SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

AMENDMENT SACATS 2/2018

The Director of Civil Aviation has, in terms of section 163(1) of the Civil Aviation Act, 2009 (Act No. 13 of 2009) read with Part 11 of the Civil Aviation Regulations, 2011 amended South African-Civil Aviation Technical Standards as reflected in the Schedules hereto. The Amendments as contained in the Schedule shall come into operation on 21 October 2018.

Poppy Khoza
Director of Civil Aviation
Date: 12 NOV 2018

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

Table of contents

1. Amendment of Technical Standard 61.11.1
2. Amendment of Technical Standard 67.00.2
3. Amendment of Document SA-CATS 121.07.3
4. Amendment of Technical Standard 127.07.21
5. Amendment of Technical Standard 135.07.13
6. Amendment of Document Technical Standard 139
7. Amendment of Document Technical Standard 171
8. Insertion of Document Technical Standard 178

AMENDMENT OF TECHNICAL STANDARD 61.11.2

1. Technical Standard 61.11.2 is hereby amended by –

(a) the substitution in section 4 for paragraph (b) of the following paragraph:

"4. Phase 3 – Instrument flying procedures training

(b) **[The candidate must have passed the IR and General Radiotelephony Operator's Certificate theoretical knowledge examinations prior to proceeding with this phase of training]** The core of the candidate's procedural IFR proficiency is established during this phase. This is especially critical, because the effectiveness of the training in the succeeding phases depends on the quality of the training in phase 3"."

(b) the substitution for section 7 of the following section:

"7. Phase 6 – Route familiarisation training in aircraft

(a) This phase of the training serves to transition the candidate to IFR operations in the aircraft. It shall comprise at least two sectors, both terminating in an instrument approach.

(b) A candidate shall have passed the IR and General Radiotelephony operator's certificate theoretical knowledge examination prior to proceeding with this phase of training.".

AMENDMENT OF TECHNICAL STANDARD 67.00.2

2. Technical Standard 67.00.2 is hereby amended by the substitution of section 5 for the following section:

"5. Class 4 medical certificate

5.1 Psychiatry system

(1) An applicant shall have no established medical history or clinical diagnosis –

(a) of any psychiatric condition that is of a severity that renders the applicant incapable of safely exercising the privileges of the licence; or

(b) that makes it likely that within the specified period of time of the assessment he or she unable to safely exercise the privileges of his or her licence,

unless acceptable and effective treatment has any additional risk of functional disorder or sudden or subtle incapacitation

5.1.1 Psychotic disorder

(1) An applicant presented with psychosis of toxic origin that has completely recovered may be considered for certification.

(2) An applicant that has recovered from the psychosis shall be stable and off the medication for a period of 3 years before he or she may be deemed medically fit.

(3) An applicant with psychosis of non-toxic origin is not eligible to be declared medically fit.

5.1.2 Brief psychotic disorder

(1) An applicant who is presented with psychotic symptoms shall be declared medically unfit while the underlying causes are being identified.

(2) An applicant with a brief psychotic disorder shall be assessed on case-by-case basis.

(3) An applicant who applied for medical recertification shall submit a comprehensive psychiatric report detailing the following:

(a) the presence and severity of symptoms;

(b) the duration shall be less than one month;

(c) full return to the premorbid level of functioning; and

(d) the use of any medication.

5.1.3 Adjustment disorder

(1) An applicant with adjustment disorder shall be assessed on a case by case basis.

(2) An applicant shall be deemed temporarily medically unfit while suffering from symptoms.

(3) Applicant is required to submit a comprehensive psychiatrist's report detailing the following –

(a) the applicant is currently asymptomatic; and

(b) the applicant is not on any medication that is not compatible with flying.

5.1.4 Personality disorders

(1) An applicant with a confirmed diagnosis of personality disorder shall be considered medically unfit.

5.1.5 Attention deficit hyperactivity disorder

(1) An applicant with attention deficit hyperactivity disorder may be considered medically fit, if the applicant submits the following:

(a) a favourable comprehensive psychiatric report detailing the signs, symptoms and diagnosis of the applicant; and

(b) a favourable comprehensive clinical psychologist assessment.

(2) An applicant showing evidence of persisting deficiencies in cognitive ability or behavioural aberrancy shall be declared medically unfit.

(3) An applicant shall be required to be on medication for a minimum of one month off therapy and clinically stable.

(4) An applicant who continually use amphetamine medication shall be declared medically unfit.

5.1.6 Substance abuse or substance dependence

(1) An applicant who has a history of psychoactive substance abuse may be declared medically fit if:

(a) an applicant has been under medical treatment for psychoactive substance abuse and the DAME or a medical practitioner concerned certifies that the applicant is free from the effects of psychoactive substance abuse;

(b) an applicant provides the name of a sponsor who is prepared to certify that the applicant no longer takes a psychoactive substance in any form and such a

sponsor shall be a person acceptable to the Medical Assessor for this purpose; and

(c) an applicant declares under oath not to take any psychoactive substance while holding a licence.

(2) An applicant with a history of alcohol dependency may be assessed as fit provided that he or she meets the following requirements:

(a) applicant abstained from alcohol for at least 6 months;

(b) applicant submit blood parameters (MCV- Mean Corpuscular Volume, GGT- Gamma Glutamyl Transpeptidase and CDT- Carbohydrate deficient Transferrin) normalised;

(c) applicant submit normal urine drug screening samples; and

(d) applicant submit a report detailing successful completion of an in-patient rehabilitation.

(3) The requirements prescribed in subsection (2) are applicable to an applicant who is presenting with the first episode of alcohol dependency.

(4) An applicant who presents two episodes of alcohol dependency shall be required to meet the requirements prescribed in subsection (2) and comply with the following:

(a) applicant shall be subjected to random drug testing for a 2 years period; and

(b) applicant who relapse after the second episode shall be declared medically unfit.

(5) Applicant presenting with a second episode shall be restricted to operating without carrying passengers or operating in multi crew environment for a minimum period of 6 months.

(6) The restriction referred in subsection (4) may be lifted after two years of proven sobriety.

5.1.7 Alcohol related seizure

(1) Applicant presenting with an alcohol-related seizure shall be assessed as medically unfit for a minimum period of two (2) years, and until such time that freedom from substance use has been established and can be demonstrated.

(2) An applicant may be considered after two (2) years and shall be restricted to the following operations restrictions:

(a) may not carry passengers; and
(b) shall operate in a multi-crew environment.

(3) An applicant shall be required to submit the following favourable reports:

(a) a report stating proven attendance of a rehabilitation programme and quarterly after-care reports;

(b) a comprehensive clinical psychologist report;

(c) a comprehensive neurologist's report;

(d) an EEG report with provocation; and

(e) a CT Scan or MRI report.

(4) An applicant shall be subjected to random alcohol testing.

(5) The limitations prescribed in subsection (3) may be lifted in 5 years after the seizure, provided sobriety is proven and an applicant has been free from seizures.

5.1.8 Anxiety disorders

A. Generalised anxiety disorder

(1) Applicant with generalised anxiety disorders shall be assessed on a case-by-case basis by the Medical Assessor.

(2) Applicant shall be required to submit a comprehensive psychiatrist report containing the following information:

(a) diagnosis and prognosis;

(b) presence and severity of symptoms;

(c) medication and side effects is any experienced; and

(d) applicant shall be required to be asymptomatic without medication for a minimum of 6 months.

B. Post-traumatic stress disorder

(1) Applicant with post-traumatic stress disorder shall be assessed on a case-by-case basis by the Medical Assessor.

(2) Applicant shall be required to submit a comprehensive psychiatrist report containing the following information:

(a) diagnosis and prognosis;

(b) presence and severity of symptoms;

(c) applicant shall be symptom free; and

(d) medication used and side effects if any.

C. Mild to moderate anxiety

(1) Applicant with a history of mild to moderate anxiety may be assessed as medically fit if he or she meet the following criteria:

(a) if the psychiatrist's and the psychologist's reports are favourable;

(b) is well and stable for a minimum of period one month; and

(c) the medication used is acceptable for flight duties.

D. Mild to moderate depression

(1) Applicant with a history of mild to moderate depression shall comply with the Mood Disorder Protocol prescribed in the SA-CATS-MR Schedule 30

E. Hypomania and bipolar mood disorder II

(1) Applicant presented with a diagnosis of hypomania and bipolar mood disorder II shall be declared medically unfit for period of 3 years.

(2) Applicant may be considered after three years if a psychiatrist report indicates that the applicant has been well and stable for a period of 3 years.

(3) If the psychiatrist's report states that the applicant has experienced a full level of functional recovery with insight into the illness and fully adheres to the agreed treatment plan.

(4) If a Clinical Psychologist report finds no alertness, concentration and motor performance deficits.

(5) An applicant use medication that is compatible with flight duties.

(6) Requirements for renewal of the medical certificates are as follows:

(a) an applicant shall be required to submit a 6-monthly Psychiatric and Psychological report, with a YMRA (Young mania rating scale); and

(b) an applicant shall be required to submit a 6-monthly biochemical profile including drug levels.

F. Bipolar mood disorder Type 1

(1) Applicant with a confirmed diagnosis of Mania with or without major depression shall be declared medically unfit.

G. Bipolar mood disorder type 2

(1) Applicant with a confirmed diagnosis of Hypomania with Major Depression shall be declared medically unfit.

H. Para-suicide

(1) Applicant presenting with a diagnosis of para-suicide shall be referred to the Medical Assessor for consideration.

(2) Applicant shall be required to submit a comprehensive Psychiatrist reports indicating the following:

(a) multi-axis diagnosis and

(b) presence or absence of substance and alcohol dependent/abuse

I. Organic mental disorders

(1) Applicant presented with a diagnosis of organic mental disorders shall be declared temporary medically unfit and referred to the Medical Assessor for consideration.

(2) Applicant shall be required to submit a comprehensive Psychiatrist report indicating the following:

(a) the underlying cause;

(b) the diagnosis and prognosis;

(c) the presence and severity of symptoms;

(d) stipulate whether the underlying cause has been identified and remedied; and

(e) indicate whether the client has reached full recovery to baseline acceptable level of functioning.

J. Delirium

(1) Applicant presenting with a diagnosis of Delirium shall be declared temporary medically unfit and referred to the Medical Assessor for consideration on a case-by-case basis.

(2) Applicant shall be required to submit a comprehensive Psychiatrist report indicating the following:

(a) the underlying cause;

(b) the diagnosis and prognosis;

(c) stipulate whether the underlying cause identified and remedied;

(d) the presence and severity of symptoms;

(e) full recovery from the delirious state; and

(f) examination done to confirm the underlying cause and a prognosis or likelihood of recurrence.

K. Dementia

(1) Applicant with a confirmed diagnosis of dementia shall be declared medically unfit. However; in the small number of cases where the cause of dementia is known and the condition has been resolved, the applicant may be considered for recertification.

(2) Applicant shall be required to submit a comprehensive Psychiatrist report indicating the following:

(a) the presence and severity of symptoms;

(b) full recovery from the delirious state;

(c) examinations done to confirm the underlying cause and a prognosis likelihood of recurrence; and

(d) stipulate whether the underlying cause has been identified and remedied.

L. Schizophrenia

(1) Applicant presenting with a diagnosis of schizophrenia shall be declared medically unfit.

M. Delusional disorder

(1) Applicant presenting with a diagnosis of delusional disorder shall be declared medically unfit.

5.2 Neurology system

(1) An applicant shall have no established medical history or clinical diagnosis of any disease, injury or abnormality of the nervous system that –

(a) is of a severity that renders the applicant incapable of safely exercising the privileges of the licence; or

(b) makes it likely that within the specified period of time of the assessment an applicant is unable to safely exercise the privileges of the licence; or

(c) if an acceptable and effective treatment has any additional risk of functional disorder or sudden or subtle incapacitation.

5.2.1 Malignant brain tumours

(1) Applicant presenting with a diagnosis of malignant brain tumours shall be declared medically unfit.

5.2.2 Hereditary, degenerative and demyelinating disorders

(1) Applicant presenting with a diagnosis of hereditary, degenerative and demyelinating disorders shall be declared temporary medically unfit and be referred to the Medical Assessor for consideration on a case by case basis.

(2) Applicant presenting with progressive or disabling shall be declared medically unfit.

(3) Applicant considered shall be required to submit the following comprehensive report:

(a) a neurological report;

(b) a neuro-ophthalmological report;

(c) an MRI of the brain and the spinal cord; and

(d) a clinical psychologist report.

5.2.3 Primary and central hypersomnia

(1) Applicant presenting with a diagnosis of primary and central hypersomnia shall be declared temporary medically unfit and be referred to the Medical Assessor for consideration.

(2) An applicant to considered medically fit shall be required to submit the following:

(a) a comprehensive neurological report; and
(b) a Polysomnogram from an HPCSA accredited practitioner.

5.2.4 Epilepsy

(1) Applicant may be declared medically fit if he or she has been free from epileptic attacks for at least 10 years without anticonvulsant medication during that time.

(2) Specific self-limited conditions such a Benign Rolandic Seizure with centro-temporal spikes shall allow medical certification after 5 years.

5.2.5 Single Seizure

(1) An applicant presented with a diagnosis of single seizure shall be declared temporary medically unfit and referred to the Medical Assessor for consideration.

(2) An applicant shall be deemed medically fit pending a favourable neurological report that stipulates that:

(a) applicant has had no further episodes of a seizure for the past four years preceding the application; and

(b) clinical examination and supporting medical reports quantify the risk of seizure to be at 2% per annum.

5.2.6 Solitary loss of consciousness or loss or altered awareness likely to be cardiovascular in origin

(1) Applicant presenting with a diagnosis of solitary loss of consciousness or loss or altered awareness likely to be cardiovascular in origin shall declared medically unfit for period of one year;

(2) Applicant may be deemed temporarily medically unfit for a minimum of three months if the underlying cause is identified and treated.

(3) Applicant to be considered medically fit shall be required to submit the following comprehensive reports for consideration:

(a) a Cardiologist's report;

(b) an Echocardiography;

(c) a resting and exercise ECG; and

(d) a Tilt-table test.

