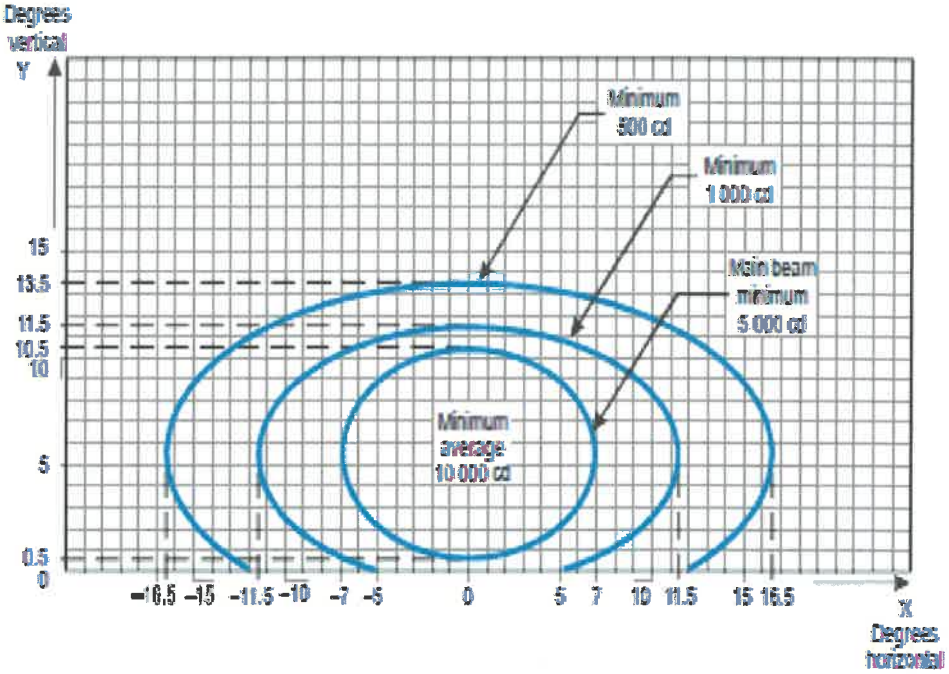
1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

a	5.5	7.5	9.0
b	4.5	6.0	8.5

2. Toe-in 3.5 degrees

Diagram 25

(e) Threshold wing bar lights on a precision approach runway shall be in accordance with the specifications of diagram 26:



Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

a	7.0	11.5	16.5
b	5.0	6.0	8.0

2. Toe-in 2 degrees

Diagram 26

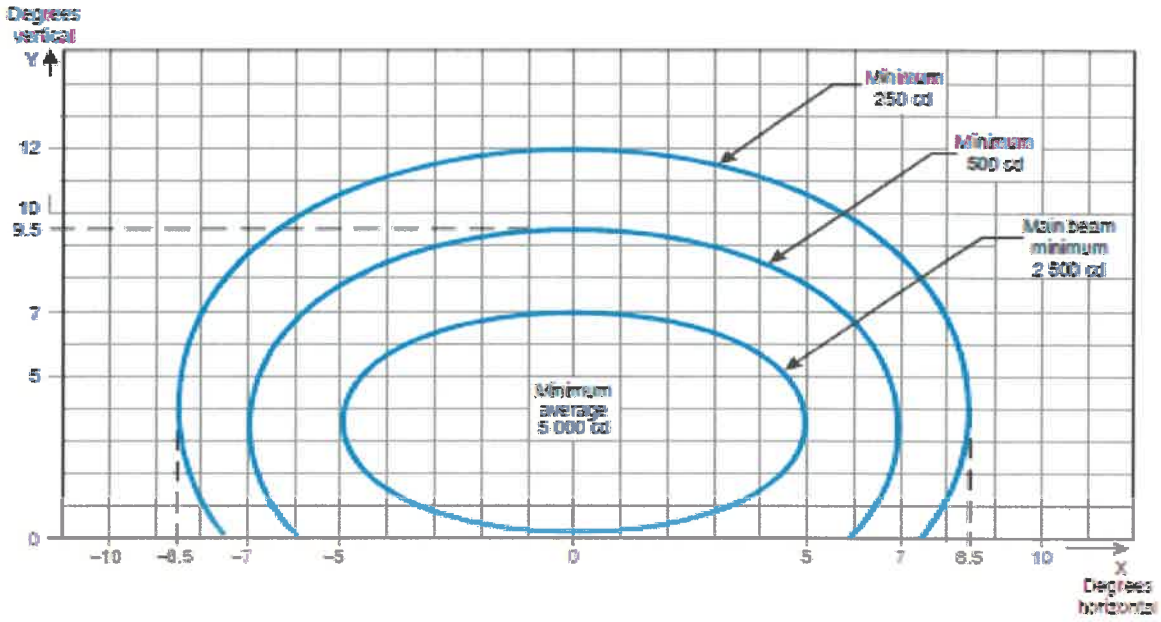
"(f) Runway centre line lights shall be located along the centre line of the runway, except that the lights may be uniformly offset to the same side of the runway centre line by not more than 60cm where it is not practicable to locate them along the centre line. The lights shall be located from the threshold to the end at longitudinal spacing approximately 15m.

(g) The runway is intended for use in runway visual range conditions of 350m or greater, the longitudinal spacing may be approximately 30m.

(h) Runway centre line lights shall be fixed lights showing variable white from the threshold to the point 900m from the runway end; alternate red and variable white from 900m to 300m from the runway end; and red from 300m to the runway end, except that for runways less than 1 800m in

length, the alternate red and variable white lights shall extend from the midpoint of the runway usable for landing to 300m from the runway end.

(i) Runway centre line lights shall be in accordance with the specifications of diagrams 27 or 28.



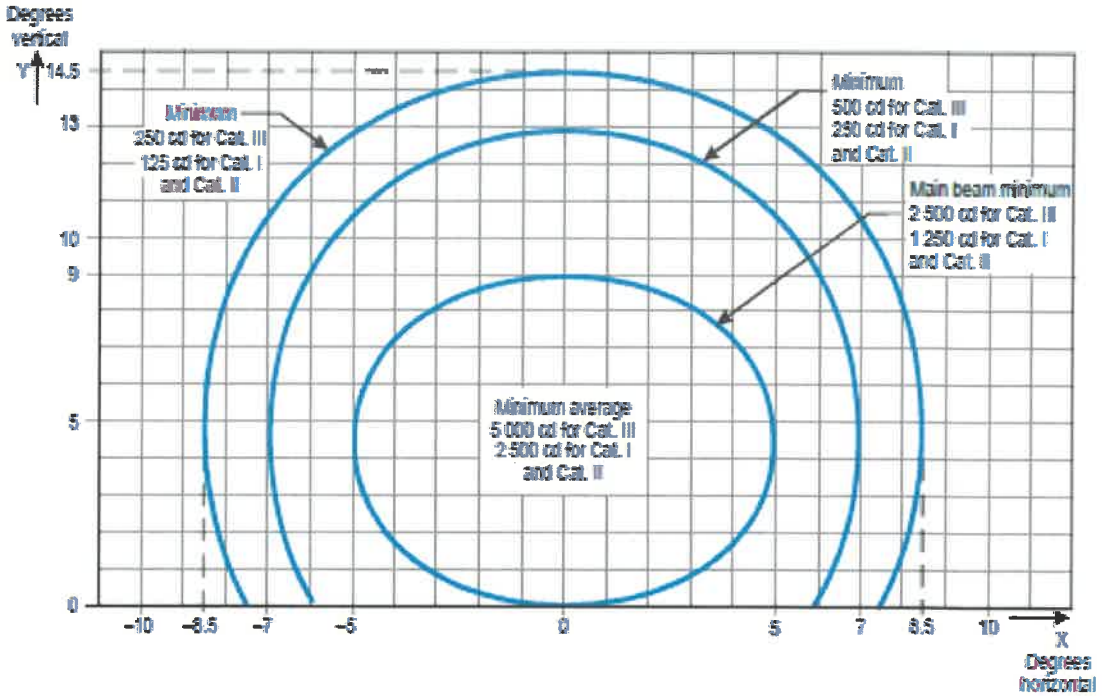
Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

a	5.0	7.0	8.5
b	3.5	6.0	8.5

2. For red light, multiply values by 0.15.
3. For yellow light, multiply values by 0.40.

Diagram 27



Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

a	5.0	7.0	8.5
b	4.5	8.5	10

2. For red light, multiply values by 0.15.
3. For yellow light, multiply values by 0.40.

Diagram 28

(q) the substitution in Technical Standard 139.02.10 for subsection (42) of the following subsection:

"(42) Runway touchdown zone lights

(a) Touchdown Zone (TDZ) lights shall be provided in the touchdown zone of a precision approach runway category II or III.

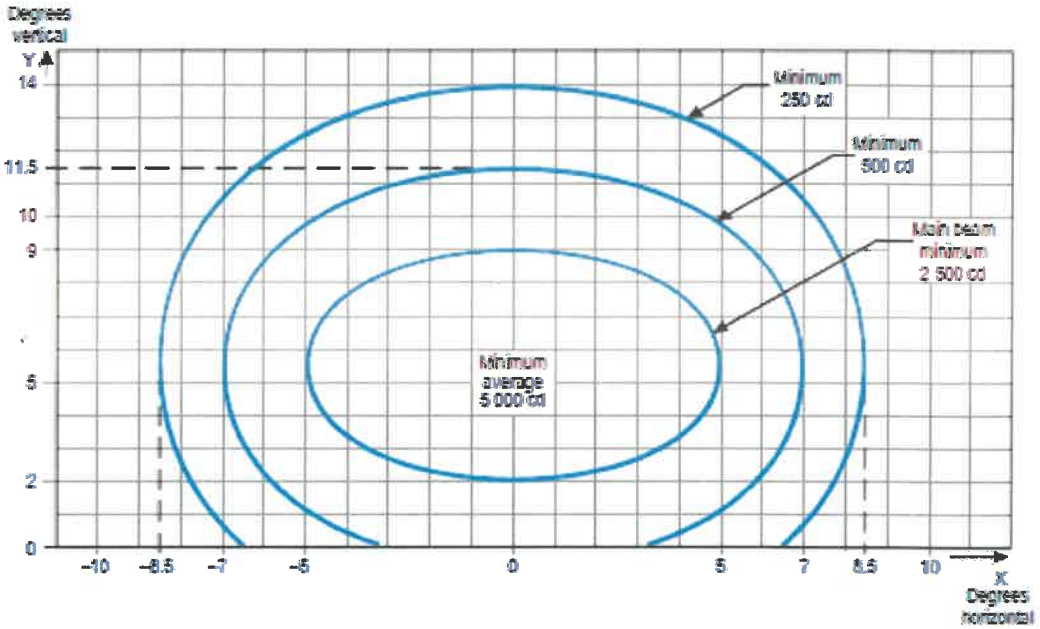
(b) Touchdown Zone lights shall extend from the threshold for a longitudinal distance of 900m, except that, on runways less than 1 800m in length, the system shall be shortened so that it does not extend beyond the midpoint of the runway. The pattern shall be formed by pairs of barrettes symmetrically located about the runway centre line. The lateral spacing

between the innermost lights of a pair of barrettes shall be equal to the lateral spacing selected for the touchdown zone marking. The longitudinal spacing between pairs of barrettes shall be either 30m or 60m.

(c) A barrette shall be composed of at least three lights with a spacing between the lights of not more than 1.5m.

(d) Touchdown zone lights shall be fixed unidirectional lights showing variable white.

(e) Touchdown zone lights shall be in accordance with the specifications of diagram 29.



Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

a	5.0	7.0	8.5
b	3.5	6.0	8.5

2. Toe-in 4 degrees

Diagram 29

(r) the insertion in Technical Standard 139.02.10 for subsection 1.(1.1)(63) after subparagraph (c) of the following paragraphs:

"(d) For a runway meant for use in runway visual range conditions less than a value of 550m, the electrical systems for the power supply, lighting and control of the lighting systems shall be designed so that the failure of one circuit will not leave the pilot with inadequate visual guidance or misleading information by ensuring that:

(i) each circuit is interleaved and in an interleaved system extend throughout the whole of the service (e.g. runway length);

(ii) be so arranged that a balanced symmetrical lighting pattern remains in the event of failure of one or more of the circuits;

(iii) the circuits and associated regulators are fed from separate buses such that each circuit is supplied from a separate CCR; and

(iv) arrangement is made such that a spare CCR is available to be placed in operation within a minimum amount of time.

(e) Interleaving shall be provided for lighting facilities listed in Table 13"."