5.3 Cardiovascular system

(1) The applicant shall have no current cardiovascular conditions likely to interfere with the safe operation of an aircraft:

(2) The resting ECG shall form part of the examination:

(a) at the initial examination;

(b) after the applicant has attained the age of 40 years;

(c) after the applicant has attained the age of 50 years;

(d) after the attainment 50 years, the applicant shall submit four yearly; and

(e) when clinically indicated.

5.3.1 Blood pressure

(1) Applicant presented with a blood pressure at examination consistently exceeds 160 mmHg systolic and/or 95 mmHg diastolic, with or without treatment shall be declared medically unfit.

(2) The initiation of medication to control blood pressure requires a period of at least two weeks' temporary medical suspension of the medical certificate to establish control and the absence of side effects.

(3) Applicant presented with hypertension shall be assessed for potential risk factors.

(4) Applicant with symptomatic hypotension shall be declared as medically unfit.

(5) Applicant shall be required to use a medication which is compatible with flying and shall be required to submit the following reports:

(a) a comprehensive report from the treating Doctor or DAME; and

(b) applicant required to submit the following blood tests:

(i) U&E and Creatinine Fasting glucose;
(ii) Random Lipogram; and
(iii) resting and stress ECG.

5.3.2 Coronary artery diseases

A. Acute Myocardial Infarctions

(1) Applicant shall not have a confirmed diagnosis of an Acute Myocardial Infarctions within the preceding 6 weeks.

(2) Applicant who have had a satisfactory cardiological evaluation, including an exercise or equivalent test that is negative for ischemia, may be declared as medically fit pending submission of the following favourable reports;

(a) a resting and maximal stress ECG;
(b) a 24-Hour Holter ECG;
(c) an Angiogram (initial);
(d) an Echocardiogram;
(e) a Stress MRI/MIBI Scan or Coronary CT Scan; and
(f) bloods (FBC, U&E, Lipogram, Fasting Glucose).

B. Coronary Artery Bypass Graft

(1) An applicant shall not be assessed if he or she has undergone coronary artery bypass graft within the preceding 3 months.

(2) Applicant who had a satisfactory cardiological evaluation, including an exercise or equivalent test that is negative for ischemia may be assessed as medically fit pending submission of the following favourable reports:

(a) a resting and maximal stress ECG;
(b) a 24-Hour Holter ECG;
(c) an Angiogram (initial);
(d) an Echocardiogram;
(e) a stress MRI/MIBI Scan or Coronary CT Scan; and
(f) bloods (FBC, U&E, Lipogram, Fasting Glucose).

C. Elective Angioplasty

(1) Applicant shall not be considered for medical certification if he or she have had an elective Angioplasty within the preceding 6 weeks.

(2) Applicant with a satisfactory cardiological evaluation, including an exercise or equivalent test that is negative for ischemia, may be declared medically fit pending submission of the following favourable reports:

(a) a resting and maximal stress ECG;
(b) a 24-Hour Holter ECG;
(c) an Angiogram;
(d) an Echocardiogram;
(e) a Stress MRI/MIBI Scan or Coronary CT Scan; and
(f) bloods (FBC, U&E, Lipogram, Fasting Glucose).

D. Angina

(1) Applicant who has been free from angina for 6 weeks with or without treatment and who had a satisfactory cardiological evaluation, including an exercise or equivalent test that is negative for ischemia, may be declared medically fit.

(2) The tests shall be determined by treating specialist and the Medical Assessor.

5.3.3 Rhythm and conduction disturbances

(1) Applicant with a significant disturbance of cardiac rhythm shall be declared medically unfit unless the rhythm disturbance is assessed by a Physician or Cardiologist and is not likely to interfere with the safe exercise of the privilege of the licence the applicant is applying for.

(2) Applicant shall be required to submit the following reports:

(a) an exercise ECG;
(b) a 24-Hour Holter ECG; and
(c) an Echocardiogram.

A. Rate and Rhythm Disturbances

(1) Applicant presented with the diagnosis above may be considered medically fit only if the arrhythmia has been controlled for 3 months and the LV ejection fraction is >40%.

B. Pacemaker Implant

(1) Applicant who has undergone a pacemaker implant may be considered medically fit 3 months following the pacemaker implantation.

(2) Applicant shall be required to submit a satisfactory cardiologist including pacemaker interrogation report.

(3) Applicant to be referred to the Medical Assessor for consideration.

C. Successful Catheter Ablation

(1) Applicant who has undergone a Catheter Ablation may be considered medically fit 3 months following the ablation pending a favourable cardiologist report.

D. Left Bundle Branch Block

(1) Applicant with a Left Bundle Branch Block may be considered medically fit following submission of a satisfactory Cardiologist evaluation, which shall include an exercise or equivalent test.

(2) The tests shall be determined by treating specialist and a Medical Assessor on a case by case basis.

(3) Applicant who do not meet the exercise test requirement may be declared medically fit with the OPL limitation to operate only without passenger or in a multi crew environment.

E. Pre-excitation

(1) Applicant may be considered medically fit subject to a satisfactory cardiological evaluation, unless if the Pre-excitation associated with an arrhythmia.

(2) Applicant with any of the following conditions shall be assessed as medically unfit or have his or her privileges limited to operations without carrying passengers or operating in a multi crew environment:

(a) a left ventricular ejection fraction known to be less than 40%;

(b) applicant Blood Pressure (with or without treatment) at examination consistently exceeding 160 mmHg systolic and /or 95 mmHg diastolic;

(c) an unsatisfactory exercise test;

(d) an aortic aneurysm in the range of 5,5 cm to 6,5 cm';

(e) pre-excitation associated with a significant arrhythmia;

(f) aneurysms greater than 6,5 cm; and

(g) symptomatic Hypertrophic Cardiomyopathy.

5.4 Respiratory system

5.4.1 Chest radiography requirements

(1) Chest Radiography, anterior, posterior and lateral view, shall form part of the respiratory system assessment for the initial issue of a Class 4 medical certificate.

(2) Periodic chest radiography is usually not necessary, but may be a necessity in situations where asymptomatic pulmonary disease can be expected.

(3) A licence holder who has a clinical indication for chest radiography may be required to undergo chest radiography at more frequent intervals.

5.4.2 Flow-volume lung function

(1) Flow-volume lung function testing shall form part of the respiratory assessment for the initial issue of a Class 4 medical certificate under the age of 40 years.

(2) The flow-volume lung function testing shall be done again at the first medical examination after the age 40, and again at the first medical examination after the age of 50.

(3) For an applicant who is an active smoker, the requirement for flow-volume lung function testing shall be not less than every 24 months (biannually) for licence holders under the age of 40 and not more than every 12 months (annually) after the age of 40.

(4) A licence holder who has a clinical indication for lung function testing may be required to submit a lung function tests at more frequent intervals.

5.4.3 Asthma

(1) An applicant with a history of pre-existent asthma may be declared medically fit if he or she complies with the following:

(a) submit a Lung Function Test which demonstrates FEV_1 / FVC Ratio >= 70% of predicted value;

(b) applicant does not present with bronchospasm on clinical examination or associated with mild respiratory infection;

(c) applicant has not in the 3 months preceding the examination required treatment with an oral corticosteroid or a short acting beta-2-agonist;

(d) applicant has not visited an emergency room or healthcare centre for symptoms of asthma in the preceding 3 months;

(e) treatment is limited to medication compatible with flight safety; and

(f) the applicant has submitted a favourable DAME or Specialist Physician report.

(2) An applicant may be declared temporarily medically unfit in the following cases:

(a) the FEV_1 / FVC Ratio <=70% of predicted value, and there is a determined cause;

(b) the applicant currently has lung infection;

(c) applicant presenting with acute bronchospasm shall be declared temporarily medically unfit until appropriate management is instituted and, on review, licence holder demonstrates acceptable lung function test (FEV_1/ FVC ratio >= 70% of predicted value) and absence of bronchospasm (wheezing) on clinical examination;

(d) this means reversibility on a pre and post lung function test shall be less than 12% and/or 200ml;

(e) any form of asthma attack requiring emergency room treatment in the past 2 years, shall be declared temporarily unfit pending pulmonologist's report; and

(f) use of short-acting beta-2-bronchodilators, subject to pulmonologist's report.

A. Exercise-Induced Asthma

(1) Applicant presenting with a diagnosis of exercise-Induced Asthma shall be declared temporary medically unfit until appropriate management is instituted.

(2) Applicant shall be required to submit a provocation test such as a Stress Lung Function Test, and he or she shall be required to demonstrates acceptable lung function test (FEV_1/ FVC ratio >= 70%) and there is absence of bronchospasm (wheezing) on clinical examination.

(3) Applicant to provide a Pulmonologist /Physicians report.

5.4.4 Chronic Obstructive Airway Disease

(1) Applicant with COAD is assessed according to the minimum lung function standards.
(2) Applicant presented with irreversible airways obstruction outside the minimum standard shall be referred to a pulmonologist for assessment of:

(a) vital capacity reduction;
(b) increased residual volume;
(c) presence of bullae;
(d) diffusion capacity;
(e) oxygen saturation and carbon dioxide retention.

(3) Applicant shall be required to submit a CXRs Biennially or as frequent as stated in the pulmonologist's report if the applicant continues smoking.

(4) Applicant presenting with acute symptoms or requiring continuous medication to relieve symptoms shall be deemed medically unfit.

(5) Applicant declared medically unfit may apply to the Medical Assessor for a special waiver.

(6) Applicant with inter-current infections shall be deemed temporarily medically unfit until the appropriate treatment is instituted.

(7) Applicant presenting with mild disease may be declared medically fit if:

(a) the lung impairment is mild;

(b) the applicant is asymptomatic;

(c) the applicant does not require treatment, and

(d) the Chest- X-ray has no evidence of bullae.

5.4.5 Pulmonary tuberculosis

(1) An initial applicant with active tuberculosis or undergoing treatment shall be declared as temporarily medically unfit for a minimum period of 3 months from the date of confirmation of disease and initiation of treatment.

(2) The applicant may be declared medically fit following completion of treatment and if the following reports are favourable:

(a) a lung function tests is normal;
(b) the chest radiograph shows no significant lung damage;
(c) a recognised course of medication has been completed; and
(d) a favourable physician report;
(e) the applicant does not have open cavitatory TB and the sputum is negative for TB;
(f) the applicant is on appropriate medication and demonstrates no drug resistance;
(g) the medication provokes no undesirable side effects that may impair flight safety;
(h) the pulmonologist's report is favourable; and
(i) the underlying medical conditions are evaluated and appropriately managed.

(3) Applicant with recurrent or re-activation tuberculosis, post TB bronchiectasis with recurrent chest infections or large cavities and MDR and XDR TB shall be declared medically unfit pending a pulmonologist's report.

(4) Special waiver may be granted on a case-to-case basis by the Medical Assessor.

(5) For recertification of an applicant, a pulmonologist's report shall be required.

5.4.6 Pulmonary Sarcoidosis

(1) Applicant with a diagnosis of active Sarcoidosis symptomatology shall be declared as medically unfit.

(2) Applicant with a history of multisystem Sarcoidosis shall be declared as medically unfit.

(3) Applicant with a history of Sarcoidosis confined to hilar lymphadenopathy may be declared as medically fit provided that:

(a) a full clinical evaluation is normal; tests shall include a chest x-ray, resting and exercise ECG, 24-hour ambulatory ECG monitoring and, if needed, myocardial scintigraphy or perfusion scanning;
(b) a normal pulmonary function tests are demonstrated;
(c) the applicant has no evidence of other organ or parenchymal involvement;
(d) the applicant is not on treatment;
(e) OPL limitation for 6 months; and
(f) applicant submit a favourable specialist physicians report.

(4) These investigations shall be repeated annually, and provided regression has occurred a fit assessment without limitation may be permitted after 2 years' observation.

(5) Blood tests (ESR- erythrocyte sedimentation rate, Angiotensin Converting Enzyme, Ca2+, uric acid) and any necessary examinations shall be at the discretion of the treating Physician.

(6) Applicant who has recovered from Multisystem Sarcoidosis with no detectable cardiac involvement may be considered by the Medical Assessor.

(7) Applicant with known Cardiac Sarcoidosis shall be declared as medically unfit.

(8) Applicant with evidence of Neuro Sarcoidosis shall be declared as medically unfit.

5.4.7 Pneumothorax

A. Traumatic Pneumothorax

(1) Applicant with a history of Traumatic Pneumothorax may be declared as medically fit if he or she meets the following requirements:

(a) six weeks shall have elapsed since full recovery;
(b) full respiratory examination shall be normal;
(c) acceptable lung function tests shall be demonstrated, i.e. FEV_1/ FVC ratio >=70%; and
(d) chest radiograph changes shall have resolved.

(2) Initial and experienced applicant with a history of recurrent episode(s) of traumatic or spontaneous pneumothorax which is complicated shall be assessed as medically unfit unless the applicant has undergone a bilateral pleurodesis, depending on the procedure.

(3) Applicant may apply to the Medical Assessor for a waiver consideration and the following reports shall be required,
(a) pulmonologist's,
(b) cardiothoracic surgeon; and
(c) other supporting investigation reports.

B. Spontaneous pneumothorax

(1) Initial applicant with a history of a single episode may be assessed as fit, provided that they submit the following:

(a) a period of 6 months has elapsed since full recovery after the episode and the applicant shall have had bilateral pleurodesis, the applicant may be declared medically fit 12 weeks after the surgery subject to the thoracic surgeon's report;
(b) a full respiratory examination and tests are normal;
(c) there shall be no bullae shown on the CXR, CT scan or any other image; and
(d) applicant presenting with any bullae present shall have been treated by surgery and a no-smoking status has been confirmed.

(2) Applicant presenting with second episode of the spontaneous pneumothorax, may be medically declared unfit.

(3) A fit assessment at renewal may only be considered by the Medical Assessor following submission of a satisfactory surgical treatment and full convalescence, usually three months.

(4) Applicant shall be restricted to OPL for one year from the original occurrence.

(5) Applicant may be declared as medically fit for certification provided that:

(a) a full re-expansion of the lung has taken place;
(b) a full respiratory evaluation is normal; and
(c) there shall be no bullae shown on the CXR, CT scan or any other image.

5.4.8 Acute lower respiratory disease

(1) Any acute active infectious disease of the respiratory system of any nature shall result in temporary unfitness until –

(a) the condition has fully resolved without sequelae;
(b) there is no further medication is required;
(c) the lung function tests are within normal range;
(d) the chest radiograph changes have resolved; and
(e) the treating physician's report is favourable.

5.4.9 Pulmonary embolism

(1) Applicant presenting with a confirmed diagnosis of Pulmonary embolism may be declared as medically fit if he or she demonstrates, upon recovery with the following:

(a) the lung function tests and diffusion test is normal;
(b) the blood gases are acceptable after 10 minutes of exercise;
(c) submission of favourable Pulmonary Angiogram/Pulmonary CT Angiogram/Pulmonary VQ Scan report;
(d) coagulation studies are acceptable;
(e) a satisfactory physician report; and
(f) applicant to be referred to the Medical Assessor for consideration on a case by case basis.

5.4.10 Post-Operative effects of Thoracic Surgery

(1) Applicant who has had thoracic surgery shall be declared as temporarily medically unfit for a period of 6 months.

(2) Unrestricted certification shall be considered where –

(a) there is full recovery from the underlying condition(s) and supporting reports are submitted;

(b) the surgery has no sequelae;

(c) a full respiratory examination and chest radiological imaging are acceptable and minimum lung function standards are met; and

(d) the specialists' reports (pulmonologist and cardiothoracic surgeon) are favourable.

5.5 Visual system

(1) An applicant may not have any condition or congenital abnormality of either eye or its attachments likely to impede the safe exercise of the privileges of the licence.

(2) An applicant's visual acuity and visual fields shall be examined.

5.5.1 Acuity

(1) An applicant's visual acuity with or without corrective lenses shall be 6/12 binocularly and 6/18 in each eye.

5.5.2 Amblyopia or monocularity

(1) An applicant with amblyopia or monocularity may be declared as medically fit, if the visual acuity in the unaffected eye with or without correction is 6/6 or better.

5.5.3 Visual field defects

(1) Applicant shall have a normal binocular visual field or a normal monocular visual field.

5.6 ENT system

(1) Applicant shall have no established medical history or clinical diagnosis of the following:

(a) any pathological process, acute or chronic, of the inner ear middle ear cavities or external ear canal;

(b) any unhealed (unclosed) perforation of the tympanic membranes, except that an applicant with a single dry perforation may be eligible for a certificate if the defect does not prevent compliance with the hearing standards;

(c) any chronic or serious recurrent obstruction of the Eustachian tubes;

(d) any serious or recurrent disturbance of the vestibular system;

(e) any obstruction to free nasal air entry on both sides;

(f) any serious malformation, or serious acute or chronic condition of the buccal cavity or upper respiratory tract; or

(g) any speech defect likely to interfere with the safe performance of duties in exercising the privileges of the licence;

(h) profound deafness may be considered medically fit if there is proven ability to communicate in the event of an emergency by speech or by using a device;

(i) applicant unable to communicate with assisted devices shall be considered medically unfit;

(j) the applicant shall be able to hear a whispered voice in a quiet room; and

(k) applicant to be referred to the Medical Assessor for consideration on a case-by-case basis.

5.6 Genitourinary System

(1) Applicants with renal or genitourinary disease shall be assessed as medically unfit, unless an adequate examination shows that their condition is unlikely to interfere with the safe exercise of their licence and rating privileges.

(2) Urine examination shall form part of the medical examination and abnormalities shall be adequately investigated.

(3) Applicant with sequelae of disease of, or surgical procedures on the kidneys or the genitourinary tract, in particular obstructions due to stricture or compression, shall be assessed as medically unfit unless the applicant's condition has been investigated and evaluated.

(4) Applicant who has undergone nephrectomy shall be declared as medically unfit unless the condition is well compensated.

(5) Applicant to be referred to the Medical Assessor for consideration on a case-by- case basis.

5.6.1 Nephrectomy

(1) Applicant who have undergone a nephrectomy shall be assessed as medically unfit for a minimum period of 3 months or until such time as they are free from any abnormality, disability and/or sequelae from the operation that is likely to interfere with the safe operation of an aircraft or with the safe performance of duties.

(2) Requirements for medical certification:

(a) upon recertification the condition shall be well compensated;

(b) the treating specialist's report detailing the underlying cause of the removal of the kidney; and

(c) any other examinations deemed necessary by treating specialist shall be submitted.

(d) Renal function testing includes the following:

(i) Urea and electrolytes (U&E, Uric Acid);

(ii) Glomerular filtration rate (GFR); and

(iii) 24-hour urine creatinine clearance;

(e) the remaining kidney's function and anatomy shall be normal.

5.6.2 Urinary calculi

A. Single renal stone (passed or removed)

(1) A medically fit assessment may be made with successful passage or removal of the stone.
(2) Urologist report.
(3) Follow-up: annual urine dipstix.
(4) Modifiable risk factors are controlled.

B. Recurrent renal stones (passed or removed)

(1) May be recertified if:

(a) an applicant is proven to be free of all stones in kidney or renal tract;
(b) the renal function is normal;
(c) modifiable risk factors are controlled; and
(d) Urologist report.

(2) Follow-up: annual urine dipstix and urate level.

C. Retained renal stones (asymptomatic)

(1) Assessment shall be done on a case-by-case basis.

(2) An applicant shall be declared medically unfit while suffering from any acute symptoms or complications.

(3) An applicant may be assessed as medically fit if:

(a) stones are located such that they are unlikely to pass into the calyx;

(b) urinary studies do not reveal any underlying risk factors for recurrent stone formation;
(c) annual urine dipstix and urate levels are normal;
(d) modifiable risk factors are controlled; and

(e) favourable Urologist report.

AMENDMENT OF TECHNICAL STANDARD 121.07.13

3. Technical Standard 121.07.13 is hereby amended by the substitution in section 6 for subsection (4) of the following subsection:

"121.07.13 OPERATIONAL CONTROL AND SUPERVISION OF FLIGHT OPERATIONS

6. Flight tracking

(1) The operator shall track the position of an aeroplane through automated reporting at least every 15 minutes for the portion(s) of the in-flight operation(s) that is planned in an oceanic area(s) under the following conditions:

(a) the aeroplane has an MCM of over 45 500 kg and a seating capacity greater than 19; and
(b) where an ATS unit obtains aeroplane position information at greater than 15 minute intervals.

(2) The operator shall establish procedures, approved by the Director, for the retention of aircraft tracking data to assist SAR in determining the last known position of the aircraft.

(3) All aeroplanes of an MCM of over 5700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2021, shall autonomously transmit information from which a position can be determined at least once every minute, when in distress.

(4) **[The operator shall make position information of a flight in distress available to the appropriate organizations, as established by the Director.]**

(a) Notwithstanding the provisions of subsection (1), the Director may, based on the results of an approved risk assessment process implemented by the operator, allow for variations to the automated reporting intervals.

(b) The risk assessment process shall demonstrate how risks to the operation resulting from the allowable variations can be managed and shall include at least the following:

(i) capability of the operator's operational control systems and processes, including those for contacting ATS units;

(ii) overall capability of the aeroplane and its systems;

(iii) available means to determine the position of, and communicate with, the aeroplane;

(iv) frequency and duration of gaps in automated reporting;

(v) human factors consequences resulting from changes to flight crew procedures; and

(vi) specific mitigation measures and contingency procedures.".

AMENDMENT OF TECHNICAL STANDARD 127.07.21

4. Technical Standard 121.07.21 is hereby amended by the substitution in section 6 for subsection (4) of the following subsection:

"127.07.21 OPERATIONAL CONTROL AND SUPERVISION OF FLIGHT OPERATIONS

6. Flight tracking

(1) The operator shall track the position of a helicopter through automated reporting at least every 15 minutes for the portion(s) of the in-flight operation(s) that is planned in an oceanic area(s) under the following conditions:

(a) the helicopter has a MCM exceeding 7 000 kg, and a seating capacity greater than 19; and

(b) where an ATS unit obtains helicopter position information at greater than 15 minute intervals.

(2) The operator shall establish procedures, approved by the Director, for the retention of helicopter tracking data to assist SAR in determining the last known position of the aircraft.

(3) All helicopters an MCM of over 3175 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2021, shall autonomously transmit information from which a position can be determined at least once every minute, when in distress.

(4) **[The operator shall make position information of a flight in distress available to the appropriate organizations, as established by the Director.]**

(a) Notwithstanding the provisions of subsection (1), the Director may, based on the results of an approved risk assessment process implemented by the operator, allow for variations to the automated reporting intervals.

(b) The risk assessment process shall demonstrate how risks to the operation resulting from the allowable variations can be managed and shall include at least the following:

(i) capability of the operator's operational control systems and processes, including those for contacting ATS units;

(ii) overall capability of the helicopter and its systems;

(iii) available means to determine the position of, and communicate with, the helicopter;

(iv) frequency and duration of gaps in automated reporting;

(v) human factors consequences resulting from changes to flight crew procedures; and

(vi) specific mitigation measures and contingency procedures.".

AMENDMENT OF TECHNICAL STANDARD 135.07.13

5. Technical Standard 135.07.13 is hereby amended by the substitution in section 6 for subsection (4) of the following subsection:

"135.07.13 OPERATIONAL CONTROL AND SUPERVISION OF FLIGHT OPERATIONS

6. Flight tracking

(1) The operator shall track the position of an aeroplane through automated reporting at least every 15 minutes for the portion(s) of the in-flight operation(s) that is planned in an oceanic area(s) under the following conditions:

(a) the aeroplane has an MCM of over 45 500 kg and a seating capacity greater than 19; and
(b) where an ATS unit obtains aeroplane position information at greater than 15 minute intervals.

(2) The operator shall establish procedures, approved by the Director, for the retention of aircraft tracking data to assist SAR in determining the last known position of the aircraft.

(3) All aeroplanes of an MCM of over 5700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2021, shall autonomously transmit information from which a position can be determined at least once every minute, when in distress.

(4) **[The operator shall make position information of a flight in distress available to the appropriate organizations, as established by the Director.]**

(a) Notwithstanding the provisions of subsection (1), the Director may, based on the results of an approved risk assessment process implemented by the operator, allow for variations to the automated reporting intervals.

(b) The risk assessment process shall demonstrate how risks to the operation resulting from the allowable variations can be managed and shall include at least the following:

(i) capability of the operator's operational control systems and processes, including those for contacting ATS units;

(ii) overall capability of the aeroplane and its systems;

(iii) available means to determine the position of, and communicate with, the aeroplane;

(iv) frequency and duration of gaps in automated reporting;

(v) human factors consequences resulting from changes to flight crew procedures; and

(vi) specific mitigation measures and contingency procedures.".

Amendment of Document SA-CATS 139

6. Document SA-CATS 139 is hereby amended by –

(a) the substitution for the Contents of the following Contents:

"SA-CATS 139
Aerodromes and Heliports

DEFINITIONS

139.01.23 SUPPLY OF FUEL TO AIRCRAFT

1. Requirements for aircraft fuelling
2. Refuelling procedure

139.01.30 OBSTACLE LIMITATIONS AND MARKINGS OUTSIDE AERODROME OR HELIPORT

1. Marking

139.01.31 LEAD-IN LIGHTS

1. Runway lead-in lighting

139.01.32 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM

1. Taxiway centre line lights
2. Rapid exit taxiway lights
3. Taxiway edge lights
4. Intermediate holding position lights
5. Runway guard lights
6. Stop bars lights

139.02.1 REQUIREMENTS FOR LICENCE

1. **[Conditions for issue and renewal]** Aerodrome licensing process

139.02.2 APPLICATION FOR LICENCE OR AMENDMENT THEREOF

1. List of government institutions

139.02.[2]10 AERODROME DESIGN REQUIREMENTS

1. **[Aerodrome design standards]** Physical requirements

139.02.[4]12 QUALITY ASSURANCE SYSTEM

1. Minimum standards for a quality assurance system

139.02.[6]14 ESTABLISHMENT OF AERODROME EMERGENCY MANAGEMENT SYSTEM

1. Requirements and contents of aerodrome emergency management system

139.02.[7]15 AERODROME RESCUE AND FIREFIGHTING

1. Classification matrix

139.02.[8]16 AERODROME RESCUE AND FIREFIGHTING TRAINING FACILITY

1. Training facilities for an aerodrome licence with a Category 6 and above
[2. Training facilities for aerodromes operating a category 3 where flying schools have been established and category 4 and 5]

139.02.[9]17 AERODROME RESCUE AND FIREFIGHTING PERSONNEL TRAINING STANDARDS

139.02.[10]18 AERODROME RESCUE AND FIREFIGHTING DEVIATIONS

1. Requirements and standards

139.02.19 ESTABLISHMENT OF AERODROME ENVIRONMENT MANAGEMENT PROGRAMME

1. Procedure for recording and reporting bird and wildlife strikes
2. Requirements for environment management programme
3. Measures to minimise collision between aircraft and wildlife
4. Risk posed by waste disposal dump sites

139.02. [12]21 NOTIFICATION OF AERODROME DATA AND INFORMATION

1. Determination and reporting of water on runways

139.02. [22]23 GENERAL DUTIES OF HOLDER OF LICENCE

1. Marking of obstructions
2. Markings
3. Markings of unserviceable areas on landing terrain
4. Aerodrome financial data and aerodrome traffic statistics
5. Facilitation plan
6. Monitoring aircraft noise
7. Meteorological equipment
8. Pavement

139.02. [23]24 WORKS ON AERODROME

1. Requirements and standards

139.02.25 MAINTENANCE OF AERODROME EMERGENCY MANAGEMENT SYSTEM

1. Procedure to address communicable diseases

139.02.26 AERODROME INSPECTION PROGRAMME

139.02.28 CONTROL OF ENTRY INTO RESTRICTED AREA

1. Restrictions of maintenance activities

139.02.29 DEMARCATION OF ROUTES ON APRON

1. Minimum clearance

139.02.31 ACCESS OF GROUND VEHICLES TO AERODROME MOVEMENT AREA

1. Signs, and signals or standards
2. Rules and procedures for the operation of ground vehicles
3. Rules

139.02.34 APPROVAL OF AIRSIDE DRIVING TRAINING

139.02.35 AIRSIDE VEHICLE DRIVING TRAINING STANDARDS

1. Training manual
2. Manoeuvring area vehicle driver and radiotelephony training
3. Radiotelephony training
4. Maintenance of competence for drivers in manoeuvring area.