(s) the insertion in Technical Standard 139.02.10 after subsection 1.(1.1)(67) of the following subsections:

"**(68) Emergency lighting**

(a) At an aerodrome provided with runway lighting and without a secondary power supply, sufficient emergency lights shall be conveniently available for installation on at least the primary runway in the event of failure of the normal lighting system and to mark obstacles or delineate taxiways and apron areas.

(b) When installed on a runway the emergency lights shall, as a minimum, conform to the configuration required for a non-instrument runway.

(c) The colour of the emergency lights shall conform to the colour requirements for runway lighting, except that, where the provision of coloured lights at the threshold and the runway end is not practicable, all lights may be variable white or as close to variable white as practicable.

(69) Apron flooding lights

(a) Apron floodlighting shall be provided on an apron, on a de-icing/anti-icing facility and on a designated isolated aircraft parking position intended to be used at night.

(b) Apron floodlights shall be located to provide adequate illumination on all apron service areas, with a minimum of glare to pilots of aircraft in flight and on the ground, aerodrome and apron controllers, and personnel on the apron. The arrangement and aiming of floodlights shall be such that the aircraft stand receives light from two or more directions to minimize shadows.

(c) The spectral distribution of apron floodlights shall be such that the colours used for aircraft marking connected with routine servicing, and for surface and obstacle marking, can be correctly identified.

(d) The average illuminance shall be at least the following:

(i) Aircraft stand:

(aa) horizontal illuminance — 20 lux with a uniformity ratio (average to minimum) of not more than 4 to 1; and

(bb) vertical illuminance — 20 lux at a height of 2m above the apron in relevant directions; and

(ii) Other apron areas:

(aa) horizontal illuminance — 50% of the average illuminance on the aircraft stands with a uniformity ratio (average to minimum) of not more than 4 to 1.

(70) Aircraft stand manoeuvring guidance lights

(a) The aircraft stand manoeuvring guidance lights shall be provided to facilitate the positioning of an aircraft on the aircraft stand on a paved apron or on a de-icing/anti-icing facility intended for use in poor visibility conditions, unless adequate guidance is provided by other means.

(b) The aircraft stand manoeuvring guidance lights shall be collocated with the aircraft stand markings.

(c) The aircraft stand manoeuvring guidance lights, other than those indicating a stop position, shall be fixed yellow lights, visible throughout the segments within which they are intended to provide guidance.

(d) The lights used to delineate lead-in, turning and lead-out lines shall be spaced at intervals of not more than 7.5m on curves and 15 m on straight sections.

(e) The lights indicating a stop position shall be fixed unidirectional lights showing red.

(f) The intensity of the lights shall be adequate for the condition of visibility and ambient light in which the use of the aircraft stand is intended.

(g) The lighting circuit shall be designed so that the lights may be switched on to indicate that an aircraft stand is to be used and switched off to indicate that it is not to be used".";

(t) the insertion after Technical Standard 139.02.10 of the following Technical Standard:

"**139.02.11 Aerodrome Manual**

1. Format of the aerodrome manual

(1) An aerodrome operator shall submit the aerodrome manual for approval containing information on how operational procedures and their safe management will be delivered.

(2) The aerodrome manual shall accurately reflect the aerodrome's SMS and show how the aerodrome intends to measure its performance against safety targets and objectives.

(3) All aerodrome safety policies, operational procedures and instructions are contained in detail or cross referenced to other formally accepted or recognized publications.

2. Contents of the aerodrome manual

(1) The aerodrome manual shall contain, as a minimum, the following sections, including some of their requirements:

(a) a table of contents;

(b) a list of the amendments: this section shall log the updates and corrections made to the aerodrome manual;

(c) a distribution list;

(d) aerodrome administrative data: an organizational chart shall be provided, as well as the aerodrome operator's safety responsibilities;

(e) a description of the aerodrome: this includes maps and charts. The physical characteristics of the aerodrome shall be documented, as well as the information regarding the ARFF level of category, ground aids, primary and secondary electrical power systems, and main obstacles. Sufficiently detailed charts of the aerodrome shall also be included (showing the aerodrome's boundaries and different areas (manoeuvring area, apron, etc.). All deviations from the regulatory provisions authorized by the Director shall be listed together with their validity and references to the related documents including any safety assessments;

(f) a description of the intended operations, including:

(i) the critical aeroplanes the aerodrome is intended to serve;

(ii) the category of runway(s) provided (non-instrument, instrument including non-precision and precision);

(iii) the different runways and their associated levels of service;

(iv) the nature of aviation activities (commercial, passenger, air transport, cargo, aerial work, general aviation);

(v) the type of traffic permitted to use the aerodrome (international/national, IFR/VFR, scheduled/non-scheduled); and

(vi) the minimum RVR that aerodrome operations can be permitted;

(g) a description of each of the aerodrome operator's procedures related to the safety of aeronautical operations at the aerodrome. For each procedure, a description or listing of the following:

(i) the responsibilities of the aerodrome operator shall be clearly described;

(ii) the tasks that are to be achieved by the aerodrome operator or its subcontractors are listed; and

(iii) the means and procedures required to complete these tasks. This shall be described or appended, together with the necessary details such as the frequency of application and operating modes;

(h) a description of an aerodrome operator's SMS as follows:

(aa) the SMS section of the manual shall be developed, and the related procedures and documents are enclosed, as well as the safety policy of the aerodrome operator signed by the accountable manager ;

(bb) the framework for the implementation of an SMS at an aerodrome shall be as prescribed in Part 140; and

(cc) the aerodrome SMS shall be commensurate with the size of the aerodrome and with the level and complexity of the services provided; and

(i) responsibilities attributed to other aerodrome stakeholders shall be clearly identified.

3. Updating of the aerodrome manual

(1) Responsibility for maintaining the accuracy of the aerodrome manual shall be clearly defined in the manual.

(2) The manual shall be updated using a defined process and shall include a record of all amendments, effective dates and amendment approvals.

(3) The method of enabling all aerodrome operating staff to have access to the relevant parts of the manual shall be clearly defined and can be demonstrated.

(4) A method of tracking amendments and ensuring their receipt shall be established when using an electronic means of distribution.

(5) Any amendments or additions shall be communicated to the Authority in accordance with the requirements in this sub- part.";

(u) the substitution in Technical Standard 139.02.12 for subsection 1(1) of the following subsection:

"(1) The quality assurance system referred to in **[CAR 139.02.4,]** CAR 139.02.12 shall include –";

(v) the substitution in Technical Standard 139.02.12 for subsection 1(3) of the following subsection:

"(3) The quality assurance system shall be documented in the operations manual referred to in **[CAR 139.02.3]** CAR 139.02.12.";

(w) the substitution in Technical Standard 139.02.15 for subsection (1) of the following subsection:

"(1) Level of Protection to be provide for Rescue and Firefighting services

Classification matrix

Column I	Column II	Column III	Column IV
Aerodrome Category	**Aircraft Overall Length**	**Aircraft Maximum Fuselage Width**	**Number of firefighting Vehicles**
1.	N/A	N/A	N/A
2.	N/A	N/A	N/A
3.	at least 12 m but less than 18 m	3 m	1
4.	at least 18 m but less than 24 m	4 m	1
5.	at least 24 m but less than 28 m	4 m	1
6.	at least 28 m but less than 39 m	5 m	2
7.	at least 39 m but less than 49 m	5 m	2
8.	at least 49 m but less than 61 m	7 m	3
9.	at least 61 m but less than 76 m	7 m	3
10.	at least 76 m but less than 90 m		3

(a) The level of protection provided at an aerodrome for rescue and firefighting shall be based on the longest aeroplanes and its fuselage width using the aerodrome.

(b) The level of protection shall be appropriate to the aerodrome category determined where the number of movements of the aeroplanes in the highest category using the aerodrome is more than 700 total movements in the busiest consecutive three months.

(c) During reduced activity, of less than 700 total movements for the busiest consecutive three months for aeroplanes in the highest category, for aerodromes above category 4 the level of protection available shall be no less than that needed for the highest category of aeroplane planned to use the aerodrome, during the time of the actual movements and may be reduced by one level during other times.

(d) When using the classification matrix contained in paragraph 1 above, aerodromes qualifying for the issue of an aerodrome licence in category 4, may provide an aircraft Category 3 firefighting service at all times if –

(i) a full risk assessment has been carried out by the operator which indicates that even with a lower category firefighting service, an acceptable level of safety can be maintained;

(ii) the level of aerodrome rescue and firefighting services protection provided is no less than that required for a Category 3 level of protection and includes both the foam, dry chemical powder and rescue equipment requirements;

(iii) fully trained and permanently appointed firefighting personnel are provided; and

(iv) for a Category 3 aircraft firefighting service, each firefighting vehicle is capable of discharging its content at the required application rate as indicated in "Table – Minimum useable amounts of extinguishing agent" below, of the minimum useable amount of extinguishing agent table in the appropriate mixture. Where nitrogen is used as the propellant to eliminate possible faulty pump operational systems; the full (pre mixed) content can be discharged as firefighting foam. This does not preclude the use of a firefighting vehicle fitted with a

pump and foam induction system provided that the full content can be discharged at the required application rate.

(e) For aerodromes issued with a category 1- 3 license, the level of firefighting service and equipment required shall be based on a risk assessment and shall not be required to meet the requirement as contained in the classification matrix. The risk assessment shall consider number of movements, prevalent aeroplane size, operational hours, minimum level of pilot proficiency, aircraft types, location, etc. Notwithstanding the aforementioned, for category 3 aerodromes with more than 700 total movements during the busiest consecutive three months, the level of service shall comply with the classification matrix at all times.

Table - Minimum useable amounts of extinguishing agent

Aerodrome Category	Foam meeting performance level A		Foam meeting performance level B		Foam meeting performance level C		Complementary agents	
	Water (L)	Discharge rate foam solution/minute (L)	Water (L)	Discharge rate foam solution/ minute (L)	Water (L)	Discharge rate foam solution/ minute (L)	Dry chemical powders (kg)	Discharge rate (kg/sec)
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	1 800	1 300	1 200	900	820	630	135	2.25
4	3 600	2 600	2 400	1 800	1 700	1 100	135	2.25
5	8 100	4 500	5 400	3 000	3 900	2 200	180	2.25
6	11 800	6 000	7 900	4 000	5 800	2 900	225	2.25
7	18 200	7 900	12 100	5 300	8 800	3 800	225	2.25
8	27 300	10 800	18 200	7 200	12 800	5 100	450	4.5
9	36 400	13 500	24 300	9 000	17 100	6 300	450	4.5
10	48 200	16 600	32 300	11 200	22 900	7 900	450	4.5

(f) These firefighting vehicles shall have both a hand-line and a roof mounted turret/mirror. A discharge distance of at least the length of the longest aeroplane using the aerodrome is required through the vehicle turret.

(g) The fire appliances deployed shall be a self-propelled 4 X 4 vehicle that can achieve the required response times of 0 to 80 km/h within 25

seconds as depicted for Rapid Intervention Vehicles when fully laden and have a maximum speed of not less than 105 km/h.

(h) The ancillary equipment to be carried on the vehicle shall consist of the equipment depicted in the rescue equipment list below.

(i) The aerodrome operator shall ensure that both principal and complementary agents are provided at an aerodrome and the principal extinguishing agent shall be:

(i) a foam meeting the minimum performance level A;

(ii) a foam meeting the minimum performance level B;

(ii) a foam meeting the minimum performance level C; or

(iii) a combination of these agents; except that the principal extinguishing agent for aerodromes in categories 1 to 3 shall preferably meet a performance level B or C foam.

(j) At aerodromes where operations by an aeroplane larger than aerodrome category are planned, the quantities of water shall be recalculated and the amount of water for foam production and the discharge rates for foam solution shall be increased accordingly.

(k) The quantity of foam concentrates that is separately provided on vehicles for foam production shall be in proportion to the quantity of water provided and the foam concentrate selected.

(l) The amount of foam concentrate provided on a vehicle shall be sufficient to produce at least two loads of foam solution.

(m) Supplementary water supplies, for the expeditious replenishment of rescue and firefighting vehicles at the scene of an aircraft accident, shall be provided.

(n) Dry chemical powders shall only be substituted with an agent that has equivalent or better firefighting capabilities for all types of fires where complementary agent is expected to be used.

(o) A reserve supply of foam concentrate equivalent to 200% of quantities and 100% of complementary agent including propellant gas shall be maintained at the aerodrome for vehicle replenishment purposes. If a major delay in replenishment is anticipated the amount of reserve supply shall be increased as determined by the risk assessment.

(p) Where a major delay in the replenishment of the supplies is anticipated, the aerodrome operator shall ensure that a contingency plan is put in place to address the delay.

Categories of Aerodromes	**1-2**	**3-5**	**6-7**	**8-10**
Equipment for rescue operations				
Forcible Entry Tools				
Prying Tool(Hooligan Tool)	1	1	1	2
Crowbar, 95 cm	1	1	1	2
Crowbar 1.65 m	1	1	1	2
Axe, rescue, large non wedge type	1	1	1	2
Axe, rescue, large non wedge type or aircraft type	1	2	2	4
Cutter bolt 61 cm	1	1	2	2
Hammer 1.8 kg	1	1	2	2
Chisel, cold 2.5 cm	1	1	2	2
A suitable range of rescue/cut-in equipment including powered rescue tools				

Hydraulic/ electrical (combination) portable rescue equipment	1	1	1	2
Powered rescue saw complete with minimum 406 diameter spare blades	1	1	1	1
Reciprocating/Oscillating saw	1	1	1	2
A range of equipment for the delivery of firefighting agent				
Delivery hoses 30m lengths X 50 and 64mm diameters	6	10	16	22
Foam branches (nozzles)	1	1	2	3
Water branches (nozzles)	1	2	4	6
Coupling adapters	1	1	2	3
Portable fire extinguishers				
CO2	1	1	2	3
DCP	1	1	2	3
SCBA-sufficient to maintain the prolonged internal operations(note: one BA per crew member)				
BA set complete with face mask and air cylinder				
BA spare air cylinder				
BA spare facemask				
A range of ladders				
Extension ladder, rescue and suitable for critical aircraft rescue	-	1	2	3
Protective clothing				

Firefighting helmet, coat, over trousers(complete with braces) boots and gloves(Note; one set per operational fire fighter)				
Additional items for personal protection				
Protective goggles	1	1	2	3
Flash Hood(One per fire-fighter)				
1 Box of surgical gloves				
Blanket fire resisting	1	1	2	2
Rope lines				
Rope line rescue 45m	1	1	2	2
Rope line general use 30m	1	1	2	2
Rope line pocket 6m one per fire-fighter				
Communication equipment				
Portable transceivers(hand held and intrinsically safe)	1	2	2	3
Mobile transceivers(One per vehicle)				
A range of hand-held/portable lighting equipment				
Hand-held flashlight (intrinsically safe	1	2	4	4
Portable lighting-spot or flood intrinsically safe	1	1	2	3
A range of general tools				
Shovel overhaul	1	1	2	3
First aid equipment				
Medical first aid kit	1	1	2	3

Automated external defibrillator(AED)	1	1	2	3
Oxygen Resuscitation Equipment(ORE)	1	1	2	3
Miscellaneous equipment(Chocks and wedges-various sizes)				
Tarpaulin- lightweight	1	1	2	3
Thermal imaging camera	-	-	1	2
Rescue tool box and content				
Hammer, claw 0.6kg	1	1	2	3
Cutters, cable 1.6cm	1	1	2	3
Socket set	1	1	2	3
Hacksaw, heavy duty complete with spare blades	1	1	2	3
Screwdriver set-slotted	1	1	2	3
Pliers, insulated	1	1	2	3
Side cutting 20cm	1	1	2	3
Slip joint-multi-grip 25cm	1	1	2	3
Seatbelt/harness cutting tool	1	1	2	3
Wrench, adjustable 30cm	1	1	2	3
Spanners, combination 10mm-21mm or 20cm	1	1	2	3

"

(x) the insertion in Technical Standard 139.02.23 after subsection (13) of the following subsection:

"**(14) Aerodrome Maintenance**

(a) **Runway pavement overlays**

(i) The longitudinal slope of the temporary ramp, measured with reference to the existing runway surface or previous overlay course, shall be:

(aa) 0.5 to 1.0% for overlays up to and including 5cm in thickness; and

(bb) not more than 0.5% for overlays more than 5cm in thickness.

(ii) Overlaying shall proceed from one end of the runway toward the other end so that based on runway utilization most aircraft operations shall experience a down ramp.

(iii) The entire width of the runway shall be overlaid during each work session.

(iv) Before a runway being overlaid is returned to a temporary operational status, a runway centre line marking conforming to the specifications shall be provided. Additionally, the location of any temporary threshold shall be identified by a 3.6m wide transverse stripe.

(v) The overlay shall be constructed and maintained above the minimum friction level specified in this sub-standard.

(b) **Visual Aids**

(i) A light shall be deemed to be unserviceable when the main beam average intensity is less than 50% of the value specified in the appropriate isocandela diagram 3 - 29. For light units where the designed main beam average intensity is above the value shown isocandela diagram 3- 29, the 50% value shall be related to that of the design value.

(ii) A system of preventive maintenance of visual aids shall be employed to ensure lighting and marking system reliability.

(iii) The system of preventive maintenance employed for a precision approach runway category II or III shall include at least the following checks:

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

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

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

(iv) 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 shall be undertaken by measuring all lights, as far as practicable, to ensure conformance with the applicable isocandela diagrams as specified in this TS.

(v) 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 shall be undertaken using a mobile measuring unit of sufficient accuracy to analyse the characteristics of the individual lights.

(vi) The frequency of measurement of lights for a precision approach runway category II or III shall 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 measurements but, in any event, shall not be less than twice a year for in-pavement lights and not less than once a year for other lights.

(vii) The system of preventive maintenance employed for a precision approach runway category II or III shall have as its objective that, during any period of category II or III operations, all approach and runway lights are serviceable and that, in any event, at least:

(aa) 95% of the lights are serviceable in each of the following particular significant elements:

(aaa) precision approach category II and III lighting system, the inner 45 m;

(bbb) runway centre line lights;

(ccc) runway threshold lights; and

(ddd) runway edge lights;

(bb) 90% of the lights are serviceable in the touchdown zone of lights;

(cc) 85% the lights are serviceable in the approach lighting system beyond 450m; and

(dd) 75% of the lights are serviceable in the runway end lights.

(viii) To provide continuity of guidance, the allowable percentage of unserviceable lights shall not be permitted in such a way as to alter the basic pattern of the lighting system. Additionally, an unserviceable light shall not be permitted adjacent to another unserviceable light, except in a barrette or a crossbar where two adjacent unserviceable lights may be permitted.

(ix) With respect to barrettes, crossbars and runway edge lights, lights are considered to be adjacent if located consecutively and:

(aa) laterally: in the same barrette or crossbar; or

(bb) longitudinally: in the same row of edge lights or barrettes

(x) The system of preventive maintenance employed for a stop bar provided at a runway-holding position used in conjunction with a runway intended for operations in runway visual range conditions less than a value of 350m shall have the following objectives:

(a) no more than two lights will remain unserviceable; and

(b) two adjacent lights will not remain unserviceable unless the light spacing is significantly less than that specified.

(xi) The system of preventive maintenance employed for a taxiway intended for use in runway visual range conditions less than a value of 350m shall have as its objective that no two adjacent taxiway centre line lights be unserviceable.

(xii) The system of preventive maintenance employed for a precision approach runway category I shall have as its objective that, during any period of category I operations, all approach and runway lights are serviceable and that, in any event, at least 85% of the lights are serviceable in each of the following:

(aa) precision approach category I lighting system;

(bb) runway threshold lights;

(cc) runway edge lights; and

(dd) runway end lights.

(xiii) To provide continuity of guidance an unserviceable light shall not be permitted adjacent to another unserviceable light unless the light spacing is significantly less than that specified.

(xiv) In barrettes and crossbars, guidance is not lost by having two adjacent unserviceable lights.

(xv) The system of preventive maintenance employed for a runway meant for take-off in runway visual range conditions less than a value of 550m shall have as its objective that, during any period of operations, all runway lights are serviceable and that in any event:

(aa) at least 95% of the lights are serviceable in the runway centre line lights (where provided) and in the runway edge lights; and

(bb) at least 75% of the lights are serviceable in the runway end lights.

(xvi) To provide continuity of guidance, an unserviceable light shall not be permitted adjacent to another unserviceable light.

(xvii) The system of preventive maintenance employed for a runway meant for take-off in runway visual range conditions of a value of 550m or greater shall have as its objective that, during any period of operations, all runway lights are serviceable and that, in any event, at least 85% of the lights are serviceable in the runway edge lights and runway end lights. In order to provide continuity of guidance, an unserviceable light shall not be permitted adjacent to another unserviceable light.

(xviii) During low visibility procedures the appropriate authority shall restrict construction or maintenance activities in the proximity of aerodrome electrical systems.".

AMENDMENT OF SA CATS 140

11. Document SA CATS 140 is hereby amended by the substitution of the following Document SA CATS:

"140.01.2 ESTABLISHMENT OF SAFETY MANAGEMENT SYSTEM

1. General

(1) An entity referred to in regulation 140.01.1 shall establish an SMS as prescribed in regulation 140.01.2 and its accompanying technical standard, in an acceptable manner to the Authority, for the control and supervision of the product or services covered by the operation.

(2) In addition, in respect of an aerodrome, to the extent that there is no conflict with these technical standards, the requirements as further prescribed in relevant documents have to be complied.

(3) An SMS shall be capable of delivering compliance with Part 140 and these Technical Standards at a level commensurate with the system description of the operator and operation.

(4) An entity referred to in regulation 140.01.1 shall perform a gap analysis to assess the current state of SMS and devise an implementation plan to address any identified deficiencies, detailing the implementation of missing components or elements of SMS. The implementation plan shall be acceptable to the Director.

(5) An SMS shall aim to implement –

(a) a mechanism for the timely resolution of safety issues on both a short- and long-term basis and where safety issues are proven to be systemic, an effective way of precluding the likelihood of recurrence;

(b) a safety information reporting system that is non-punitive in nature and capable of assuring anonymity and protection for the person providing the information; and

(c) an audit programme to continuously monitor the programme being implemented to provide critical assessment as to the effectiveness of such a programme.

(6) An entity referred to in regulation140.01.1 may combine safety and quality functions in one office. Such an entity shall demonstrate how the conflict of interest shall be addressed, where applicable.

Note: Further guidance on ICAO requirements, which have been incorporated into this technical standard are contained in the latest version of ICAO Doc 9859.

140.01.3 REQUIREMENTS OF SAFETY MANAGEMENT SYSTEM

1. Components and elements of a safety management system

1.1 Safety Policy and objectives –

1.1.1 Management Commitment

1.1.1.1 Safety Policy

(1) An entity referred to in regulation 140.01.1 shall develop safety policy, implement and maintain such a safety policy.

(2) The policy referred to in subsection (1) shall:

(a) reflect organisational commitment regarding safety as primary responsibility of all managers, including the continuous improvement of the level of safety performance, compliance with regulatory requirements and the promotion of a positive safety culture;

(b) include a clear statement about the provision of the necessary resources for the implementation of the safety policy and achievement of safety objectives;

(c) promote a positive reporting safety culture to encourage the reporting of safety issues;

(d) promote a disciplinary policy that outlines acceptable and unacceptable behaviours with regards to aviation activities;

(e) be signed by the accountable manager;

(f) be communicated throughout the organisation;

(g) be reviewed periodically, at least every 2 years to ensure it remains relevant;

(h) include a policy on the protection of safety data and safety information; and

(i) include safety reporting procedures.

1.1.1.2 Safety Objectives

(1) An entity referred to in regulation 140.01.1 shall develop, document, implement and maintain current safety objectives in support of the safety policy. The safety objectives shall:

(a) form the basis of the safety performance monitoring and measurement of the safety policy;

(b) define what the entity aims to achieve in terms of safety;

(c) include a combination of process orientated and outcome orientated objectives;

(d) be reflective of the entity's safety priorities;

(e) be communicated throughout the organisation;

(f) be periodically reviewed to ensure they remain relevant. A review may be triggered by the entity's current safety risks, inputs from safety analysis and a response to major changes in the operation;

(g) be developed by senior management and documented and signed off by the accountable manager; and

(h) be further enhanced with the establishment of specific safety performance indicators and targets that the entity intends to achieve.

(2) Safety objectives, indicators and targets shall be accepted by the Director and the entity shall maintain sufficient records to prove that they monitor their performance against their safety performance targets.

(3) Safety policy and objectives shall outline the principles, processes and methods of the entity's SMS to achieve the desired safety outcomes. The policy and objectives shall establish senior management's commitment to safety, its goals and supporting organisational structure.

1.1.2 Safety accountabilities and responsibilities

(1) An entity referred to in regulation 140.01.1 shall –

(a) identify an accountable manager who irrespective of other functions, is accountable on behalf of an entity for the implementation and maintenance of an effective SMS to ensure safety performance of internal and external organisations supporting their activities;

(b) clearly define lines of safety accountability throughout the entity, including a direct accountability for safety on the part of management;

(c) identify the safety responsibilities of all members of management and employees with respect to the safety performance of the organisation;

(d) document and communicate safety accountability, responsibilities, and authorities throughout the organisation; and

(e) define the levels of management with authority to make decisions regarding safety risk tolerability.