139.03.1 REQUIREMENTS FOR LICENCE

1. Conditions for issue and renewal

139.03.2 HELIPORT DESIGN REQUIREMENTS

1. Heliport design standards
2. Heliport data
3. General heliport requirements
4. Elevated heliports
5. Hospital heliports

6. Heliport facilities on aerodromes
7. Obstacle limitation requirements
8. Visual aids
9. Lighting requirements

139.03.4 QUALITY ASSURANCE SYSTEM

1. Minimum standards for a quality assurance system

139.03.7 HELIPORT RESCUE AND FIRE FIGHTING

1. Level of protection to be provided

139.03.19 GENERAL DUTIES OF HOLDER OF LICENCE

1. Marking of obstructions
2. Markings
3. Marking of unserviceable areas on touch-down terrain
4. Heliport financial data and heliport traffic statistics
5. Facilitation plan
6. Monitoring of helicopter noise

139.03.20 WORKS ON HELIPORT

1. Requirements and standards

139.03.28 ACCESS OF GROUND VEHICLES TO HELIPORT MOVEMENT AREA

1. Signs, signals or standards
2. Rules and procedures for the operation of ground vehicles

139.03.29 HELIPORT ABANDONED OR NOT MAINTAINED

139.06.3 REGISTRATION, DE-REGISTRATION OR RE-REGISTRATION OF AERODROME

Appendix 1

MONITORING AIRCRAFT NOISE ON AND IN THE VICINITY OF AERODROMES";

(b) the insertion of the following definitions:

"Definitions

Any word or expression to which a meaning has been assigned in the Act and the Regulations, bears the same meaning unless the context indicates otherwise, and –

"aerodrome beacon" means aeronautical beacon used to indicate the location of an aerodrome from the air, and an aeronautical ground light visible at all azimuths, either continuously or intermittently, to designate a particular point on the surface of the earth;

"aerodrome elevation" means the elevation of the highest point of the landing area;

"aerodrome facilities and equipment" means facilities and equipment, inside or outside the boundaries of an aerodrome that are constructed or installed and maintained for the arrival, departure and surface movement of aircraft;

"aerodrome identification sign" means a sign placed on an aerodrome to aid in identifying the aerodrome from the air;

"aerodrome licence" means a licence issued by the Director under Part 139 for the operation of an aerodrome;

"aerodrome manual" means the manual that forms part of the application for an aerodrome licence in terms of Part 139, including any amendments thereto accepted or approved by the Director;

"aerodrome mapping data" means data collected for the purpose of compiling aerodrome mapping information for aeronautical uses;

Note - Aerodrome mapping data are collected for purposes that include the improvement of the user's situational awareness, surface navigation operations, training, charting and planning;

"aerodrome mapping database" means a collection of aerodrome mapping data organized and arranged as a structured data set;

"aerodrome operator" in relation to a licensed aerodrome, means the aerodrome licence operator;

"aerodrome reference point" means the designated geographical location of an aerodrome;

"aerodrome traffic density" when referred to as –

(a) Light - refers to where the number of movements in the mean busy hour is not greater than 15 per runway or typically less than 20 total aerodrome movements;
(b) Medium – refers to where the number of movements in the mean busy hour is of the order of 16 to 25 per runway or typically between 20 to 35 total aerodrome movements;
(c) Heavy – refers to where the number of movements in the mean busy hour is of the order of 26 or more per runway or typically more than 35 total aerodrome movements;

Note 1 - The number of movements in the mean busy hour is the arithmetic mean over the year of the number of movements in the daily busiest hour.

Note 2 - Either a take-off or a landing constitutes a movement.

"aeronautical ground light" means any light specially provided as an aid to air navigation, other than a light displayed on an aircraft;

"aeroplane reference field length" means the minimum field length required for take-off at maximum certificated take-off mass, sea level, standard atmospheric conditions, still air and zero runway slope, as shown in the appropriate aeroplane flight manual prescribed by the certificating authority or equivalent data from the aeroplane manufacturer. Field length means balanced field length for aeroplanes, if applicable, or take-off distance in other cases;

"aircraft classification number" means a number expressing the relative effect of an aircraft on a pavement for a specified standard subgrade category;

Note - The aircraft classification number is calculated with respect to the centre of gravity (CG) position which yields the critical loading on the critical gear. Normally the aftmost CG position appropriate to the maximum gross apron (ramp) mass is used to calculate the ACN. In exceptional cases the forward most CG position may result in the nose gear loading being more critical.

"apron management service" means a service provided to regulate the activities and the movement of aircraft and vehicles on an apron;

"aircraft stand" means a designated area on an apron intended to be used for parking an aircraft;

"barrette" means three or more aeronautical ground lights closely spaced in a transverse line so that from a distance they appear as a short bar of light;

"clearway" means a defined rectangular area on the ground or water under the control of the appropriate authority, selected or prepared as a suitable area over which an aeroplane may make a portion of its initial climb to a specified height;

"declared distances" means take-off run available (TORA) which is the length of runway declared available and suitable for the ground run of an aeroplane taking off such as:

(a) Take-off distance available (TODA) - The length of the take-off run available plus the length of the clearway, if provided.

(b) Accelerate-stop distance available (ASDA) - The length of the take-off run available plus the length of the stopway, if provided.

(c) Landing distance available (LDA) - The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

"dependent parallel approaches" means simultaneous approaches to parallel or near-parallel instrument runways where radar separation minima between aircraft on adjacent extended runway centre lines are prescribed;

"displaced threshold" means a threshold not located at the extremity of a runway;

"fixed light" means a light having constant luminous intensity when observed from a fixed point;

"frangible object" means an object of low mass designed to break, distort or yield on impact so as to present the minimum hazard to aircraft;

"hazard beacon" means an aeronautical beacon used to designate a danger to air navigation;

"holding bay" means a defined area where aircraft can be held, or bypassed, to facilitate efficient surface movement of aircraft;

"hot spot" means a location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots or drivers is necessary;

"human performance" means human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations;

"identification beacon" means an aeronautical beacon emitting a coded signal by means of which a particular point of reference can be identified;

"independent parallel approaches" means simultaneous approaches to parallel or near-parallel instrument runways where radar separation minima between aircraft on adjacent extended runway centre lines are not prescribed;

"independent parallel departures" means simultaneous departures from parallel or near-parallel instrument runways;

"instrument runway" means one of the following types of runways intended for the operation of aircraft using instrument approach procedures such as:

(a) non-precision approach runway - an instrument runway served by visual aids and a non-visual aid providing at least directional guidance adequate for a straight-in approach;

(b) precision approach runway, category I - an instrument runway served by ILS or MLS and visual aids intended for operations with a decision height not lower than 60m (200 ft.) and either a visibility not less than 800m or a runway visual range not less than 550m;

(c) precision approach runway, category II - an instrument runway served by ILS or MLS and visual aids intended for operations with a decision height lower than 60m (200 ft.) but not lower than 30m (100 ft.) and a runway visual range not less than 300m;

(d) precision approach runway, category III - an instrument runway served by ILS or MLS to and along the surface of the runway.

Notes-ISO Standard 19108, Geographic information - Temporal schema A - intended for operations with a decision height lower than 30m (100 ft.), or no decision height and a runway visual range not less than 175m.
B - intended for operations with a decision height lower than 15m (50 ft.), or no decision height and a runway visual range less than 175m but not less than 50m.
C - intended for operations with no decision height and no runway visual range limitations.

"intermediate holding position" means a designated position intended for traffic control at which taxiing aircraft and vehicles shall stop and hold until further cleared to proceed, when so instructed by the aerodrome control tower;

"laser-beam critical flight zone" means airspace in the proximity of an aerodrome but beyond the LFFZ where the irradiance is restricted to a level unlikely to cause glare effects;

"laser-beam free flight zone" means airspace in the immediate proximity of the aerodrome where the irradiance is restricted to a level unlikely to cause any visual disruption;

"laser-beam sensitive flight zone" means airspace outside, and not necessarily contiguous with, the LFFZ and LCFZ where the irradiance is restricted to a level unlikely to cause flash-blindness or after-image effects;

"licensed aerodrome" means an aerodrome whose operator has been granted an aerodrome licence;

"marker" means an object displayed above ground level in order to indicate an obstacle or delineate a boundary;

"marking" means a symbol or group of symbols displayed on the surface of the movement area in order to convey aeronautical information;

"non-instrument runway" means runway intended for the operation of aircraft using visual approach procedures;

"normal flight zone" means airspace not defined as LFFZ, LCFZ or LSFZ but which shall be protected from laser radiation capable of causing biological damage to the eye;

"obstacle" means all fixed (whether temporary or permanent) and mobile objects, or parts thereof, that –

(a) are located on an area intended for the surface movement of aircraft;
(b) extend above a defined surface intended to protect aircraft in flight; or
(c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.

"obstacle free zone" means the airspace above the inner approach surface, inner transitional surfaces, and balked landing surface and that portion of the strip bounded by these surfaces, which is not penetrated by any fixed obstacle other than a low-mass and frangibly mounted one required for air navigation purposes;

"obstacle limitation surfaces" means a series of surfaces that define the volume of airspace at and around an aerodrome to be kept free of obstacles in order to permit the intended aeroplane operations to be conducted safely and to prevent the aerodrome from becoming unusable by the growth of obstacles around the aerodrome;

"pavement classification number" means a number expressing the bearing strength of a pavement for unrestricted operations;

"primary runway(s)" means runway(s) used in preference to others whenever conditions permit;

"protected flight zones" means airspace specifically designated to mitigate the hazardous effects of laser radiation;

"runway end safety area" means an area symmetrical about the extended runway centre line and adjacent to the end of the strip primarily intended to reduce the risk of damage to an aeroplane undershooting or overrunning the runway;

"runway guard lights" means a light system intended to caution pilots or vehicle drivers that they are about to enter an active runway;

"runway strip" means a defined area including the runway and stopway, if provided, intended to:

(a) reduce the risk of damage to aircraft running off a runway; and
(b) protect aircraft flying over it during take-off or landing operations;

"runway turn pad" means a defined area on a land aerodrome adjacent to a runway for the purpose of completing a 180-degree turn on a runway;

"runway visual range" means the range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line;

"sagregated parallel operations" means simultaneous operations on parallel or near-parallel instrument runways in which one runway is used exclusively for approaches and the other runway is used exclusively for departures;

"shoulder" means an area adjacent to the edge of a pavement so prepared as to provide a transition between the pavement and the adjacent surface;

"sign" when used in relation to a –

(a) fixed message sign means a sign presenting only one message;
(b) variable message sign means a sign capable of presenting several predetermined messages or no message, as applicable;

"signal area" means an area on an aerodrome used for the display of ground signals;

"slush" means water-saturated snow which with a heel-and-toe slap-down motion against the ground shall be displaced with a splatter; specific gravity: 0.5 up to 0.8;

Note - Combinations of ice, snow or standing water may, especially when rain, rain and snow, or snow is falling, produce substances with specific gravities in excess of 0.8. These substances, due to their high water or ice content, shall have a transparent rather than a cloudy appearance and, at the higher specific gravities, shall be readily distinguishable from slush.

"stopway" means a defined rectangular area on the ground at the end of take-off run available prepared as a suitable area in which an aircraft can be stopped in the case of an abandoned take-off;

"switch-over time (light)" means the time required for the actual intensity of a light measured in a given direction to fall from 50% and recover to 50% during a power supply changeover, when the light is being operated at intensities of 25% or above;

"take-off runway" means a runway intended for take-off only;

"taxiway intersection" means a junction of two or more taxiways;

"taxiway strip" means an area including a taxiway intended to protect an aircraft operating on the taxiway and to reduce the risk of damage to an aircraft accidentally running off the taxiway;

"threshold" means the beginning of that portion of the runway usable for landing;

"touchdown zone" means the portion of a runway, beyond the threshold, where it is intended landing aeroplanes first contact the runway;

"unserviceable area" means part of the movement area that is unfit and unavailable for use by aircraft; and

"work area" means a part of an aerodrome in which maintenance or construction works are in progress"."

(c) the insertion of the following technical standard:

"139.01.23 SUPPLY OF FUEL TO AIRCRAFT

1. Requirements for aircraft fuelling

(1) Aircraft fuel and loading operators shall adhere to safety procedures during the fuelling of aircraft.

(2) All personnel working on aprons shall be made aware of safety precautions and report any breach to a safety official responsible for fuelling operations.

(3) The following requirements shall be adhered to:

(a) No smoking or naked lights, flames and electronic devices within (15m) of the fuelling zone.

(b) A clear exit path shall be maintained to and from the aircraft to allow the quick removal of fuelling equipment and persons in an emergency.

(c) Aircraft and supply sources shall be correctly bonded and the correct earthing procedures employed.

(d) Fire extinguishers of a suitable type shall be readily available.

(e) Fuel spillage shall be immediately brought to the attention of the fuelling operator.

2. Refuelling procedure

(1) The refuelling procedure shall form part of the training for refuelling operators.

(2) When aircraft refuelling operations take place while passengers are embarking, on board, or disembarking, ground equipment shall be positioned so as to allow –

(a) the use of a sufficient number of exits for expeditious evacuation; and

(b) a ready escape route from each of the exits to be used in an emergency.

(3) Fire extinguishing equipment suitable for at least initial intervention in the event of a fuel fire and personnel trained in its use shall be readily available during the ground servicing of an aircraft, and there shall be a means of quickly summoning the rescue and firefighting service in the event of a fire or major fuel spill.";

(d) the substitution for technical standard 139.02.1 of the following technical standard:

"139.02.1 REQUIREMENTS FOR AERODROME LICENCE

[1. Conditions for issue and renewal

The documents, contemplated in regulation 139.02.1 as condition for the issuing and renewal of an aerodrome licence, are the standards contained in the relevant ICAO Annexes and Documents, and the recommended practice contained in these documents incorporated by the Director as a standard, are the following:]

1. Aerodrome licensing process

The aerodrome licensing (certification) process comprises of the following phases:

1.1 Phase 1 - Dealing with expressions of interest

(1) This phase shall include a flight operations assessment by the Director or the relevant authorities as well as National Airspace Committee referred to in regulation 11.05.1 to ensure that the operation of an aerodrome at the location specified in the application shall not endanger the safety of aircraft operations. If the result of this assessment is negative, then there is no need to proceed any further, and the applicant shall be advised accordingly.