(2) An accountable manager shall:

(a) be the person who has ultimate responsibility over the safe operation of an entity;

(b) be situated at the highest level of an entity, thus ensuring that right strategic safety decisions are made and that the SMS is effective; and

(c) have the final authority for the resolution of safety issues.

(3) In the case where SMS applies to several approvals that are part of the same entity:

(a) there shall be a single accountable manager; or

(b) an accountable manager shall be identified for each approval and clear lines of accountability defined and coordinated.

(4) Accountabilities, responsibilities and powers of the accountable manager and all members of management shall:

(a) be articulated in the SMS manual and included in an organogram;

(b) be reflected in the job descriptions;

(c) be communicated throughout the entity;

(d) be allocated in such a way that conflict of interest between individual's responsibilities and other entity's responsibilities is averted; and

(e) include allocation of resources to ensure effective performance of the system.

(5) The day to day operation of SMS may be delegated, however the accountable manager cannot delegate responsibility or decisions regarding safety risks. Accountable manager's accountabilities include:

(a) ensuring safety policy and safety objectives are communicated;

(b) ensuring necessary allocation of resources such as financial, human, training, and acquisition;

(c) setting the acceptable safety risk limits and resourcing of the necessary controls;

(d) promoting a safety culture;

(e) ensuring appropriate actions are taken to address safety issues and safety risks;

(f) ensuring accidents and incidents are investigated;

(g) ensuring that SMS is properly implemented and performing to requirements; and

(h) ensuring the continuous improvement of SMS.

(6) An accountable manager has the authority:

(a) to make decisions on behalf of the entity;

(b) over all safety issues; and

(c) over operations under the approval of the entity and to stop operations or activities.

1.1.2.1 Accountability and responsibilities with respect to external organisation

(1) An entity referred to in regulation 140.01.1 shall be accountable for safety performance of products and services provided by an external organisation or contractor supporting its activities, if such an organisation is not required to establish and implement SMS. Therefore, the entity shall:

(a) identify and document external interfaces;

(b) ensure that interfaces are defined within the system description which is included in the SMS documentation;

(c) manage and monitor interfaces to ensure safety provision of products and services. The hazards related to interfaces shall be identified. The associated safety risk assessment shall be completed, and appropriate safety risk control implemented;

(d) ensure effective coordination with an organisation to clarify each party's role and responsibilities. Agree on actions to be taken and identify safety information that needs to be shared and communicated; and

(e) ensure that all safety issues or safety risks related to interfaces are documented and made accessible to the organisation for sharing and review.

Note 1: It is advisable to establish formal agreements through service level agreements to ensure that interfaces are managed effectively.

Note 2: A system is an array of components built / assembled together to establish a common desired output. A system can / will interface and interact with other systems both internally and externally in such a way that a source of hazards will be created and thus, will necessitate risk control. This interface will enable the entity to gain

more control over risks related to the interfaces if relationships are defined.

1.1.3 Appointment of key safety personnel

(1) An accountable manager shall appoint a competent person to fulfil the role of safety manager, who is responsible for the implementation and maintenance of an effective SMS. A safety manager shall be accountable to the accountable manager.

(2) A safety manager shall have direct access to an accountable manager in order to keep an accountable manager informed on safety matters.

(3) A safety manager shall not be involved in the product or service delivery, however, should have a working knowledge of the product or service delivery.

(4) The appointment shall consider the potential conflicts of interest with other tasks and functions, conflicts of interest may include:

(a) competition for funding;

(b) conflicting priorities for resources; and

(c) where the safety manager has an operational role and the ability to assess the effectiveness of the SMS with respect to the operational activities.

(5) Competencies of a safety manager shall include, but are not limited to the following:

(a) safety or quality management experience;

(b) operational experience related to the product or service provided by the organisation;

(c) technical background to understand the systems that support operations, or the products or service provided;

(d) interpersonal skills;

(e) analytical and problem-solving skills;

(f) project management skills;

(g) oral and written communication skills; and

(h) understanding human factors.

Note: Entities shall ensure that appointed safety officers/managers meet operational requirements as per the entities' approval. The competencies specified below are in the context of performing safety management responsibilities.

(6) The functions performed by a safety manager include, but are not limited to the following:

(a) managing the SMS implementation plan on behalf of an accountable manager;

(b) perform or facilitate hazard identification and safety risk analysis;

(c) collecting and analysing safety information in a timely manner;

(d) administering any safety related surveys;

(e) monitoring and evaluating the results of corrective actions;

(f) ensuring that risk assessments are conducted when applicable;

(g) monitoring the industry for safety concerns that could affect the organisation;

(h) being involved with actual or practice emergency responses, where applicable;

(i) being involved in the development and updating of the emergency response plan and procedures where applicable;

(j) provide independent advice on safety matters;

(k) plan and facilitate safety training; and

(l) ensuring safety-related information, including organisational goals and objectives, are made available to all personnel through established communication processes.

(7) Additional functions of a safety manager may also include, but not limited to:

(a) monitor corrective actions and evaluate their results if this is not delegated to the Safety Review Board (SRB);

(b) provide periodic reports on the entity's performance;

(c) maintain SMS documentation and records;

(d) ensure that lessons learnt from investigations and case histories or experiences, both internally and externally from other organisations are distributed;

(e) monitor safety concerns in aviation industry and their perceived impact on the entity's performance;

(f) coordinate and communicate safety issues within an entity as well as with external organisation including the Authority on issues relating to safety; and

(g) monitor the safety data collection and processing systems to ensure prompt collection and analysis of safety data and appropriate distribution within the entity of related safety information such that safety risk decisions and controls, as necessary, can be made.

1.1.3.1 Safety Review Board

(1) An entity referred to in regulation 140.01.1 shall establish a Safety Review Board (SRB) to support the SMS functions across the entity. The SRB is a high-level board that considers matters of strategic safety importance.

(2) The SRB shall provide the platform to achieve objectives of resource allocation and to assess the effectiveness and efficiency of risk mitigation strategies.

(3) The SRB shall be chaired by an accountable manager and composed of senior managers, including managers responsible for functional areas as well as those from relevant administrative departments.

(4) The safety manager shall also be included to participate in the SRB.

(5) The SRB shall meet periodically, at least once every 3 months, or as often as possible.

(6) Functions of the SRB include, but not limited to the following:

(a) monitoring the effectiveness of the SMS;

(b) providing strategic directions to improve safety performance;

(c) monitoring that any necessary corrective action is taken in a timely manner;

(d) monitoring safety performance against the organisation's safety policy and objectives;

(e) monitoring the effectiveness of the organisation's safety management processes which support the declared corporate priority of safety management and promotion of safety across the organization;

(f) monitoring the effectiveness of the safety supervision of subcontracted operations;

(g) monitoring overall effectiveness of safety risk mitigation strategies;

(h) ensuring that appropriate resources are allocated to achieve safety performance beyond that required by regulatory compliance; and

(i) monitoring the effectiveness of the entity's safety management processes which supports:

(aa) the safety priorities of the entity; and

(bb) promotion of safety across the entity.

1.1.3.2 Safety Action Group(s)

(1) The SRB may establish a Safety Action Group (SAG) based on the system description. The SAG is a tactical group that deals with specific implementation issues in accordance with strategies developed by the SRB.

(2) A departmental SAG shall be established when there is a need to:

(a) monitor operational safety performance within a functional area of the entity and ensure that appropriate SRM activities are carried out;

(b) review available safety data and identify the implementation of appropriate safety risk control strategies to ensure employee feedback is provided;

(c) assess the impact related to the introduction of operational changes or new technologies;

(d) coordinate the implementation of any actions related to safety risk controls and ensure that actions are taken promptly;

(e) monitor safety promotion activities as necessary to increase awareness of safety issues among relevant employees, and to ensure that employees are provided with appropriate

opportunities to participate in safety management activities; and

(f) review the effectiveness of specific safety risk controls.

(3) An established SAG:

(a) may be a standing group or an ad hoc group;

(b) shall be composed of front-line managers and front-line personnel;

(c) shall be chaired by a designated line-manager; and

(d) shall take direction from and report to the SRB.

1.1.4. Coordination of emergency response planning

(1) Where applicable in other Parts of the regulations other than Part 140 , an entity referred to in regulation 140.01.1 shall develop, coordinate and maintain an aviation emergency response plan (ERP) that ensures orderly and efficient transition from normal to emergency operations, and return to normal operations.

(2) An entity shall ensure that its emergency response plan is properly coordinated with the emergency response plans of those entities it interfaces with during the provision of this service.

(3) An entity shall meet the requirements for aviation emergency response planning and contingency planning as required by the regulations under which its certificate of operation is issued (E.g. an aerodrome operator to comply with Part 139).

(4) An ERP shall address foreseeable emergencies as identified through an SMS and shall include mitigating actions, processes and controls to effectively manage aviation related emergencies.

(5) An ERP shall be documented in a format of a manual or directly integrated into the SMS manual. If an ERP is documented in a separate manual, it shall be cross- referenced to the SMS manual.

(6) An ERP shall be reflective of the nature and complexity of the operations of an entity.

1.1.5 SMS Documentation

1.1.5.1 SMS Manual

(1) An entity referred to in regulation 140.01.1 shall develop an SMS implementation plan that defines the entity's approach to the management of safety in a manner that meets the entity's safety objectives.

(2) An entity shall develop and maintain an SMS manual that describes the entity's SMS policy, processes and procedures to facilitate the organisation's internal administration, communication and maintenance of the SMS.

(3) An SMS manual shall be:

(a) endorsed/approved by the accountable manager; and

(b) approved by the Authority.

(4) An SMS manual may be a stand-alone document or may be integrated with other documents maintained by an entity.

(5) An entity's SMS processes addressed in existing documents shall be cross referenced and reflected in the SMS manual.

(6) An SMS manual referred to in subsection (2) shall help personnel to understand how the entity's SMS functions, and how the safety policy and objectives shall be met.

(7) The documentation shall include a system description that provides the boundaries of SMS. It shall clarify the relationship between various

policies, processes, procedures and practices, and define how these link to an entity's safety policy and objectives.

1.1.5.2 Contents of the manual

(1) The SMS manual shall have a detailed description of the entity's policies, processes and procedures and include the following where applicable:

(a) safety policy and objectives;

(b) reference to any applicable regulatory SMS requirements;

(c) system description;

(d) safety accountabilities and key safety personnel;

(e) voluntary, mandatory and confidential safety reporting system processes and procedures;

(f) hazard identification and safety risk assessment processes and procedures;

(g) safety investigation procedures;

(h) procedures for establishing and monitoring safety performance indicators;

(i) SMS training processes, procedures and communication;

(j) safety communication processes and procedures;

(k) internal audit procedures;

(l) management of change procedures;

(m) SMS documentation management procedures; and

(n) coordination of emergency response planning.

1.1.6 SMS operational records

(1) An entity referred to in regulation 140.01.1 shall develop and maintain SMS operational records as part of its SMS documentation.

(2) SMS documentation shall include the compilation and maintenance of operational records substantiating the existence and ongoing operation of the SMS.

(3) Operational records are the outputs of SMS processes and procedures such as the Safety Risk Management (SRM) and safety assurance activities.

(4) SMS operational records shall be stored and kept in accordance with existing retention periods.

(5) SMS operational records shall include, but are not limited to the following where applicable:

(a) hazards register and hazard or safety reports;

(b) safety performance indicators, targets and related charts;

(c) record of completed or in-progress safety risk assessments;

(d) an SMS internal review or audit records;

(e) internal audit records;

(f) SMS or safety training records and safety promotion records;

(g) SMS or safety committee meeting minutes such as the SRB and SAG;

(h) the SMS implementation plan during the initial implementation; and

(i) the gap analysis to support the implementation plan.

1.1.7 Changes to the SMS manual

(1) An entity referred to in regulation 140.01.1 shall submit its SMS manual to the Director if the following occurs:

(a) change of the accountable manager and safety manager, unless both positions have already been accepted by the Authority through other regulation requirements;

(b) changes to the entity's organogram that affect safety reporting lines or the accountable manager's responsibilities;

(c) changes due to the re-allocation of accountabilities, responsibilities or authorities; and

(d) major operational changes.

1.2 Safety risk management

1.2.1 Hazard Identification

(1) An entity referred to in regulation 140.01.1 shall develop, document, implement and maintain a process that collects, records, identifies, acts and feedbacks on hazards associated with its aviation products or services.

(2) The hazard identification shall be based on a combination of reactive and proactive methods.

(3) An entity shall consider various sources for hazard identification including safety reporting systems, especially the voluntary and confidential safety reporting system.