(2) The flight operations assessment shall take into consideration the proximity of the aerodrome to other aerodromes and landing sites, including military aerodromes obstacles and terrain', any excessive operational restriction requirements, any existing restrictions and controlled airspace and any existing instrument procedures.

(3) Part 139 of regulations require that an application for an aerodrome certificate be accompanied by an environmental impact assessment report. The processing of the expression of interest shall therefore include referrals from the Local Authorities for necessary clearance.

(4) Where the results of the flight operations assessment are positive, the Director shall advise the applicant in writing to complete and submit a formal application for an aerodrome licence in accordance with the requirements of Subpart 2 of Part 139 of the regulations.

1.2 Phase 2 – Assessing the formal application and aerodrome manual

(1) The applicant shall satisfy the Director that the aerodrome operator has the necessary competence and experience to comply with the relevant regulatory provisions, orders and directives.

1.3 Phase 3 - Assessing the aerodrome facilities and equipment

(1) An on-site inspection shall be undertaken by an authorised person or inspector for the purpose of assessing the aerodrome facilities, services and equipment to verify and ensure that they comply with the specified standards and requirements.

1.4 Phase 4 – Issuing or refusing an aerodrome licence

(1) The Director shall notify the applicant of the decision to issue or refuse the application license.

(a) The Director may impose operational restrictions, in the interest of safety, on an aerodrome licence being issued –

(i) the refusal may be based on one or more of the following determinations, the inspection of aerodrome facilities and equipment revealed that they do not make satisfactory provision for the safety of aircraft operations;

(ii) the assessment of the aerodrome operating procedures reveals that they do not make satisfactory provision for the safety of aircraft operations;

(iii) the assessment of the aerodrome manual reveals that it does not contain the particulars set out in Subpart 2 of Part 139 of the regulations; and

(iv) the assessment of the above facts and other factors reveals that the applicant shall not be able to adequately operate and maintain the aerodrome as required by the regulations.

1.5 Phase 5 – Promulgating the licensed (certified) status of an aerodrome and the required details in the AIP

(1) Upon issuing of an aerodrome licence, an aerodrome operator shall provide particulars of the aerodrome as stated in the aerodrome manual to the aeronautical information service for publication in the AIP.

1. Physical characteristics

1.1 Runways

(1) Aerodrome reference code

(a) An aerodrome reference code — code number and letter — which is selected for aerodrome planning purposes; shall be determined in accordance with the characteristics of the aeroplane for which an aerodrome facility is intended.

(b) The code number for element 1 shall be determined from Table 1, column 1, selecting the code number corresponding to the highest value of the aeroplane reference field lengths of the aeroplanes for which the runway is intended

Code element 1 Code element 2

Table 1: Aerodrome reference code

Code Number	Aeroplane reference field length	Code letter	Wing span	Outer main gear wheel span
1	Less than 800 m	A	Up to but not including 15 m	Up to but not including 4,5 m
2	800 m up to but not including 1200 m	B	15 m up to but not including 24 m	4,5 m up to but not including 6 m
3	1200 m up to but not including 1800 m	C	24 m up to but not including 36 m	6 m up to but not including 9 m
4	1800 m and over	D	36 m up to but not including 52 m	9 m up to but not including 14 m
		E	52 m up to but not including 65 m	9 m up to but not including 14 m
		F	65 m up to but not including 80 m	14 m up to but not including 16 m

(2) Runway width

(a) The width of a runway shall be not less than the appropriate dimension specified in table2.

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

Table 2: Runway widths

Code Number	Code Letter					
	A	B	C	D	E	F
1	18m	18m	23m	-	-	-
2	23m	23m	30m	-	-	-
3	30m	30m	30m	45m	-	-
4	-	-	45m	45m	45m	60m

(3) Runway length

(a) Except where a runway is associated with a stopway or clearway, the actual runway length to be provided for a primary runway shall be adequate to meet the operational requirements of the aircraft for which the runway is intended to serve.

(b) The surface of runways shall –

(i) be constructed without irregularities that shall impair the runway surface friction characteristics or otherwise adversely affect the take-off or landing of an aircraft;

(ii) be so constructed or resurfaced as to provide friction characteristics at or above the minimum friction level specified by the Director.

Table 3: Friction levels for new and existing runway surfaces

Test equipment	Test tire type	Test tire pressure (KPa)	Test Speed (km/h)	Test water depth (mm)	Design objective new surface	Maintenance planning level	Minimum friction level
Mu-meter trailer	A A	70 70	65 95	1.0 1.0	0,72 0,66	0,52 0,38	0,42 0,26
Skiddometer Trailer	B B	210 210	65 95	1.0 1.0	0,82 0,74	0,60 0,47	0,50 0,34
Surface Friction Tester Vehicle	B B	210 210	65 95	1.0 1.0	0,82 0,74	0,60 0,47	0,50 0,34
Runway Friction Tester Vehicle	B B	210 210	65 95	1.0 1.0	0,82 0,74	0,60 0,54	0,50 0,41
TATRA Friction Tester Vehicle	B B	210 210	65 95	1.0 1.0	0,76 0,67	0,57 0,52	0,48 0,42
Grip Tester Trailer	C C	140 140	65 95	1.0 1.0	0,74 0,64	0,53 0,36	0,43 0,24

(4) Runway slopes

(a) Longitudinal slopes:

The overall longitudinal slope, calculated by dividing the difference in elevation between the runway ends by the length of the runway, shall not exceed 1% (1:100) for runways where the code number is 3 or 4 and 2% (1:50) for runways where the code number is 1 or 2.

(b) Local longitudinal slopes on runways shall not exceed –

(i) 1.25% (1:80) where the code number is 4;
(ii) 1.5% (1:66) where the code number is 3;
(iii) 2.0% (1:50) where the code number is 1 or 2.

(c) The first and last quarters of precision approach runways Category II or III, the longitudinal slope shall not exceed 0.8% (1:125).

(d) Longitudinal slope changes along a runway have an effect on the operation of aircraft which is in direct ratio to the slope change and inverse ratio to the length of transition between successive slopes. Slope changes shall be minimised on new construction and wherever possible on existing runways during the course of major runway maintenance.

(e) Where a slope cannot be avoided, the change between two consecutive slopes shall not exceed –

(i) 1.5% where the code number is 3 or 4;
(ii) 2.0% where the code number is 1 or 2.

(f) The transition from one slope to another shall be accomplished by a curved surface with a rate of change not exceeding –

(i) 0.1% per 30m (minimum radius of curvature of 30 000m) where the code number is 4;
(ii) 0.2% per 30m (minimum radius of curvature of 15 000m) where the code number is 3;
(iii) 0.4% per 30m (minimum radius of curvature of 7500m) where the code number is 1 or 2.

(g) Rapid drainage of water from a paved runway is assisted by a cambered surface. The surface of a new runway shall be cambered. However, a single cross-fall from high to low in the direction of the wind flow most frequently associated with rain may ensure a more rapid drainage of water.

(h) The transverse slope on either side of the crown shall be symmetrical and shall be 1,5% (1:66) where the code letter is C, D, E or F; and 2% (1:50) where the code letter is A or B; but shall not exceed 1,5% or 2% as applicable, nor be less than 1% except at runway or taxiway intersections where flatter slopes may be necessary.

(i) A 1.5% slope shall be provided on a straight cross-fall.

(5) Runway shoulders

(a) Runway shoulders shall be provided for a runway where –

(i) the code letter is D or E, and the runway width is less than 60 m; or

(ii) the code letter is F.

(b) The runway shoulders shall extend symmetrically on each side of the runway so that the overall width of the runway and its shoulders is not less than –

(i) 60m where the code letter is D or E; and
(ii) 75m where the code letter is F.

(c) The surface of the shoulder that abuts the runway shall be flush with the surface of the runway and its transverse slope shall not exceed 2.5%.

(d) A runway shoulder shall be prepared or constructed so as to be capable of supporting ground vehicles which may operate on the shoulder and, in the event of an aircraft running off the runway, of supporting the aircraft without inducing structural damage to the aircraft.

(6) Runway turn pads

(a) Where the end of a runway is not served by a taxiway or a taxiway turnaround and where the code letter is D, E or F, a runway turn pad shall be provided to facilitate a 180-degree turn of aircraft.

(b) The design of a runway turn pad shall be such that when the cockpit of the aircraft for which the turn pad is intended remains over the turn pad marking, the clearance distance between any wheel of the aircraft landing gear and the edge of the turn pad shall be not less than 4.5m.

(c) The surface of a runway turn pad shall not have surface irregularities that may cause damage to an aircraft using the turn pad.

(7) Runway strips

(a) A strip shall extend before the threshold and beyond the end of the paved runway or stopway for a distance of at least –

(i) 60m where the aerodrome reference code is 2, 3 or 4;
(ii) 60m where the aerodrome reference code 1 instrument.
(iii) 30m where the aerodrome reference code 1 non-instrument.

(b) A strip including a precision approach runway shall, wherever practicable, extend laterally to a distance of at least –

(i) 150m where the code number is 3 or 4-; and
(ii) 75m where the code number is 1 or 2-,

on each side of the centre line of the runway and its extended centre line throughout the length of the strip.

(c) A strip including a non-precision approach runway shall extend laterally to a distance of at least –

(i) 150m where the code number is 3 or 4-; and
(ii) 75m where the code number is 1 or 2-,

on each side of the centre line of the runway and its extended centre line throughout the length of the strip.

(d) A strip including a non-instrument runway shall extend on each side of the centre line of the runway and its extended centre line throughout the length of the strip, to a distance of at least –

(i) 75m where the code number is 3 or 4;
(ii) 40m where the code number is 2; and
(iii) 30m where the code number is 1.

(e) No fixed object, other than visual aids required for air navigation purposes and satisfying the relevant frangibility requirements shall be permitted on a runway strip –

(i) within 77.5m of the runway centre line of a precision approach runway category I, II or III where the code number is 4 and the code letter is F; or
(ii) within 60m of the runway centre line of a precision approach runway category I, II or III where the code number is 3 or 4; or
(iii) within 45m of the runway centre line of a precision approach runway category I where the code number is 1 or 2.

(f) No mobile object shall be permitted on those parts of the runway strip as prescribed in paragraph (a) during use of the runway for landing or take-off.

(g) The surface of that portion of a strip that abuts a runway, shoulder or stopway shall be flush with the surface of the runway, shoulder or stopway.

(8) Runway end safety area (RESA)

(a) A RESA shall extend to a distance of at least 90 metres from the end of the runway strip.

(b) If required by the Director, RESA may extend –
  (i) to a distance of at least 240 metres from the end of the runway strip; or
  (ii) to the greatest distance that is practicable between the 90 metres required in paragraph(a) and the 240 metres required sup-paragraph (i).

(c) The width of a RESA shall –
  (i) be at least twice the width of the associated runway and be positioned symmetrically on either side of the extended centre line of the runway; and
  (ii) where practicable, be equal to the width of the graded portion of the associated runway strip.

(d) A RESA shall be constructed to –
  (i) provide a cleared and graded area to reduce the risk of damage to an aircraft that undershoots or overruns the runway; and
  (ii) be clear of any object which might endanger an aircraft that undershoots or overruns the runway.

(e) A RESA shall not penetrate the approach or take-off climb surface for the runway.

(f) If a RESA has a longitudinal slope –
  (i) any downward shall not exceed 5%;
  (ii) slope changes shall be as gradual as practicable; and
  (iii) abrupt changes or sudden reversals of slopes shall be avoided.

(g) If a RESA has a transverse slope –
  (i) any upward or downward slope shall not exceed 5%; and
  (ii) slope changes shall be as gradual as practicable.

(h) A RESA shall be provided for –
  (i) Code 3 and 4 runways; and
  (ii) Code 1 and 2 instrument runways.

(9) Clearways

(a) Where applicable, the clearway shall –
  (i) be at the end of the take-off run available;
  (ii) not have a length exceeding half the length of the take-off run available;
  (iii) extend laterally to a distance of at least 75m on each side of the extended centre line of the runway.
  (iv) not project above a plane having an upward slope of 1.25 %, the lower limit of this plane being a horizontal line which is perpendicular to the vertical plane containing the runway centre line; and
  (v) passes through a point located on the runway centre line at the end of the take-off run available.

(b) An object situated on a clearway which may endanger aircraft in the air shall be regarded as an obstacle and shall be removed.

(10) Stopways

(a) A stopway shall have the same width as the runway with which it is associated.

(b) Slopes and changes in slope on a stopway shall comply with the longitudinal slopes of the associated runway.

(c) A stopway shall be prepared or constructed so as to be capable, in the event of an abandoned take-off, of supporting the aircraft which the stopway is intended to serve without inducing structural damage to the aircraft.

(d) The surface of a paved stopway shall be so constructed or resurfaced as to provide surface friction characteristics at or above those of the associated runway.

(11) Radio Altimeter operating area

(a) A radio altimeter operating area shall be established in the pre-threshold area of a precision approach runway.

(b) A radio altimeter operating area shall extend before the threshold for a distance of at least 300m.

(c) A radio altimeter operating area shall extend laterally, on each side of the extended centre line of the runway, to a distance of 60m, except that, when special circumstances so warrant, the distance may be reduced to no less than 30m if an aeronautical study indicates that such reduction shall not affect the safety of operations of aircraft.

(d) On a radio altimeter operating area, slope changes shall be avoided or kept to a minimum.

(e) Where slope changes cannot be avoided, the slope changes shall be as gradual as practicable and abrupt changes or sudden reversals of slopes avoided. The rate of change between two consecutive slopes shall not exceed 2% per 30m.

(12) Taxiways

(a) The design of a taxiway shall be such that, when the cockpit of the aircraft for which the taxiway is intended remains over the taxiway centre line markings, the clearance distance between the outer main wheel of the aircraft and the edge of the taxiway shall be not less than that given by Table 4.

Table 4: Clearance distance between outer main wheel of an aeroplane and the edge of the taxiway

Code letter	Clearance
A	1.5m
B	2.25m
C	3m on straight portions
	3 m on curved portions if the taxiway is intended to be used by aircraft with a wheel base less than 18 m
	4.5 m on curved portions if the taxiway is intended to be used by aircraft with a wheel base equal to or greater than 18 m
D	4.5m
E	4.5m
F	4.5m

Table 5: Taxiway widths

(b) A straight portion of a taxiway shall have a width of not less than that given by the following tabulation-

Code letter	Taxiway width
A	7.5m
B	10.5m
C	15m
D	18m if the taxiway is intended to be used by aircraft with an outer main gear wheel span of less than 9m
	23m if the taxiway is intended to be used by aircraft with an outer main gear wheel span equal to or greater than 9m
E	23m
F	25m

(c) The separation distance between the centre line of a taxiway and the centre line of a runway, the centre line of a parallel taxiway or an object shall not be less than the appropriate dimension specified in Table 6 Taxiway minimum separation distances.

Table 6: Taxiway minimum separation

Code letter	Distance between taxiway centre line and runway centre line (metres)								Taxiway centre line to taxiway centre line (metres)	Taxiway, other than aircraft stand taxilane, centre line to object (metres)	Aircraft stand taxilane centre line to aircraft stand taxilane centre line (metres)	Aircraft stand taxilane centre line to object (metres)
	Instrument runways Code number				Non-instrument runways Code number							
	1	2	3	4	1	2	3	4				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
A	82.5	82.5	–	–	37.5	47.5	–	–	23	15.5	19.5	12
B	87	87	–	–	42	52	–	–	32	20	28.5	16.5
C	–	–	168	–	–	–	93	–	44	26	40.5	22.5
D	–	–	176	176	–	–	101	101	63	37	59.5	33.5
E	–	–	–	182.5	–	–	–	107.5	76	43.5	72.5	40
F	–	–	–	190	–	–	–	115	91	51	87.5	47.5

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

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

(d) The strength of a taxiway shall be at least equal to that of the runway it serves, due consideration being given to the fact that a taxiway shall be subjected to a greater density of traffic and, as a result of slow moving and stationary aircraft, to higher stresses than the runway it serves.

(13) Taxiway slopes

(a) The longitudinal slopes of taxiways shall be kept to a minimum to avoid tracking or handling problems. The longitudinal slopes shall not exceed –

(i) 1,5% (1:66) where the code letter is C, D, E or F; and

(ii) 3,0% (1:33) where the code letter is A or B.

(b) Where longitudinal slope changes on a taxiway cannot be avoided, the transition from one slope to another shall be accomplished by a curved surface with a rate of change not exceeding:

(i) 1% per 30m (minimum radius of curvature of 3000m) where the code letter is C, D, E or F; and

(ii) 1% per 25m (minimum radius of curvature of 2500m) where the code letter is A or B.

(c) The transverse slope of a taxiway shall be sufficient to prevent the accumulation of water, but shall not exceed:

(i) 1,5% (1:66) where the code letter is C, D, E or F;

(ii) 2,0% (1:50) where the code letter is A or B

(14) Taxiway Shoulders

(a) Straight portions of a taxiway where the code letter is C, D, E or F shall be provided with shoulders which extend symmetrically on each side of the taxiway so that the overall width of the taxiway and its shoulders on straight portions is not less than:

(i) 60m where the code letter is F;

(ii) 44m where the code letter is E;

(iii) 38m where the code letter is D; and

(iv) 25m where the code letter is C.

(b) On taxiway curves and on junctions or intersections where increased pavement is provided, the shoulder width shall be not less than that on the adjacent straight portions of the taxiway.

(15) Taxiway Strips

(a) A taxiway, other than an aircraft stand taxilane, shall be included in a strip.

(b) A taxiway strip shall extend symmetrically on each side of the centre line of the taxiway throughout the length of the taxiway to at least the distance from the centre line given in Table 6, column 11.

(c) The taxiway strip shall provide an area clear of objects which may endanger taxiing aircraft.

(d) The centre portion of a taxiway strip shall provide a graded area to a distance from the centre line of the taxiway of at least:

(i) 11m where the code letter is A;

(ii) 12.5m where the code letter is B or C;

(iii) 19m where the code letter is D;

(iv) 22m where the code letter is E; and

(v) 30m where the code letter is F.

(e) The surface of the strip shall be flush at the edge of the taxiway or shoulder, if provided, and the graded portion shall not have an upward transverse slope exceeding:

(i) 2.5% for strips where the code letter is C, D, E or F; and

(ii) 3% for strips of taxiways where the code letter is A or B.

(f) The downward transverse slope shall not exceed 5% measured with reference to the horizontal.

(16) Holding bays, runway-holding positions, intermediate holding positions and road-holding positions

(a) A runway-holding position shall be established
  (i) on the taxiway, at the intersection of a taxiway and a runway; and
  (ii) at an intersection of a runway with another runway when the former runway is part of a standard taxi-route.

(b) A runway-holding position shall be established on a taxiway if the location or alignment of the taxiway is such that a taxiing aircraft or vehicle can infringe an obstacle limitation surface or interfere with the operation of radio navigation aids.

(c) A road-holding position shall be established at an intersection of a road with a runway.

(d) A runway-holding position shall be established:
  (i) on the taxiway, at the intersection of a taxiway and a runway; and
  (ii) at an intersection of a runway with another runway when the former runway is part of a standard taxi-route.

(e) A runway-holding position shall be established on a taxiway if the location or alignment of the taxiway is such that a taxiing aircraft or vehicle can infringe an obstacle limitation surface or interfere with the operation of radio navigation aids.

(f) A road-holding position shall be established at an intersection of a road with a runway.

(g) The distance between a holding bay, runway-holding position established at a taxiway/runway intersection or road-holding position and the centre line of a runway shall be in accordance with table 7 and, in the case of a precision approach runway, such that a holding aircraft or vehicle shall not interfere with the operation of radio navigation aids.

(h) For a precision instrument approach runway, code numbers 3 and 4, the distance of 90m shall be increased to 107.5m where the code letter is F.

Table 7: Distance between runway centreline and road-holding position or holding bay and runway holding position at a taxiway/runway intersection

Type of Runway	Code Number			
	1	2	3	4
Non-instrument and Take-off	30m	40m	75m	75m
Non-precision approach	40m	40m	75m	75m
Precision approach category 1	60m	60m	90m	90m
Precision approach categories II and III	-	-	90m	90m

(i) The location of a runway-holding position established in accordance with paragraph (e) shall be such that a holding aircraft or vehicle shall not infringe the obstacle free zone, approach surface, take-off climb surface or ILS/MLS critical/ sensitive area or interfere with the operation of radio navigation aids.

(17) Aprons

(a) An apron shall be provided to permit the on- and off-loading of passengers, cargo or mail as well as the servicing of aircraft without interfering with the aerodrome traffic.

(b) Each part of an apron shall be capable of withstanding the traffic of an aircraft it is intended to serve, due consideration being given to the fact that some portions of the apron shall be subjected to a higher density of traffic and, as a result of slow moving or stationary aircraft.

(c) Slopes on an apron, including those on an aircraft stand taxilane, shall be sufficient to prevent accumulation of water on the surface of the apron but shall be kept as level as drainage requirements permit. The maximum slope allowable is 1%.

(d) An aircraft stand shall provide the following minimum clearances between an aircraft entering or exiting the stand and any adjacent building, aircraft on another stand and other objects:

Table 8: aircraft stand minimum clearance distances

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

(18) Isolated aircraft parking position

An isolated aircraft parking position shall be designated or the aerodrome control tower shall be advised of an area or areas suitable for the parking of an aircraft which is known or believed to be the subject of unlawful interference, or which for other reasons needs isolation from normal aerodrome activities.

(19) Obstacle limitation surfaces

(a) The following obstacle limitation surfaces shall be established for a runway
   (i) conical surface; and
   (ii) inner horizontal surface;
   (iii) approach surface; and
   (iv) transitional surfaces

(b) The following additional obstacle limitation surfaces shall be established for a precision approach runway category II or III:
   (i) inner approach surface;
   (ii) inner transitional surfaces; and
   (iii) balked landing surface.

(c) For a non-instrument runway, new objects or extensions of existing objects shall not be permitted above an approach or transitional surface except when the new object or extension shall be shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety or significantly affect the regularity of operations of aircraft.

(d) For a non-precision approach runway, new objects or extensions of existing objects shall not be permitted above an approach surface within 3000m of the inner edge or above a transitional surface except when the new object or extension shall be shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety or significantly affect the regularity of operations of aircraft.

(e) For a precision approach runway fixed objects shall not be permitted above the inner approach surface, the inner transitional surface or the balked landing surface, except for frangible objects which because of their function shall be located on the strip. Mobile objects shall not be permitted above these surfaces during the use of the runway for landing.

(f) For a precision approach runway, new objects or extensions of existing objects shall not be permitted above an approach surface or a transitional surface except when the new object or extension shall be shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety or significantly affect the regularity of operations of aircraft.

(g) A take-off climb surface shall be established for a runway meant for take-off.

(h) New objects or extensions of existing objects shall not be permitted above a take-off climb surface except when the new object or extension shall be shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety or significantly affect the regularity of operations of aircraft.

(20) Visual aids for navigation

Wind direction indicator

(a) An aerodrome shall be equipped with at least one wind direction indicator.

(b) A wind direction indicator shall be located so as to be visible from aircraft in flight or on the movement area and in such a way as to be free from the effects of air disturbances caused by nearby objects.

(c) The wind direction indicator shall –
- (i) be in the form of a truncated cone made of fabric and shall have a length of not less than 3.6m and a diameter, at the larger end, of not less than 0.9m ; and
- (ii) be constructed so that it gives a clear indication of the direction of the surface wind and a general indication of the wind speed.

(d) The colour or colours shall be selected to make the wind direction indicator clearly visible and understandable from a height of at least 300m, having regard to background.

(e) Where practicable, a single colour, preferably white or orange, shall be used.

(f) The location of at least one wind direction indicator shall be marked by a circular band 15 m in diameter and 1.2m wide and the band shall be centred about the wind direction indicator support and shall be in a colour chosen to give adequate conspicuity, preferably white.

(g) Provision shall be made for illuminating at least one wind indicator at an aerodrome intended for use at night.

(21) Signalling devices

Where applicable:

(a) A signalling lamp shall be provided at a controlled aerodrome in the aerodrome control tower.

(b) A signalling lamp shall be capable of producing red, green and white signals, and of -
- (i) being aimed manually at any target as required;
- (ii) giving a signal in any one colour followed by a signal in either of the two other colours; and
- (iii) transmitting a message in any one of the three colours by Morse Code up to a speed of at least four words per minute.

(22) Signalling panel and signalling area

(a) The signal area shall be located so as to be visible for all angles of azimuth above an angle of 10° above the horizontal when viewed from a height of 300m.

(b) The signal area shall be an even horizontal surface at least 9m square.

(c) The colour of the signal area shall be chosen to contrast with the colours of the signal panels used, and it shall be surrounded by a white border not less than 0.3m wide.

(23) Markings

Colour

(a) Runway markings shall be white.

(b) Taxiway markings, runway turn pad markings and aircraft stand markings shall be yellow.

(c) Apron safety lines shall be of a conspicuous colour which shall contrast with that used for aircraft stand markings.

(24) Runway markings

(a) A runway designation marking, centre line marking and threshold marking shall be provided on all paved runways.

Table 9: threshold stripes

Runway Width	Number of stripes
18m	4
23m	6
30m	8
45m	12
60m	16

(b) At an intersection of 2 or more runways the markings of the primary runway, except for the runway side stripe marking, shall be displayed and the markings of the other runway(s) shall be interrupted. The runway side stripe marking of the primary runway may be either continued across the intersection or interrupted.

(c) At an intersection of a runway and taxiway the markings of the runway shall be displayed and the markings of the taxiway interrupted, except that runway side stripe markings may be interrupted.

(d) Where a runway threshold is displaced from the extremity of a paved runway or where the extremity of a paved runway is not square with the runway centre line, a transverse stripe shall be added to the threshold marking. The transverse stripe shall be 1.8m wide and shall be located 6m from the threshold markings.

(e) Where a paved runway threshold is permanently displaced, arrows shall be provided on the portion of the runway before the displaced threshold.

(f) An aiming point marking shall be provided at each approach end of a paved instrument runway where the aerodrome reference code number is 2, 3 or 4. The location and dimension of the aiming point markings shall be in accordance with Table 10."

(g) A touchdown zone marking shall be provided in the touchdown zone of a paved precision approach runway where the aerodrome reference code number is 2, 3 or 4.

Table 10: Location and dimensions of aiming point marking

Location and dimensions	**Landing distance available**			
	Less than 800m	800m up to but not including 1 200m	1 200m up to but not including 2 400m	2 400m and above
(1)	(2)	(3)	(4)	(5)
Distance from threshold to beginning of marking	150m	250m	300m	400m
Length of stripe[a]	30–45m	30–45m	45–60m	45–60m
Width of stripe	4m	6m	6–10m[b]	6–10m[b]
Lateral spacing between inner sides of stripes	6m[c]	9m[c]	18–22.5m	18–22.5m
a) The greater dimensions of the specified ranges are intended to be used where increased conspicuity is required.				
b) The lateral spacing may be varied within these limits to minimize the contamination of the marking by rubber deposits.				
c) These figures were deduced by reference to the outer main gear wheel span which is element 2 of the aerodrome reference code.				

(h) A touchdown zone marking shall consist of pairs of rectangular markings symmetrically disposed about the runway centre line with the number of such pairs related to the landing distance available and, where the marking is to be displayed at both the approach directions of a runway, the distance between the thresholds, as given in Table 11.

Table 11: Touchdown zone markings

Landing distance available or the distance between thresholds	Pairs of markings
less than 900m	1
900m up to but not including 1 200m	2
1 200m up to but not including 1 500m	3
1 500m up to but not including 2 400m	4
2400m or more	6

(i) A runway side stripe marking shall be provided between the thresholds of a paved runway where there is a lack of contrast between the runway edges and the shoulders or the surrounding terrain.

(j) 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.

(k) On a paved runway or taxiway a runway-holding position marking shall be displayed along a runway-holding position.

(25) Taxiway centre line marking

(a) 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.

(b) Taxiway centre line marking shall be provided on a paved runway when the runway is part of a standard taxi-route where:
   (i) there is no runway centre line marking; or
   (ii) the taxiway centre line is not coincident with the runway centre line.

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

(d) 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.

(e) 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 0.9 m prior to and after the intersected runway-holding position marking.

(f) 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.

(26) VOR aerodrome check-point marking

When a VOR aerodrome check-point is established, it shall be indicated by a VOR aerodrome check-point marking.