(4) The safety risk management process shall:

(a) determine the safety data and safety information to be collected, to support the safety performance management process and make safety decisions;

(b) collect and store safety data obtained from direct sources, both internal and external;

(c) clearly define the responsibilities for the identification of hazards for the entire chain of services within the system and including an external organisation, without gaps or overlaps;

(d) ensure an entity is knowledgeable about the safety risks induced by activities of its subcontractor;

(e) document sources used for hazard identification;

(f) ensure the protection of safety data, safety information and related sources in accordance with **Appendix A**;

(g) be systematically conducted on all sources employed and where possible, carried out as a joint exercise with the interfacing organisation;

(h) ensure effective coordination among departments or divisions as necessary to streamline efforts for reporting and collecting safety data to avoid duplications; and

(i) document hazards and their potential consequences and shall categorise safety data using taxonomies and supporting definitions so that the data to be captured and stored uses meaningful terms.

Note: The mandatory system is normally used for incidents that have occurred, whereas the voluntary system provides an additional reporting channel for potential safety issues such as hazards, errors, or other human factors related issues. They can provide valuable information to the organisation on lower consequence events.

1.2.2 Hazards related to SMS interfaces with external organizations

(1) An entity referred to in regulation 140.01.1 shall identify hazards related to their safety management interfaces. It is recommended that this identification process be carried out as a joint exercise with the interfacing organizations.

(2) The hazard identification should consider the operational environment and the various organizational capabilities (people, processes, technologies) which could contribute to the safe delivery of the service or product's availability, functionality or performance.

1.2.3 Internal Safety Reporting

(1) The internal safety reporting system shall:

(a) facilitate the collection and evaluation of errors, hazards and incident or safety occurrences reported internally;

(b) ensure corrective and preventative actions are taken to address any safety issues and hazards;

(c) ensure feedback to the entity's safety training, whilst maintaining appropriate confidentiality;

(d) provide feedback to a reporter on what actions have been taken. This is to ensure support to the internal safety reporting system and disseminate the results to other relevant parties. This will promote a safety culture and promote future reporting;

(e) have appropriate protections and a non-punitive approach which encourages safety reporting within a system that clearly indicates which types of behaviours are unacceptable;

(f) be confidential for a voluntary safety reporting system;

(g) be accessible to personnel at all levels and across all disciplines, including interfacing organisations where applicable;

(h) be promoted to ensure that everyone is made aware of the benefits of safety reporting and what should be reported;

(i) preferably use a taxonomy;

(j) record all identified hazards and their potential consequences; and

(k) use structured decision-making approach with defined criteria points to initiate an investigation, including occurrences and hazards considered to have a high-risk potential.

(2) The internal reporting system shall allow the effective application of an investigation process to:

(a) identify factors contributing to occurrences to reduce the likelihood of reoccurrence and severity;

(b) identify adverse trends;

(c) identify those reports which require further investigation; and

(d) conclude with clearly defined findings, root causes, including any technical, organisational, managerial or human factor issues, and any other contributing factors leading to the event and recommendations that eliminate or mitigate safety deficiencies.

(3) Depending on the hazard identification sources and the approach to hazard identification, the following methods for hazard identification may be used:

(a) *Reactive hazard identification methods* - hazards are recognised through trend monitoring and investigation of safety occurrences. Incidents and accidents are clear indicators of systems' deficiencies and should be therefore investigated to determine the hazards that played a role in that event.

(b) *Proactive hazard identification methods* - hazards are identified by analysing systems' performance and functions for intrinsic threats and potential failures. The most commonly applied proactive methods are safety surveys, operational safety audits, safety monitoring and safety assessments. Other methods, such as Flight Data Analysis (FDA), specifically designed to track normal operations (trends), and Line Operations Safety Audit (LOSA) and Normal Operations Safety Survey (NOSS) designed to capture real

life strategies (i.e., human performance), play an important role in proactive hazard identification.

1.2.4 Risk assessment and mitigation process

(1) An entity referred to in regulation 140.01.1 shall develop, document, implement and maintain a formal risk management process that ensures analysis (in terms of probability and severity of occurrence), assessment (in terms of tolerability or acceptability) and control (in terms of mitigation) of risks to an acceptable level.

(2) An entity shall:

(a) ensure that the process of gathering and aggregation of available data is in place. Such data shall be analysed to identify and document potential hazards as well as risks;

(b) develop a safety risk assessment model and procedures which will allow a consistent and systematic approach for the assessment of safety risks. This should include a method that will help determine what safety risks are acceptable or unacceptable and to prioritise actions;

(c) demonstrate its commitment to safety information sharing and exchange; and

(d) employ data driven decision making methods for the management of its safety performance.

(3) Using the matrixes in Appendix B:

(a) clearly define the responsibilities for the management of associated safety risks for the entire chain of services within the system (including external contractors) without gaps or overlaps; and

(b) engage in a data driven decision making process to determine safety priorities and the required risk controls. The prioritisation process shall consider the following:

(i) assessment and control of the highest safety risks in terms of probability and severity;

(ii) allocation of resources to the highest safety risks;

(iii) achievement of stated and agreed safety objectives, safety targets and safety indicators; and

(iv) satisfaction of the regulatory requirements with regards to the control of safety risks.

(4) Subject matter operational personnel and subject matter experts shall be involved in the determination of appropriate safety risk control.

(5) An entity shall document the SRM outputs.

(6) The entity shall establish procedures for the development and implementation of corrective actions. These shall result in a specific corrective action plan that addresses:

(a) the development and proposal of the corrective action;

(b) the analysis and final approval level of the corrective action plan, including who is responsible for approval of the corrective action;

(c) who shall implement the corrective action;

(d) how the corrective action shall be implemented;

(e) when the corrective action due date is;

(f) who shall evaluate the outcome and how, including the identification of required data, awareness of the possibility of unintended consequences and events that should trigger a response;

(g) who shall monitor the status of the corrective action and how; and

(h) reporting the status of the corrective action.

(7) An entity shall periodically review the SRM processes to ensure suitability.

(8) The results of the safety data analysis shall highlight areas of high safety risk and assist decision makers to:

(a) make timeous corrective actions;

(b) implement safety risk-based surveillance;

(c) define or refine safety policy or safety objectives;

(d) define or refine safety performance indicators;

(e) define or refine safety performance targets;

(f) set Safety Performance Indicator (SPI) triggers;

(g) promote safety; and

(h) conduct further safety risk assessment.

1.3 Safety assurance

1.3.1 Monitoring and measurement of safety performance

(1) An entity referred to in regulation 140.01.1 shall develop, implement and maintain current and appropriate means to:

(a) verify the safety performance; and

(b) validate the effectiveness of safety risk controls.

(2) The established process shall:

(a) monitor the safety objectives to ensure that they remain appropriate and current with the entity's strategy and priorities;

(b) select and define SPIs, which are tactical parameters related to the safety objectives;

(c) set and define Safety Performance Targets (SPTs), if appropriate, which are also tactical parameters used to monitor progress towards the achievement of the safety objectives. When SPTs are

established, they should be realistic, context specific and achievable taking into account the resources available to the entity;

(d) include a process for acceptance of SPIs, SPTs and the associated alert levels required by the Authority after it has been demonstrated that they are appropriate with:

(i) established safety objectives;

(ii) the analysis of available data; and

(iii) the size and complexity of the entity.

(e) monitor the performance of established SPIs, SPTs and associated alert levels to identify abnormal changes in safety performance, including an update of safety objectives, refinement of SPIs, and SPTs and periodically review the appropriateness of SPIs and SPTs.

1.3.2 Initial Acceptance of SPIs

(1) An entity referred to in regulation 140.01.1 shall propose SPIs for the review and acceptance by the Authority as part of the initial acceptance of SMS.

(2) The Authority may consider planning the acceptance of SPIs later in the implementation process. This is applicable for an entity which is at initial certification as it does not have sufficient data to develop meaningful SPIs;

(3) The acceptance of SPTs may be addressed after the SPIs have been monitored over a period of a year. This establishes the baseline performance. It may be based on targets established at the national, regional or global level;

(4) The initial acceptance of SPIs, SPTs, associated alert levels and corrective action plans should be appropriate and pertinent to the entity's aviation activities prior to acceptance;

(5) The acceptance shall be between the Authority's principal inspector and the entity. The principal inspector shall review the proposed SPIs, SPTs, alert levels and implementation plan to ensure that:

(a) they are appropriate and relevant to the entity's activities;

(b) their development has used an appropriate measuring matrix; and

(c) they are consistent with the Authority's national aviation safety priorities.

1.3.3 Continuous acceptance

(1) An entity referred to in regulation 140.01.1 shall, on a quarterly basis, demonstrate to the Authority that the SPIs, SPTs and associated alert levels and implementation plans are appropriate and relevant to the entity's aviation activities.

(2) The Authority shall be notified immediately of any changes to SPIs, SPTs, alert levels and implementation plans.

1.3.4 Internal audit

(1) Internal audits shall be conducted to assess and provide an accountable manager and senior management with feedback on the status of:

(a) compliance with the regulations and technical standards;

(b) compliance with policies, procedures and processes;

(c) effectiveness of the safety risk controls;

(d) effectiveness and implementation status of the implementation plans and corrective action plans;

(e) effectiveness of the SMS; and

(f) opportunities for improvement.

(2) Internal audits should be conducted by persons or departments independent of the functions being audited;

(3) Planning of internal audits shall take into account the results of the previous audits and assessments and implemented safety risk controls;

(4) The results from the analysis of causes and contributing factors for any non-compliance shall feed into the organisation's SRM processes.

1.3.5 Management of change

(1) An entity referred to in regulation 140.01.1 shall develop, document, implement and maintain the current process to:

(a) identify changes which may affect the level of safety risk associated with its aviation products or services; and

(b) identify and manage the safety risks that may arise from those changes.

(2) An entity shall establish a process aimed at identifying internal and external changes that may have an adverse effect on safety before implementation and aim at defining the changes that shall require a comprehensive management of change process.

(3) One of the following changes shall trigger a comprehensive management of change process:

(a) introduction of new technology or equipment;

(b) changes in the operating environment;

(c) changes in key personnel;

(d) significant changes in staffing levels;

(e) changes in regulatory requirements;

(f) exemptions or alternative means of compliance;

(g) significant changes in an organisation's policies, procedures and manuals;

(h) changes in the scope of an organisation's certificate;

(i) significant restructuring of the entity; and

(j) physical changes (new facility or base, aerodrome layout changes, etc).

(4) The entity shall establish a management of change process which includes:

(a) understanding and defining the change; this shall include a description of the change and why it is being implemented. This activity shall assist the entity to evaluate the criticality of the change by assessing the impact on its activities, and the impact on other entities and the aviation system;

(b) understanding and defining who and what it shall affect; including individuals within the entity, other departments and external people and other entities. Equipment, systems and processes may also be impacted. A review of the system description and organisations' interfaces may be needed. This is an opportunity to determine who shall be involved in the change. Changes may also affect risk controls already in place to mitigate other risks, and therefore change may increase or introduce risks in areas that are not immediately obvious;

(c) identifying hazards related to the change and carrying out a safety risk assessment; this shall identify any hazards directly related to the change. The impact on existing hazards and safety risk controls that may be affected by the change and shall also be reviewed. This activity shall use the existing entity's SRM processes since it is intended to collect data and information that may be used to provide information on the situation and enable analysis for the change;

(d) developing an action plan shall define what needs to be done, by whom and by when. There shall be a clear plan describing how the change will be implemented and who shall be responsible for which actions, and the sequencing and scheduling of each task;

(e) sign off on the change, this is to confirm that the change is safe to implement. The individual with overall responsibility and authority for implementing the change shall sign the change plan; and

(f) the assurance plan; this is to determine what follow-up action is needed. Consider how the change shall be communicated and whether additional activities, such as audits, are needed during or after the change.

1.3.6 Continuous improvement of SMS

(1) An entity referred to in regulation 140.01.1 shall develop, document, implement and maintain a formal and current process to monitor, assess, continuously improve the SMS performance, processes and activities.

(2) The internal evaluation process shall evaluate safety management functions, procedures, policies, risk management processes, safety assurance processes and safety promotion activities throughout the entity and feedback shall be provided to the accountable manager and senior management with the highlighting of opportunities for improvement.

(3) The process may include the following methods:

(a) audits, this includes internal audits and audits carried out by external parties;

(b) assessments, this includes assessments of the safety culture and SMS effectiveness;

(c) monitoring of accidents and incidents, errors and violations;

(d) safety surveys;

(e) management reviews to examine whether the safety objectives are being achieved by the entity;

(f) evaluation of SPIs and SPTs;

(g) address lessons learned from the safety reporting systems and safety investigations.