(27) Road-holding position marking

A road-holding position marking shall be provided at all paved road entrances to a runway.

(28) Mandatory instruction marking

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

(29) Information marking

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.

(30) Lights

(a) Elevated approach lights

(i) Elevated approach lights and their supporting structures shall be frangible except that, in that portion of the approach lighting system beyond 300m from the threshold:

(aa) where the height of a supporting structure exceeds 12m, the frangibility requirement shall apply to the top 12m only; and

(bb) where a supporting structure is surrounded by non-frangible objects, only that part of the structure that extends above the surrounding objects shall be frangible.

(b) When an approach light fixture or supporting structure is not in itself sufficiently conspicuous, it shall be suitably marked.

(31) Elevated lights

Elevated runway and taxiway lights shall be frangible and their height shall be sufficiently low to preserve clearance for propellers and for the engine pods of jet aircraft.

(32) Surface lights

Light fixtures inset in the surface of runways, taxiways, and aprons shall be so designed and fitted as to withstand being run over by the wheels of an aircraft without damage either to the aircraft or to the lights themselves.

(33) Light intensity and control

(a) The intensity of runway lighting shall be adequate for the minimum conditions of visibility and ambient light in which use of the runway is intended, and compatible with that of the nearest section of the approach lighting system when provided.

(b) A suitable intensity control shall be incorporated to allow for adjustment of the light intensity to meet the prevailing conditions.

(c) Separate intensity controls other suitable methods shall be provided to ensure that the following systems, when installed, can be operated at compatible intensities –

(i) approach lighting system
(ii) runway edge lights;
(iii) runway threshold lights;
(iv) runway end lights;
(v) runway centre line lights;
(vi) runway touchdown zone lights; and
(vii) taxiway centre line lights.

(34) Aerodrome beacon

(a) An aerodrome beacon shall be provided at an aerodrome intended for use at night if one or more of the following conditions exist –

(i) aircraft navigate predominantly by visual means;
(ii) reduced visibilities are frequent;
(iii) it is difficult to locate the aerodrome from the air due to surrounding lights or terrain; and
(iv) where aerodromes are in close proximity, to avoid confusion, coordination needs to be effected to distinguish between the various aerodromes

(35) Approach lighting systems

(a) Where physically practicable, a simple approach lighting system shall be provided to serve a non-precision approach runway, except when the runway is used only in conditions of good visibility or sufficient guidance is provided by other visual aids.

(b) Where physically practicable, a precision approach category I lighting system shall be provided to serve a precision approach runway category I.

(c) A precision approach category II and III lighting system shall be provided to serve a precision approach runway category II or III.

(36) Visual approach slope indicator systems

(a) A visual approach slope indicator system shall be provided to serve the approach to a runway whether or not the runway is served by other visual approach aids or by non-visual aids, where one or more of the following conditions exist –

(i) the runway is used by turbojet, turbofan, or other aircraft with similar approach guidance requirements;

(ii) the pilot of any type of aircraft may have difficulty in judging the approach due to inadequate visual guidance such as is experienced during an approach over water or featureless terrain by day or in the absence of sufficient extraneous lights in the approach area by night; or

(iii) misleading information produced by deceptive surrounding terrain or runway slopes

(b) The presence of objects in the approach area may involve serious hazard if an aircraft descends below the normal approach path, particularly if there are no non-visual or other visual aids to give warning of such objects.

(c) Physical conditions at either end of the runway present a serious hazard in the event of an aircraft undershooting or overrunning the runway.

(d) Terrain or prevalent meteorological conditions are such that the aircraft may be subjected to unusual turbulence during approach.

(e) PAPI, T-VASIS or AT-VASIS shall be provided where the aerodrome reference code number is 3 or 4; when 1 or more of the conditions specified in paragraphs (a) to (e) exist.

(f) PAPI or APAPI shall be provided where the aerodrome reference code number is 1 or 2; when 1 or more of the conditions specified in paragraphs (a) to (e) exist.

(37) Obstacle protection surface

(a) An obstacle protection surface shall be established when it is intended to provide a visual approach slope indicator system.

(b) New objects or extensions of existing objects shall not be permitted above an obstacle protection surface except when the new object or extension shall be shielded by an existing immovable object.

(c) Existing objects above an obstacle protection surface shall be removed except when the object is shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety of operations of aircraft.

(d) Where an aeronautical study indicates that an existing object extending above an obstacle protection surface could adversely affect the safety of operations of aircraft one or more of the following measures shall be taken –

(i) suitably raise the approach slope of the visual approach slope indicator system;

(ii) reduce the azimuth spread of the visual approach slope indicator system so that the object is outside the confines of the beam;

(iii) displace the axis of the visual approach slope indicator system and its associated obstacle protection surface by no more than 5 degrees;

(iv) suitably displace the runway threshold; and

(v) where paragraph (d) is found to be impracticable, suitably displace the visual approach slope indicator system upwind of the runway threshold to provide an increase in threshold crossing height equal to the height of the object penetration.

(38) Runway edge lights and runway end lights

Runway edge lights and runway end 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.

(39) Runway threshold and wing bar lights

(a) Runway threshold lights shall be provided for a runway equipped with runway edge lights, except on a non-instrument or non-precision approach runway where the threshold is displaced and wing bar lights are provided.

(b) 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.

(40) Runway centre line lights

(1) Runway centre line lights shall be provided on a precision approach runway category II or III.

(2) Runway centre line lights shall be provided on a runway intended to be used for take-off with an operating minimum below a runway visual range of 400m.

(41) Runway touchdown zone lights

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

(42) Taxiway centre line lights

(a) Taxiway centre line lights shall be provided on an exit taxiway, taxiway and apron intended for use in runway visual range conditions of less than 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 centre line marking provides adequate guidance.

(b) 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 of less than 350m, except that these lights need not be provided where the traffic density is light and centre line marking provides adequate guidance.

(43) Taxiway edge lights

(a) Taxiway edge lights shall be provided at the edges of a holding bay, apron and other similar areas 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.

(b) 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.

(44) Runway turn pad lights

Runway turn pad lights shall be provided for continuous guidance on a runway turn pad intended for use in runway visual range conditions of less than 350m, to enable an aircraft to complete a 180 degree turn and align with the runway centre line.

(45) Stop bars

(a) A stop bar shall be provided at every runway-holding position serving a runway when it is intended that the runway shall be used in runway visual range conditions of less than 550m, except where –

(i) appropriate aids and procedures are available to assist in preventing inadvertent incursions of traffic onto the runway; or

(ii) operational procedures exist to limit, in runway visual range conditions of less than 550m, the number of—

(aa) aircraft on the manoeuvring area to 1 at a time; and
(bb) vehicles on the manoeuvring area to the essential minimum.

(iii) Where there is more than 1 stop bar associated with a taxiway or runway intersection, only one shall be illuminated at any given time.

(46) Intermediate holding position lights

Except where a stop bar has been installed, intermediate holding position in runway visual range conditions of less than 350m.

(47) Runway guard lights

(a) Runway guard lights shall be provided at each intersection of a taxiway with a runway intended for use in—
(i) runway visual range conditions of less than 550m where a stop bar is not installed; and
(ii) runway visual range conditions between 550m and 1200m where the traffic density is heavy.

(48) Visual docking guidance system

A visual docking guidance system shall be provided when it is intended to indicate, by a visual aid, the precise positioning of an aircraft on an aircraft stand and other alternative means, such as marshoulders, are not practicable.

(49) Signs

Signs shall be provided to convey a mandatory instruction, information on a specific location or destination on a movement area or to provide other information to meet the requirements of a surface movement guidance and control system.

(50) Lighting

(b) Signs shall be illuminated when intended for use—
(i) in runway visual range conditions of less than 800m; or
(ii) at night in association with an instrument runway; or
(iii) at night in association with a non-instrument runway where the code number is 3 or 4.

(51) Mandatory instruction signs

(a) A mandatory instruction sign shown on table 12 shall be provided at a controlled aerodrome to identify a location beyond which an aircraft taxiing or vehicle shall not proceed unless authorised by the aerodrome control tower.

(b) Mandatory instruction signs shall include runway designation signs, category I, II or III holding position signs, runway-holding position signs, road-holding position signs and 'NO ENTRY' signs.

(52) Information signs

(a) An information sign shown on table 13 shall be provided where there is an operational need to identify by a sign, a specific location, or routing (direction or destination) information.

(b) Information signs shall include:

(i) direction signs;
(ii) location signs;
(iii) destination signs, and
(iv) runway exit signs, runway vacated signs and intersection take-off signs.

(c) A runway exit sign shall be provided where there is an operational need to identify a runway exit.

(d) A runway vacated sign shall be provided where the exit taxiway is not provided with taxiway centre line lights and there is a need to indicate to a pilot leaving a runway the perimeter of the ILS/MLS critical/sensitive area or the lower edge of the inner transitional surface, whichever is farther from the runway centre line.

(e) A combined location and direction sign shall be provided when it is intended to indicate routing information prior to a taxiway intersection.

(f) A direction sign shall be provided when there is an operational need to identify the designation and direction of taxiways at an intersection.

(g) A location sign shall be provided in conjunction with a runway designation sign except at a runway/runway intersection.

(h) A location sign shall be provided in conjunction with a direction sign, except that it may be omitted where an aeronautical study indicates that it is not needed.

(i) Information signs shall, wherever practicable, be located on the left-hand side of the taxiway.

(j) At a taxiway intersection, information signs shall be located prior to the intersection and in line with the intermediate holding position marking. Where there is no intermediate holding

position marking, the signs shall be installed at least 60m from the centre line of the intersecting taxiway where the code number is 3 or 4, and at least 40m where the code number is 1 or 2.

(k) A runway exit sign shall be located on the same side of the runway as the exit is located (i.e. left or right)

(l) A runway exit sign shall be located prior to the runway exit point in line with a position at least 60m prior to the point of tangency where the code number is 3 or 4, and at least 30m where the code number is 1 or 2.

(m) A runway vacated sign shall be located at least on one side of the taxiway located at the holding position.

(n) Where provided in conjunction with a runway vacated sign, the taxiway location sign shall be positioned outboard of the runway vacated sign.

(o) An information sign other than a location sign shall consist of an inscription in black on a yellow background.

(p) A location sign shall consist of an inscription in yellow on a black background and where it is a stand-alone sign shall have a yellow border.

(q) The inscription on a runway exit sign shall consist of the designator of the exit taxiway and an arrow indicating the direction to follow.

(r) The inscription on a runway vacated sign shall depict the pattern A runway-holding position marking.

(s) Where a location sign and direction signs shown on table 14 are used in combination –

(i) all direction signs related to left turns shall be placed on the left side of the location sign, and all direction signs related to right turns shall be placed on the right side of the location sign, except that where the junction consists of one intersecting taxiway, the location sign may alternatively be placed on the left-hand side;

(ii) the direction signs shall be placed such that the direction of the arrows departs increasingly from the vertical with increasing deviation of the corresponding taxiway;

(iii) an appropriate direction sign shall be placed next to the location sign where the direction of the location taxiway changes significantly beyond the intersection; and

(iv) adjacent direction signs shall be delineated by a vertical black line.

Table 12: Mandatory instruction sign

Runway designation of a runway extremity (Example)		Indicates a runway-holding position at a runway extremity
Runway designation of both extremities of a runway (Example)		Indicates a runway-holding position located at taxiway/runway intersection other than runway extremity
Category I hold position (Example)		Indicates a category I runway-holding position at the threshold of runway 25
Category II hold position (Example)		Indicates a category II runway-holding position at the threshold of runway 25
Category III hold position (Example)		Indicates a category III runway-holding position at the threshold of runway 25
Category II and III hold position (Example)		Indicates a joint category II and III runway-holding position at the threshold of runway 25
Category I, II and III hold position (Example)		Indicates a joint category I, II and III runway-holding position at the threshold of runway 25
NO ENTRY		Indicates that entry to an area is prohibited
Runway-holding position (Example)		Indicates a runway-holding position (in accordance with 3.12.3)