(4) An entity shall establish an audit schedule and the audits shall be conducted annually.

1.4 Safety Promotion

1.4.1 Training and education

(1) An entity referred to in regulation 140.01.1 shall develop, document, implement and maintain a formal and current safety training and education programme that ensures that all safety related personnel are trained and competent to perform their duties and that facilitates effective two-way communication throughout all levels of the entity.

(2) The scope of the safety training and education programme shall be appropriate to the individual's safety accountabilities, responsibilities and authorities within the entity as outlined in Appendix C (in-house SMS Training levels).

(3) A safety manager/officer and approved SMS instructor shall undergo full scope SMS training once within a 3-year period at a Part 141 organisation or institution approved by the Director or an acceptable aviation entity.

(4) The safety training and education programme shall, at a minimum include:

(a) the list of staff who shall be trained and to what depth and give due consideration to external interfacing organisations;

(b) the policy for initial safety training and the education programme for the accountable manager, post holders, managers, supervisors, and all other safety related personnel;

(c) a policy for the staff's ongoing safety knowledge and competency needs; these needs will be met through a recurrent training and education programme;

(d) a policy to ensure that each staff member has access to up-to-date safety information to fulfil their safety responsibilities and can voluntarily request additional training;

(e) the appropriate method for training delivery including competent trainers whose commitment, teaching skills and safety management expertise will have a significant impact on the effectiveness of the training delivered;

(f) a process with clear responsibilities for:

(i) the development and maintenance of training and education content based on international best practise and the SMS's outputs and outcomes;

(ii) the scheduling of training activities;

(iii) the periodical review of the training and education programme; and

(iv) ensuring that personnel, at all levels of the organisation, maintain their competency to fulfil their safety roles; therefore, competencies of personnel should be reviewed regularly.

(g) tailor the needs of the individual's role within an entity and be commensurate with the accountabilities, responsibilities, and powers the individuals hold. The level and depth of training for managers involved in the entity's safety committees will be more extensive than for personnel directly involved with the delivery of the entity's product or services. The safety training for the accountable manager, post holders and senior managers includes the following topics:

(i) specific awareness training for new accountable managers and post holders on their SMS accountabilities, responsibilities and authorities;

(ii) importance of compliance with national and the entity's safety requirements;

(iii) management commitment towards safety improvement and compliance, with the understanding of the SMS and its relationship to the entity's overall business strategy;

(iv) allocation of resources;

(v) promotion of safety policy, safety objectives and the SMS;

(vi) promotion of a positive safety culture;

(vii) effective interdepartmental safety communication;

(viii) establishment of safety objectives, SPTs, and alert levels; and

(x) the disciplinary policy.

(h) safety department employees shall be provided with more detailed SMS training to enhance their competence in safety risk assessment, system evaluation, system assessment, data mining, auditing and inspections; and

(i) be developed using formal training needs analysis to ensure a clear understanding of the operation, the safety duties of personnel and the available training.

(5) An organisation which may provide SMS training shall be:

(a) a training organisation with Part 141 approval; and

(b) an international organisation which is recognised by the Director. The list of these international organisations is available from the Authority upon request.

1.4.2 Safety Communication

(1) An entity referred to in regulation 140.01.1 shall develop, document, implement and maintain an effective safety communication strategy of safety related data or information by the appropriate method and with consideration to the individual's role within the entity.

(2) The safety strategy referred to in subsection (1) shall:

(a) apply to internal and external communications;

(b) be clear, simple, practical and align with the safety policy and safety objectives; and

(c) achieve, at a minimum, the following objectives:

(i) ensure in a timely manner, that personnel have a knowledge of the SMS to a degree commensurate with their position;

(ii) convey, in a timely manner safety-critical information that may expose an entity to safety risks;

(iii) raise awareness of new safety risk controls and corrective actions and explain why particular safety actions are taken;

(iv) provide information on new or amended safety policy, objectives and procedures and explain why they are introduced or changed to ensure the appropriate people are kept informed;

(v) promote a positive safety culture among their systems and interfaces;

(vi) encourage personnel to identify and report hazards; and

(vii) provide feedback to personnel submitting a safety report.

140.02.2 MANDATORY OCCURRENCE REPORTING

1. Form and manner of reporting

(1) The safety reporting requirements shall be described and implemented to facilitate reporting of occurrences and perceived hazards to the area operational management and the safety officer/manager.

(2) Reporting procedures shall include management reporting and reporting to the Authority.

(3) An entity shall report any hazard with intolerable/high/unacceptable risk identified through its SMS to the Authority within 30 days of it being verified through its SMS processes. The report shall include the mitigation actions taken to address the risk.

(4) A PIC or flight crew member or entity shall report the following safety information to the Authority and in a manner prescribed by the Authority:

(a) aviation accidents as soon as possible but at least within 24 hours from the time of the accident;

(b) serious incidents as soon as possible but at least within 48 hours from the time of the incident/serious incident; and

(c) incidents as soon as possible but at least within 72 hours from the time of the incident and other safety related occurrences as per the schedule agreed with the Authority.

Appendix A

PRINCIPLES FOR THE PROTECTION OF SAFETY DATA, SAFETY INFORMATION AND RELATED SOURCES BY THE AUTHORITY

1A. Principles of Protection

(1) The Authority shall ensure that safety data or safety information is not used for:

(a) disciplinary, civil, administrative and criminal proceedings against employees, operational personnel or entities;

(b) disclosure to the public; or

(c) any other purposes other than maintaining or improving safety, unless a principle of exception applies.

(2) The Authority shall provide protection to safety data, safety information and related sources by ensuring:

(a) the protection is specified based on the nature of safety data and safety information;

(b) a formal procedure to provide protection to safety data, safety information and related sources is established and may include that any person seeking disclosure of safety data and safety information shall provide the justification for its release;

(c) safety data and safety information shall not be used in a way different from the purposes for which it was collected, unless a principle of exception applies;

(d) to the extent that a principle of exception applies, the use of safety data and safety information in disciplinary, civil, administrative and criminal proceedings shall be carried out only under authoritative safeguards.

2A. Principles of exception

(1) Exceptions to the protection of safety data, safety information and related sources shall exist when the Authority:

(a) determines that there are facts and circumstances reasonably indicating that the occurrence may have been caused by an act or omission considered, in accordance with South African law, to be conduct constituting gross negligence, wilful misconduct or criminal activity;

(b) after reviewing the safety data or safety information, determines that its release is necessary for the proper administration of justice, and that the benefits of its release outweigh the adverse domestic and international impact such release is likely to have on the future collection and availability of safety and safety information; or

(c) after reviewing the safety data and safety information, determines that its release is necessary for maintaining or improving safety, and that the benefits of its release outweigh the adverse domestic and international impact such release is likely to have on the future collection and availability of safety data and safety.

3A. Public disclosure

(1) Where disclosure is made in accordance with section 2A, the Authority shall ensure:

(a) the public disclosure of relevant personal information included in the safety data or safety information complies with applicable privacy laws; or

(b) the public disclosure of the safety data or safety information is made in a de-identified, summarized or aggregate form.

4A. Responsibility of the custodian of safety data and safety information

(1) The Authority shall ensure that safety data collection and processing systems (SDCPS) have a designated custodian to apply the protection to the safety data and safety information and the custodian may be an individual or organisation.

Appendix B

Safety Risk Assessment Matrix

1B. Safety risk probability

(1) Safety risk probability is the likelihood that a safety consequence or outcome shall occur. It is important to envisage a variety of scenarios so that all potential consequences may be considered. The following questions shall assist in the determination of probability:

(a) is there a history of occurrences similar to the one under consideration, or is this an isolated occurrence?

(b) what other equipment or components of the same type might have similar issues?

(c) what is the number of personnel following, or subject to, the procedures in question?

(d) what is the exposure of the hazard under consideration? For example, during what percentage of the operation is the equipment or activity in use?

(2) Taking into consideration any factors that might underlie these questions shall help when assessing the probability of the hazard consequences in any foreseeable scenario.

(3) An occurrence is considered foreseeable, if any reasonable person may have expected the kind of occurrence to have happened under the same circumstances. Identification of every conceivable or theoretically possible hazard is not possible. Therefore, good judgment is required to determine an appropriate level of detail in hazard identification. An entity shall exercise due diligence when identifying significant and reasonably foreseeable hazards related to their product or service.

2B. Safety risk probability table

Table 1: Safety risk probability to be considered together with the safety risk severity table

Likelihood/Probability	Meaning	Value
Frequent	Likely to occur may times (has occurred frequently)	5
Occasional	Likely to occur sometimes (has occurred frequently)	4
Remote	Unlikely to occur, but possible (has occurred rarely)	3
Improbable	Very unlikely to occur (not known to have occurred)	2
Extremely improbable	Almost inconceivable that the event will occur	1

3B. Safety risk severity

(1) Once the probability assessment has been completed, the next step is to assess the severity, taking into account the potential consequences related to the hazard.

(2) Safety risk severity is defined as the extent of harm that might reasonably be expected to occur as a consequence or outcome of the identified hazard.

(3) The severity classification shall consider:

(a) fatalities or serious injury which may occur as a result of:

(i) being in an aircraft;

(ii) having direct contact with any part of the aircraft, including parts which have become detached from the aircraft; or

(iii) having direct exposure to jet blast;

(b) damage or structural failure sustained by the aircraft which:

(i) adversely affects the structural strength, performance or flight characteristics of the aircraft; or

(ii) shall normally require major repair or replacement of the affected component; or

(c) damage sustained by ATS or aerodrome equipment which:

(i) adversely affects the management of aircraft separation; or

(ii) adversely affects landing capability.

(4) The severity assessment shall consider all possible consequences related to a hazard, taking into account the worst foreseeable situation.

(5) Table 2 presents a typical safety risk severity table. It includes five categories to denote the level of severity, the description of each category, and the assignment of a value to each category.

Table 2: Safety risk severity

Severity	**Meaning**	**Value**
Catastrophic	• Aircraft or equipment destroyed • Multiple deaths	A
Hazardous	• A large reduction in safety margins, physical distress or a workload such that operational personnel cannot be relied upon to perform their tasks accurately or completely • Serious injury • Major equipment damage	B
Major	• A significant reduction in safety margins, a reduction in the ability of operational personnel to cope with adverse operating conditions as a result of an increase in workload or as a result of conditions impairing their efficiency • Serious incident • Injury to persons	C
Minor	• Nuisance	D

	• Operating limitations • Use of emergency procedures • Minor incident	
Negligible	• Few consequences	E

4B. Safety risk tolerability

(1) The safety risk index rating is created by combining the results of the probability and severity scores. Table 3 is an alphanumeric designator.

(2) The respective severity/probability combinations are presented in the safety risk assessment matrix in Tables 1 and 2. The safety risk assessment matrix is used to determine safety risk tolerability.

Note: Consider, for example, a situation where the safety risk probability has been assessed as occasional (4), and the safety risk severity has been assessed as hazardous (B), resulting in a safety risk index of (4B).

Table 3: Safety risk tolerability

Safety Risk	**Severity**				
Probability/likelihood	**Catastrophic** **A**	**Hazardous** **B**	**Major** **C**	**Minor** **D**	**Negligible** **E**
Frequent 5	5A	5B	5C	5D	5E
Occasional 4	4A	4B	4C	4D	4E
Remote 3	3A	3B	3C	3D	3E
Improbable 2	2A	2B	2C	2D	2E
Extremely improbable 1	1A	1B	1C	1D	1E

The index obtained from the safety risk assessment matrix should then be exported to a safety risk tolerability table that describes — in a narrative form — the tolerability criteria for the particular entity.

(3) Table 4 presents an example of a safety risk tolerability table. Using of an example, the criterion for safety risk assessed as 4B falls in the "intolerable" category. In this case, the safety risk index of the consequence is unacceptable.

(4) An entity shall therefore take risk control action to reduce:

(a) an entity's exposure to the particular risk, i.e., reduce the probability component of the risk to an acceptable level;

(b) the severity of consequences related to the hazard, i.e., reduce the severity component of the risk to an acceptable level; or

(c) both the severity and probability so that the risk is managed to an acceptable level.

(5) Safety risks are conceptually assessed as acceptable, tolerable or intolerable.

(6) Safety risks assessed as initially falling in the intolerable region are unacceptable under any circumstances.

(7) The probability and severity of the consequences of the hazards are of such a magnitude, and the damaging potential of the hazard poses such a threat to safety, that mitigation action is required, or activities are stopped.

Table 4: Safety risk tolerability narrative

Safety risk index range	**Safety risk description**	**Recommended action**
5A, 5B, 5C, 4B, 3A	Intolerable	Take immediate action to mitigate the risk or stop the activity. Perform priority safety risk mitigation to ensure additional or enhanced preventative controls are in place to bring down the safety risk index to tolerable

5D, 5E, 4C, 4E, 3B, 3C, 3D, 2A, 2B, 2C, 1A	Tolerable	Risk can be tolerated based on safety risk mitigations in place. It may require a management decision to accept the risk.
3E, 2D, 2E, 1B, 1C, 1E	Acceptable	Risk is acceptable as is. No further risk mitigation required

5B. Safety risk mitigation strategies

(1) Safety risk mitigation is often referred to as safety risk control. Safety risks shall be managed to an acceptable level by mitigating the safety risk through the application of appropriate safety risk controls.

(2) This shall be balanced against time, cost and difficulty of taking action to reduce or eliminate the safety risk.

(3) The level of safety risk shall be lowered by reducing the severity of the potential consequences, reducing the likelihood of occurrence or by reducing exposure to that safety risk.

(4) It is easier and more common to reduce the likelihood than it is to reduce the severity.

(5) Safety risk mitigations are actions that often result in changes to operating procedures, equipment or infrastructure. Safety risk mitigation strategies fall into three categories:

(a) *Avoidance*: The operation or activity is cancelled or avoided because the safety risk exceeds the benefits of continuing the activity, thereby eliminating the safety risk entirely.

(b) *Reduction*: The frequency of the operation or activity is reduced, or action is taken to reduce the magnitude of the consequences of the safety risk.

(c) *Segregation*: Action is taken to isolate the effects of the consequences of the safety risk or build in redundancy to protect against them.

(6) A safety risk mitigation strategy may involve one of the approaches described above or may include multiple approaches. It is important to consider the full range of possible control measures to find an optimal solution. The effectiveness of each alternative strategy shall be evaluated before a decision is made. Each proposed safety risk mitigation alternative shall be examined from the following perspectives:

(a) *Effectiveness* - the extent to which the alternatives reduce or eliminate the safety risks. Effectiveness can be determined in terms of the technical, training and regulatory defences that may reduce or eliminate safety risks;

(b) *Cost/benefit* - the extent to which the perceived benefits of the mitigation outweighs the costs;

(c) *Practicality* - the extent to which mitigation shall be implemented and how appropriate it is in terms of available technology, financial and administrative resources, legislation, political will and operational realities;

(d) *Acceptability* - the extent to which the alternative is acceptable to those people that will be expected to apply it;

(e) *Enforceability* - the extent to which compliance with new rules, regulations or operating procedures can be monitored;

(f) *Durability* - the extent to which the mitigation will be sustainable and effective;

(g) *Residual safety risks* - the degree of safety risk that remains subsequent to the implementation of the initial mitigation and which may necessitate additional safety risk control measures;

(h) *Unintended consequences* - the introduction of new hazards and related safety risks associated with the implementation of any mitigation alternative; and

(i) *Time* - time required for the implementation of the safety risk mitigation alternative.

(7) Corrective action shall consider any existing defences and the ability or inability to achieve an acceptable level of safety risk. This may result in a review of previous safety risk assessments that may have been impacted by the corrective action.

(8) Safety risk mitigations and controls will need to be verified/audited to ensure that they are effective. Another way to monitor the effectiveness of mitigations is through the use of SPIs.

Appendix C

In-house SMS Training levels

	Level of training	**Recipients**	**Training Objective**	**Training content**	**Recurrence**	**Level of Instructor**
(a)	Aviation Safety content for Induction training.	Non-Operational staff within 90 days of service commencement.	To familiarise trainees with the Entities SMS safety policies, objectives and SMS fundamentals.	• The Safety Policy and Objectives •Hazards, consequences and risks. •Safety reporting.	Once off, 1 hour training during induction.	Company Instructor/safety manager/officer personnel or approved Part 141 organisation
(b)	Aviation Safety training for Operational	Within 90 days All operational staff of entities	To familiarise trainees with the entities safety policies, objectives, their role in hazard identification	•The Safety Policy and Objectives •Hazards, consequences and risks. •Safety risk management	5 hours of training within each three-year period	Company Instructor/safety manager/officer personnel or approved Part 141 organisation

	personnel.		and risk management and SMS fundamentals.	process, including roles and responsibilities. •Safety reporting. •Human factors		
(c)	Safety Review specific training as per regulation 141.01.1. (a)	Entities personnel actively involved in the Safety Review Process, including middle, executive/senior management and accountable manager	To familiarise trainees with safety concepts, relevant to their respective roles, functions and responsibilities including compliance with national and organisational safety requirements and inter-departmental safety communication and active promotion of SMS.	In addition to the training contents referred to in (b) above, training should include the following: •Hazard identification and risk management processes. •Safety data collection and analysis. •Safety roles and responsibilities •Safety assurance and safety promotion •Establishment of safety performance targets, indicators, alerts and safety performance of SMS •The role and responsibilities of operational management within the SMS.	5 hours of training within each three-year period	Company Instructor/safety manager/officer personnel or approved Part 141 organisation

AMENDMENT OF SA CATS 171

12. Document SA CATS 171 is hereby amended by:

(a) the substitution in Technical Standard 171.03.8 for section 1 of the following section:

"1. Specifications outlined in the following ICAO Annexure 10 Volume II chapters:

(a) Chapter 2: Administrative Provisions relating to the International Aeronautical Telecommunication Service;

(b) Chapter 3: General Procedures for the International Telecommunication Service;

(c) Chapter 4: Aeronautical Fixed Service (AFS);

(d) Chapter 5: Aeronautical Mobile Service – Voice Communication; and

(e) Chapter 6: Aeronautical Radio Navigation Service.

(f) Chapter 7: Aeronautical Broadcast Service.

(g) Chapter 8: Aeronautical Mobile Service – Data Link Communications"."

(b) the deletion in Technical Standard 171.03.8 for subsection 2 (5) paragraph (a):

(5) The results and supporting evidence shall then be submitted to the Authority for acceptance and approval of the facility.

[(a) Chapter 7: Aeronautical Broadcast Service

Chapter 8: Aeronautical Mobile Service – Data Link Communications

(Editorial Note: Numbering as per official Civil Aviation Technical Standards.)]

AMENDMENT OF SA CATS 172

13. Document SA CATS 172 is hereby amended by:

(a) the insertion before Technical Standard "172.01.2" of the following definition:

"**"non-duty period"** means a continuous and defined period of time, subsequent to and prior to a duty period, during which air traffic service personnel are free from all duties;";

(b) the substitution in Technical Standard 172.01.2 of subsection (1) of the following subsection:

"(1) The need for the provision of an air traffic service or discontinuation thereof shall be submitted to the Authority for approval, accompanied by a detailed business case which is inclusive of a safety case and risk assessment.

(c) the substitution in Technical Standard 172.03.2 for subsection 2 paragraph (6) of the following paragraph:

(6) **[The]** A person conducting the assessment shall record the assessment on the prescribed form **[contained in Annexure A],** together with relevant remarks and any discrepancies noted. Assessments shall be retained on the controllers' unit training record.

(d) the substitution in Technical Standard 172.03.4 of section 6 of the following section:

"6. Aerodrome control tower

An aerodrome control tower shall have –

(1) headsets;

(2) microphones;

(3) transceivers;

(4) speakers;

(5) radio selector panel;

(6) telephone;

(7) intercom;

(8) auto-switch headset/speaker;

(9) recorder (radio and telephone);

(10) power;

(11) back-up power;

(12) wind speed and direction display;

(13) altimeter setting indicator;

(14) clock, in accordance with section 10 below;

(15) aerodrome lighting panel;

(16) navaid(s) monitor panel;

(17) lighting, including emergency lights;

(18) daylight radar/display consoles, as appropriate;

(19) flight data panel, flight progress strip card holders and/or the display of electronic flight progress strip cards;

(20) clipboards/displays (NOTAM etc.);

(21) automatic terminal information system recorder where applicable;

(22) fire alarm and extinguishers;

(23) desks/consoles/shelves;

(24) chairs;

(25) shades;

(26) air conditioning, heating/cooling;

(27) binoculars;

(28) sound-absorbing coverings (floor/wall);

(29) aeronautical fixed telecommunication network terminal; and

(30) signal lamp"."

(e) the substitution in Technical Standard 172.03.12 for section 5 of the following section:

5. Investigation of air traffic service incidents

The air traffic service incident reporting **[form is contained in Annexure F]** system shall be accessed through the SACAA website.

(f) the deletion of the following Annexures:

[ANNEXURE

Annexure A: DE Assessment Form for Air Traffic Services Personnel

Annexure B: Example of a completed annual en-route facility financial report

Annexure C: Example of a completed annual en-route facility traffic report

Annexure D: Air traffic service incident report

Annexure E: Letter of agreement between A and B]

[Annexure B

EXAMPLE OF A COMPLETED ANNUAL EN-ROUTE FACILITY FINANCIAL REPORT

CIVIL AVIATION AUTHORITY

AIR TRANSPORT REPORTING FORM

EN ROUTE FACILITY FINANCIAL DATA

State: **XYZ**		**Year ended: 31 December 20–**
FIR/UIR(s) covered: **ABC** **BCD** **CDE**	**Data are required for all of Part I, and for Items I through 5 in column (a),**	**Currency: RX** **.....**

	and for rows 6 and 6.1 of Part II. All other data items are optional.
EFG	Estimated data, identified by an asterisk (*), may be used if exact data are not available.

PART I: REVENUES

Revenue item	Amounts
1.....Route facility charges	57 000 000
2.Revenues from airport charges allocated to route facilities	–
3.Grants and subsidies allocable to route facilities (specify individually in the "Remarks" section any item exceeding 10% of ite	–
4.Other revenues allocable to route facilities including profit on assets sold (specify individually in the "Remarks" section any item exceeding 10% of item 5)	431 000 A/
5.....Total en-route revenues	57 431 000

PART II: EXPENSES

	Expenses by facility or service					
Total expenses for route facilities and services	Total All facilities and services	ATS	COM	MET	SAR	AIS
Expenses by item	(a)	(b)	(c)	(d)	(e)	(f)

1. Operation and maintenance (e.g. labour, spares, materials, power, etc.)	33 190 842	14 045 385	9 800 000	7 503 016	–	1 842 441
2. Administrative overheads..... B/	1 017 855	927 855	C/	C/	–	90 000*
3. Depreciation and/or amortisation	18 051 281	16 943 938	C/	961 574	–	145 769
4. Interest	10 411 803	10 004 806	C/	379 681	–	27 316
5. Other expenses (specify individually in the "Remarks" section any item exceeding 10% of item 6)	1 808 369	1 808 369	C/	C/	–	C/
6. Total expenses	64 480 150	43 730 353	9 800 000*	8 844 271	–	2 105 526
Expense allocation by type of utilisation (amounts or percentages of total expenses)						
6.1 En-route utilisation	34 085 614	20 565 160	5 730 600*	5 684 328	–	2 105 526
6.2 Airport utilisation	30 394 536	23 165 193	4 069 400*	3 159 943	–	
6.3 Non-aeronautical utilisation						

PART III: CAPITAL ASSETS – GROSS CAPITAL INVESTMENTS DURING THE YEAR

Facility or service	Gross capital investments
1. ATS – Air traffic services	20 315 000
2. COM – Communications	1 720 000
3. MET – Meteorological services	5 250 000
4. SAR – Search and rescue services	–
5. AIS – Aeronautical information services	–
6. TOTAL	27 285 000

Remarks: (including description of any major deviation(s) from the reporting instructions)

A/ Revenue from sale of publications

B/ Includes contribution to the Eurocontrol Agency budget in respect of services rendered

C/ Included under column B/]

GENERAL INSTRUCTIONS

This form is to be filed by the holder of an air traffic service unit approval providing en route air navigation facilities and services, within its territory or externally to it, for international civil aviation.

The form is to be filed annually. It is preferred that the data reported cover the calendar year (January to December). However, if this is not practical, it may cover a different 12-month period (e.g. financial year). The form should be filed as soon as possible after the annual data become available but no later than 6 months after the end of the period to which it refers.

It is recognised that holders may experience difficulties in reporting all of the data requested on the form, in which case the following general guidelines apply:

1. **Where an actual figure cannot be reported a reasonable estimate will be adequate. Estimates should be identified with an asterisk (*) following the estimated figure.**

2. **Combined financial data for two or more facilities or services, or items, can be reported if a breakdown cannot be made, in which case this should be clearly indicated on the form.**

3. **General guidance in the area of route facility cost-accounting and cost-allocation may be found in the Manual on Route Air Navigation Facility Economics (ICAO Doc 9161-AT/724).**

4. **The "Remarks" section of the form should be used to explain any major deviations from the reporting instructions.**

FACILITIES AND SERVICES

For purposes of this form:

"FIR/UIR" means flight information region/Upper flight information region;

"ATS" (air traffic services) means the employment of personnel and facilities for providing variously, flight information service, alerting service, air traffic advisory service, air traffic control service, area control service, approach control service or aerodrome control service;

"COM" (communication facilities) means the communication facilities that are broadly classifiable under three main categories COM fixed

(aeronautical fixed service), COM mobile (aeronautical mobile service) and NAVAIDS (aeronautical radio navigation service);

"COM fixed" comprises all facilities and personnel employed to maintain telecommunication services between fixed points, such as LTT, RTT, MAS, ATS direct speech circuits, and ATS computer data circuits, including terminals and switching centres;

"COM mobile" comprises all facilities and personnel located on the earth's surface that are engaged in air/ground communications and radiotelephony broad-casts such as VOLMET (i.e. VHF and HF transmitting and receiving stations);

"NAVAIDS" comprises radio equipment provided on the earth's surface for the benefit of aircraft, and intended for the determination of position or direction, or for warning of obstructions to air navigation: included, for example, are VOR, DME, NDB, LORAN and CONSOL;

"MET" (meteorological services) means meteorological services that comprise those facilities and services that furnish aviation with meteorological forecasts, briefs and observations as well as SIGMET information, VOLMET broadcasting material and any other meteorological data provided by States for aeronautical use;

"SAR" means search and rescue services;

"AIS" (aeronautical information services) means the employment of personnel and facilities for providing information pertaining to the availability of air navigation facilities and services and the procedures associated with them, necessary for the safety, regularity and efficiency of air navigation (i.e. AIP, AIC, NOTAM, etc.).

INSTRUCTIONS FOR PART I: REVENUES

1. **Route facility charges**

   Any charges and fees specifically levied and collected for the provision of en route facilities and services.

2. **Revenues from aerodrome charges allocated to route facilities**

Any revenues from aerodrome charges (e.g. landing or passenger-service charges) which are applied towards the costs of providing en route facilities and services.

3. **Grants and subsidies allocable to route facilities**

   Any payments received to meet the costs of providing en route facilities and services and not requiring the transfer of assets or provision of services in return.

4. **Other revenues allocable to route facilities**

   All other revenues not included in Items 1 to 3, but which are applied towards the costs of providing route facilities and services. Included here shall be the profit, if any, on assets sold (i.e. the difference between the depreciated value (book value) and the sales price).

INSTRUCTIONS FOR PART II: EXPENSES

The expenses which are to be reported are those contained in the accounting system to which should be added any additional costs which may have been included in the cost basis for route facility charging purposes.

1. Expenses by item

1.1 Operation and maintenance (salaries, supplies and services)

The costs of employing operating and maintenance personnel (i.e. direct remuneration, training, travel, social insurance, pensions, remuneration in kind, etc.); the costs of power supply for operating and maintenance purposes; the costs of spare parts and materials incorporated or expended in maintaining equipment and buildings; rentals paid for premises and equipment; and charges for operating and maintenance services provided by others. Also to be included are the costs of services and supplies such as heating, air conditioning, lighting water, cleaning, laundry, sanitation, stationery and postage.

1.2 Administrative overheads

To the extent they have not been included under Item 1 include the costs of common administrative services such as overall management, economic planning, etc.

1.3 Depreciation and/or amortisation

The amounts by which the value of the assets has decreased during the year due to physical deterioration, obsolescence and other such factors that limit their productive life. Also to be included are amounts by which intangible assets (e.g. investments in experimental research and training projects) have been written off during the year.

1.4 Interest

Interest paid or payable on debt during the year as well as any interest computed on capital assets.

1.5 Other expenses

Expenses not already included under expense items 1.1 to 1.4 above.

2. Expenses by facility or service

Columns (b) to (f) provide for the reporting of expenses by facility or service. The totals for all the facilities and services are to be reported in column (a), rows 1 to 6.

3. Expense allocation by type of utilisation

In reporting the allocations of total expenses to en route, aerodrome and non-aeronautical utilisation, approximate absolute amounts or even percentages will suffice. (Guidance concerning such allocations may be found in the Manual on Route Air Navigation Facility Economics, ICAO Doc 9161-AT/724).

INSTRUCTIONS FOR PART III: CAPITAL ASSETS – GROSS CAPITAL INVESTMENTS DURING THE YEAR

1. **Gross capital investments during the year**

   The value of any fixed assets acquired during the year.

2. **Fixed assets**

   All the physical property that is of a lasting nature, such as land and improvements thereto, buildings and durable equipment (machinery, vehicles, furniture and fixtures, tools, etc.).

Note: When an asset, such as a building, is being completed gradually over a period of years, the capital expenditure incurred during the year should be reported rather than the accumulated total once the asset is put into commission.

SYMBOLS

Please use the following symbols in filling this form:

- **Estimated data**

& **Magnitude less than half the unit value**

- **Magnitude nil**

-- **Category not applicable**

--- **Data not available.]**

[Annexure C

EXAMPLE OF A COMPLETED ANNUAL EN ROUTE FACILITY TRAFFIC REPORT

CIVIL AVIATION AUTHORITY
AIR TRANSPORT REPORTING FORM
EN ROUTE FACILITY TRAFFIC STATISTICS

State:	**X**		**Year**	
YZ			**ended:**	**20–**

FIR/UIR(s) covered:		
ABC BCD CDE	Data required are the totals at the foot of columns (b) and (e). The breakdown by FIR/UR is optional.	
EFG	Estimated data, identified by an asterisk (*), may be used if exact data are not available.	

	Number of flights			
Name of FIR/UIR	International flights (including IGA)	Domestic flights (including GA)	Other flights	Total flights
(a)	(b)	(c)	(d)	(e)
ABC	8 639*	173 447*	10 928*	193 014*
BCD	100 473*	18 335*	14 294*	133 102*
CDE	35 234*	205 510*	20 961*	261 705*
EFG	3 800*	128 000*	20 000*	151 800*
Total – all FIR/UIR(s)	148 146*	525 292*	66 183*	739 621*

Remarks: (including description of any major deviation(s) from the reporting instructions)

Column (d) includes training, local and domestic military flight.

GENERAL INSTRUCTIONS

This form is to be filed by the holder of an air traffic service unit approval providing area control or flight information services for one or more FIRs/UIRs within its territory of externally to it

The form is to be filed annually. It should be filed within four months of the year being reported.

Only IFR and other flights for which flight plans have been filed with the respective area control centre(s) or flight information centre(s) should be reported. Flights should be counted separately for each FIR/UIR through which they move.

It is recognised that holders may experience difficulties in reporting all of the data requested on the form, in which case the following general guidelines apply:

1. **Where an actual figure cannot be reported a reasonable estimate will be adequate. The estimates should be identified with an asterisk (*) following the estimated figure.**
2. **The "Remarks" section of the form should be used to explain any major deviations from the reporting instructions.**

DEFINITION OF TERMS AND INSTRUCTIONS

For purposes of this form:

"domestic flights" (including GA) means all flights including general aviation wholly within the territory of one State except flights by State aircraft for other than civil purposes which should be reported under column (d) "Other flights";

"FIR/UIR" means flight information region/upper flight information region;

"flight" means the movement of an aircraft during its en route phase through the airspace of an FIR/UIR; Each such movement following a landing within the FIR/UIR is to be counted as a separate flight;

"international flights" (including IGA) means all international air transport flights and all international general aviation flights;

"other flights" means all flights not reported under columns (b) and (c).

SYMBOLS

Please use the following symbols in filling this form:

- **Estimated data**

& **Magnitude less than half the unit value**

- **Magnitude nil**

-- **Category not applicable**

--- **Data not available.]**

[Annexure ***D***

AIR TRAFFIC SERVICE INCIDENT REPORT

LOGO

1. Actions performed by ATSU	**Tick appropriate**	
1.1 Radiotelephony and telephone tape recordings impounded	**YES**	**NO**
1.2 Radiotelephony and telephone tape recordings transcribed and attached to report with cassette copy included	**YES**	**NO**
1.3 Recorded radar data available	**YES**	**NO**
1.4 Copies of meteorological reports and forecasts relevant to the time of the incident	**YES**	**NO**

1.5 Copies of flight progress strips and other relevant data	YES	NO
1.6 Technical statements concerning the operation status of equipment, if applicable	YES	NO
1.7 Unit findings and recommendations for corrective actions, if appropriate	YES	NO
1.8 Appropriate INCREP filed. Note: If NO please state reason	YES	NO
....		
2. Background to the incident (Description based on available facts)		
3. Personal information		
3.1 Name of ATC		
3.2 Licence number		
3.3 Position and frequency		
3.4 Date of last standards evaluation		

3.5 Date of last medical	
4. Analysis of incident	
4.1 Procedures	
4.2 Data and display	
4.3 Coordination	
4.4 Communication	
4.5 Equipment	
4.6 Personnel performance	

4.7 Task environment
4.8 General operations
5. Unit findings (factual)
6. Probable cause of the incident
7. Unit recommendations

Investigating Officer		**Date**
8. Appendices		
9. Standards officer recommendations		
Standards Officer		**Date**
10. Officer-in-charge of ATSU comments		
11. Quality control **An applicant for the issuing of an air traffic service licence shall:**		

Annexure E

LETTER OF AGREEMENT BETWEEN A and B

1. DOCUMENT MANAGEMENT

1.1 Table of contents

1.2 Checklist of effective pages

Subject	Pages	Issue date
Letter of agreement	11	

2. OVERVIEW

Introduction The following document is a Letter of Agreement between .... involving the following units: and

Objective A statement of agreed procedures between .....

Scope The procedures contained in this operational Letter of Agreement supplement or detail, where

so required in the vicinity of the common FIR boundary, those prescribed by ICAO Annex 2, Annex 11, PANS-RAC (Document 4444), Regional Supplementary Procedures (Document 7030) and local AIP, ATS instructions and .....

Effective date — This Letter of Agreement becomes effective on

3. AIRSPACE

Airspace definition

4. SEPARATION

General

Vertical separation — Assignment of cruising levels shall, as far as possible, comply with the IFR table of Cruising Levels in Appendix 3 of ICAO Annex 2, except:

Cruising levels which do not correlate to track and cruise climbs may be approved, subject to prior coordination and agreement.

Longitudinal separation

5. COORDINATION AND COMMUNICATION

Transfer of control point

Communication systems

Level changes

Near boundary operations

Transfer of responsibility

Transfer of communication

6. REVISION

Revision conditions — This agreement shall be subject to revision whenever a modification to ICAO standards, recommended practices and/or regional supplementary procedures standard operating procedures, AIP or ..... instructions,

which might affect the procedures contained in this agreement occurs, or when new communications facilities, or air traffic services which might affect these procedures are commissioned.

For any other reason which might make it advisable to change this agreement and its associated attachments, either ATSU shall propose the pertinent revision, with approval from .....

When less than thirty (30) days exists between an identified need to amend this agreement and the effective date of the amendment, the respective Centre Manager or their designated deputies shall agree via telephone, followed by confirming fax message signed by all parties, on the nature of the change and publish the change to staff by a suitable local instruction. Formal exchange of signed copies of the amended document shall take place as soon as practicable thereafter, following ..... approval.

7. DISSEMINATION

Dissemination agreement	Notwithstanding the provisions outlined in revisions, the dissemination of this agreement and its subsequent modification shall be made in full, thirty (30) days before the effective date.
Authority	Signed in ..... and .....
	....
	OIC Air traffic services OIC Air traffic services
	....
	Date Date]

(f) the substitution in Technical Standard 172.03.12 for section 3 of the following section:

"3. En-route facility traffic statistics

[The] A holder of an approval shall provide the with en-route facility-traffic statistics referred to in **[CAR]** regulation 172.03.12**[9]**(g), annually on the prescribed form **[ICAO Form L]**. [This] Such a form and the explanatory notes for the completion thereof are available at the Authority website"."

(g) the insertion in Technical Standard 172.03.14 after subsection (16) of the following subsections:

"(15) all applicable ICAO documents; **[and]**

(16) all applicable co-ordination documents**[.]**;

(17) SMS Manual; and

(18) Quality Manual"."

(h) the substitution in Technical Standard 172.03.15 for subsection (1) paragraph (b) of the following paragraph:

" (b) **[air traffic control instructions]** Standards and procedures manual";"

(i) the substitution in Technical Standard 172 .03.18 for section 1 of the following section:

"1. Where units are providing services adjacent to areas serviced by other units a letter of agreement shall be compiled between the units in accordance with the format prescribed on the Authority website"." **[contained in annexure e.]**.".