Table 13: Information sign

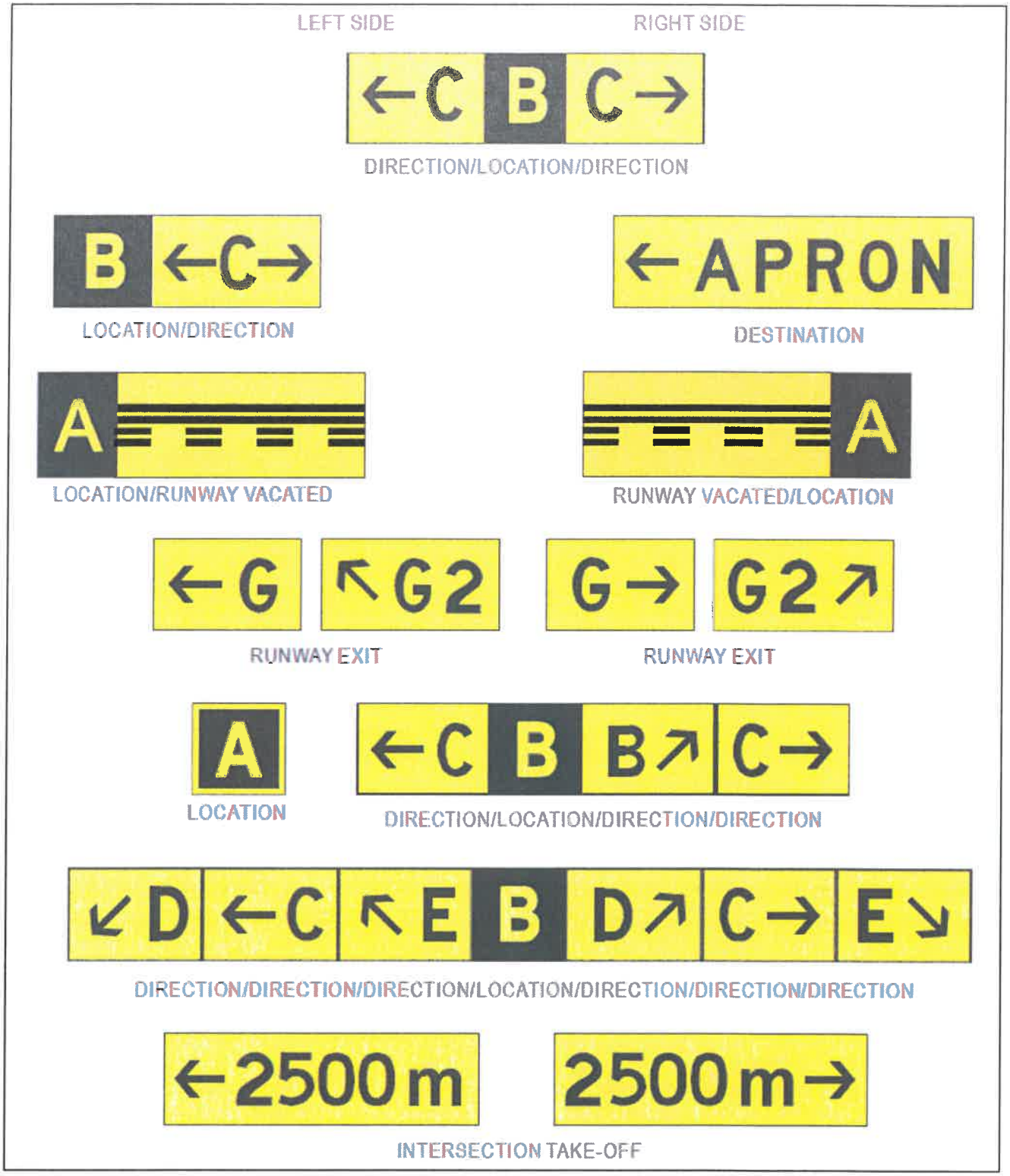
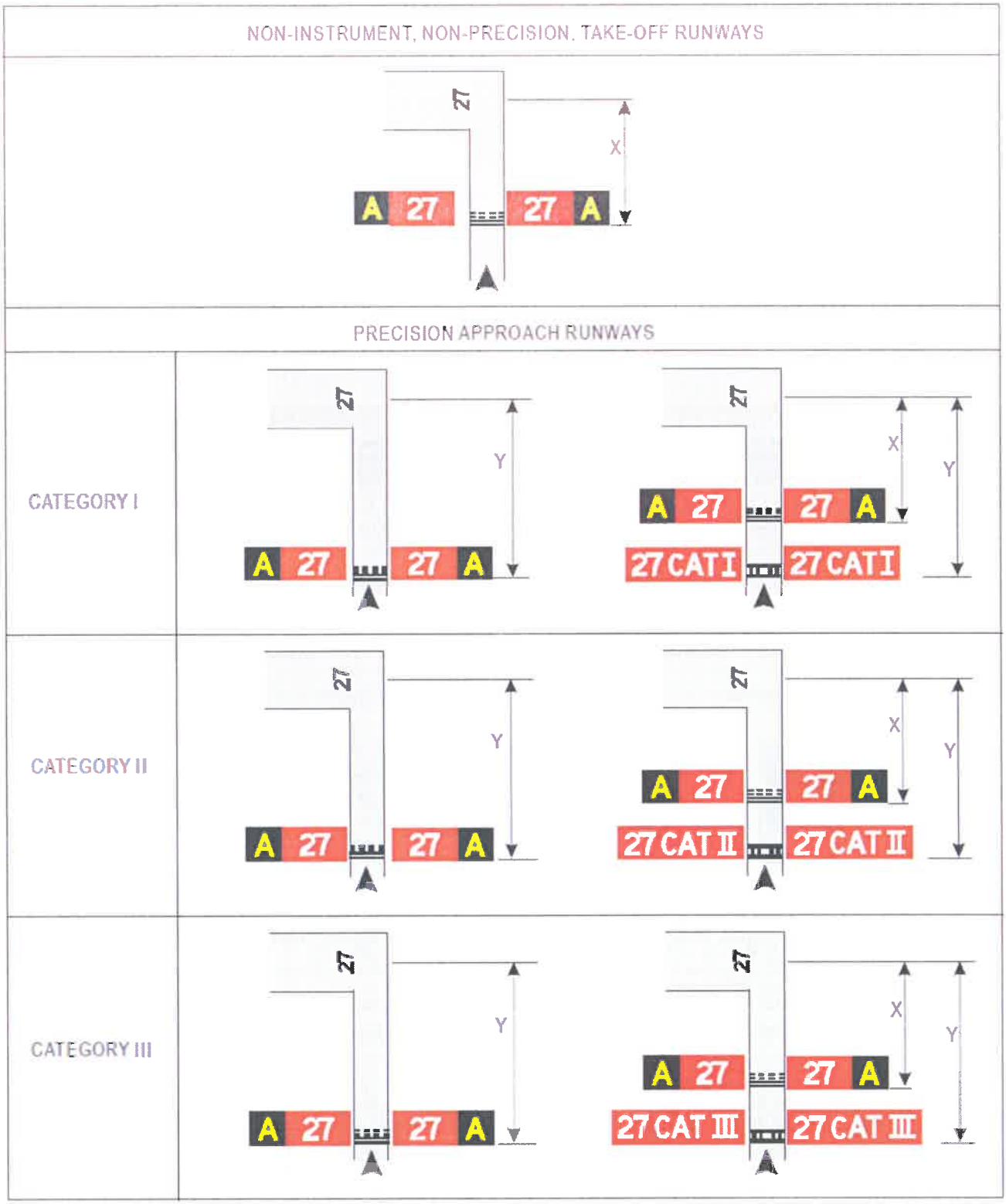


Table 14: Signs for location of positions at runways/takeways



(53) Visual Aids for Denoting Obstacles

(a) Objects to be marked and/or lighted

(i) A fixed obstacle that extends above an approach surface within 3000m of the inner edge or above a transitional surface shall be marked and, if the runway is used at night, lighted, except that –

(aa) Such marking and lighting may be omitted when the obstacle is shielded by another fixed obstacle; or

(bb) the marking may be omitted when the obstacle is lighted by medium-intensity obstacle lights, Type A, by day and its height above the level of the surrounding ground does not exceed 150m; or

(cc) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day; or

(dd) the lighting may be omitted where the obstacle is a lighthouse and an aeronautical study indicates the lighthouse light to be sufficient.

(ii) A fixed object that extends above an obstacle protection surface shall be marked and, if the runway is used at night, lighted.

(iv) Vehicles and other mobile objects, excluding aircraft and aircraft servicing equipment and vehicles used only on aprons, on the movement area of an aerodrome are obstacles and shall be marked and, if the vehicles and aerodrome are used at night or in conditions of low visibility, lighted.

(v) Elevated aeronautical ground lights within the movement area shall be marked so as to be conspicuous by day. Obstacle lights shall not be installed on elevated ground lights or signs in the movement area.

(vi) All obstacles within the distance specified in Table 6 (Taxiway minimum separation which provides a distance between taxiway centre line and runway centre line), from the centre line of a taxiway, an apron taxiway, or aircraft stand taxilane shall be marked and, if the taxiway, apron taxiway, or aircraft stand taxilane is used at night, lighted.

(54) Marking of objects

(a) All fixed objects to be marked shall, whenever practicable, be coloured, but if this is not practicable, markers or flags shall be displayed on or above them, except that objects that are sufficiently conspicuous by their shape, size, or colour need not be otherwise marked.

(b) All mobile objects to be marked shall be coloured or marked with display flags.

(55) Use of markers

(a) Markers displayed on or adjacent to objects shall be located in conspicuous positions so as to retain the general definition of the object and shall be recognizable in clear weather from a distance of at least 1000m for an object to be viewed from the air and 300m for an object to be viewed from the ground in all directions in which an aircraft is likely to approach the object.

(b) The shape of markers shall be distinctive to the extent necessary to ensure that they are not mistaken for markers employed to convey other information, and they shall be such that the hazard presented by the object they mark is not increased.

(56) Lighting of objects

(a) The presence of objects which shall be lighted, as specified in Table 6, shall be indicated by low-, medium- or high-intensity obstacle lights, or a combination of such lights.

(b) Type C low-intensity obstacle lights shall be displayed on vehicles and other mobile objects excluding aircraft.

(c) Type D low-intensity obstacle lights shall be displayed on follow-me Vehicles.

(57) Visual aids for denoting restricted use areas

(a) Closed runways and taxiways

A closed marking shall be displayed on a runway or taxiway, or portion thereof, which is permanently closed to the use of all aircraft.

(58) Non-load-bearing surfaces

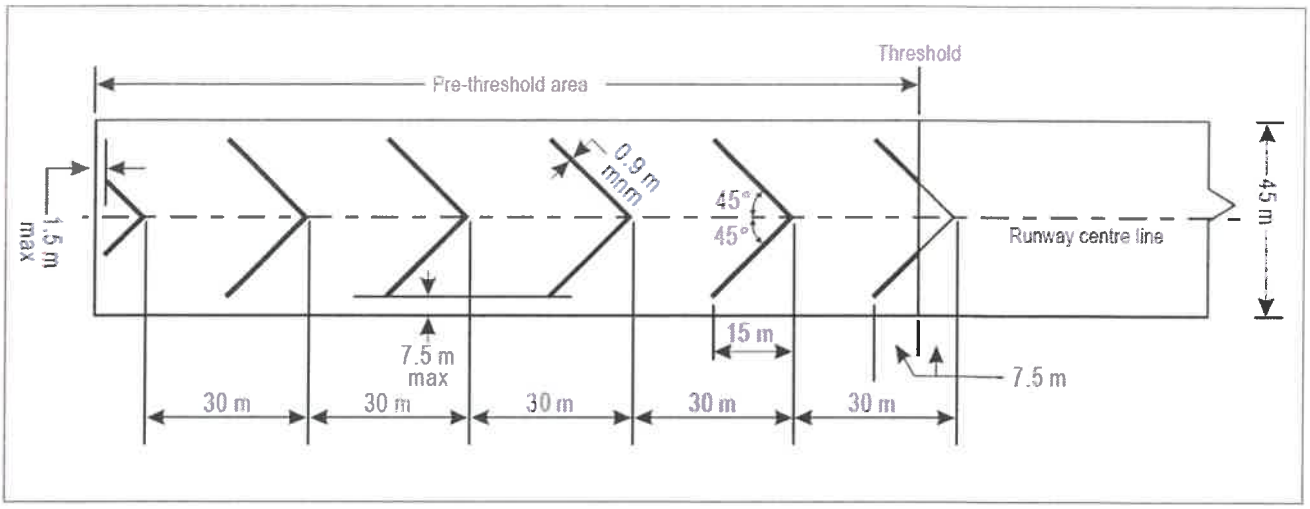
Shoulders for taxiways, holding bays and aprons and other non-load-bearing surfaces which cannot readily be distinguished from load-bearing surfaces and which, if used by aircraft, might result in damage to the aircraft shall have the boundary between such areas and the load-bearing surface marked by a side stripe marking.

(59) Pre-threshold area

(a) When the surface before a threshold is paved and exceeds 60m in length and is not suitable for normal use by aircraft, the entire length before the threshold shall be marked with a chevron marking.

(b) A chevron marking shall point in the direction of the runway and be placed as shown in table 15.

Table 15: Chevron marking



(c) A chevron marking shall be of conspicuous colour and contrast with the colour used for the runway markings; it shall preferably be yellow. It shall have an overall width of at least 0.9m.

(60) Unserviceable areas

Unserviceability markers shall be displayed wherever any portion of a taxiway, apron or holding bay is unfit for the movement of aircraft but it is still possible for aircraft to bypass the area safely. On a movement area used at night, unserviceability lights shall not be used.

(61) Electrical Systems

(a) Power supply systems for air navigation facilities

(i) Adequate primary power supply shall be available at aerodromes for the safe functioning of air navigation facilities.

(ii) For aerodromes that are referred to in regulation 139.02.1(1), the design and provision of electrical power systems for the aerodrome visual and radio navigation aids shall be such that an equipment failure shall not leave pilots with inadequate visual and non-visual guidance or misleading information.

(62) Visual aids

(a) For a precision approach runway, a secondary power supply capable of meeting the requirements specified in Table 8 for the appropriate category of precision approach runway shall be provided. Electric power supply connections to those facilities for which secondary

power is required shall be so arranged that the facilities are automatically connected to the secondary power supply on failure of the primary source of power.

(b) For a runway meant for take-off in runway visual range conditions of less than 800 m, a secondary power supply capable of meeting the relevant requirements of Table 8 shall be provided

(63) System design

(a) For a runway meant for use in runway visual range conditions of less than 550m, the electrical systems for the power supply, lighting and control of the lighting systems included in Table 12 shall be so designed that an equipment failure shall not leave the pilot with inadequate visual guidance or misleading information.

(b) Where the secondary power supply of an aerodrome is provided by the use of duplicate feeders, such supplies shall be physically and electrically separate so as to ensure the required level of availability and independence.

(c) Where a runway forming part of a standard taxi-route is provided with runway lighting and taxiway lighting, the lighting systems shall be interlocked to preclude the possibility of simultaneous operation of both forms of lighting.

(64) Monitoring

Where lighting systems are used for aircraft control purposes, such systems shall be monitored automatically so as to provide an indication of any fault which may affect the control functions. This information shall be automatically relayed to the air traffic service unit.

(65) Secondary power supply requirements

Secondary power supply requirements shown in Table 16.

Table 16: Secondary power supply requirements

Runway Classification	Lighting		Radio Aids	
	Visual Aids requiring power	Maximum switch-over time	Radio Aids Requiring Power	Max Switch-Over time
Non-Instrument	Visual Approach Slope Indicator	2 minutes 2 minutes		

	Runway Edge Runway Threshold Runway End Obstacle	2 minutes 2 minutes 2 minutes		
Non-precision	Approach Lighting System Visual Approach Slope Indicator Runway Edge Runway Threshold Runway End Obstacle	15 seconds 15 seconds 15 seconds 15 seconds 15 seconds 15 seconds	SRE VOR NDB D/Facility	15 seconds 15 seconds 15 seconds 15 seconds
Precision approach category I	Approach Lighting System Runway Edge Runway Threshold Runway End Obstacle	15 seconds 15 seconds 15 seconds 15 seconds 15 seconds 15 seconds	ILS localizer ILS glide path ILS middle marker ILS outer marker PAR	10 seconds 10 seconds 10 seconds 10 seconds 10 seconds
Precision approach category II	Approach Lighting System Runway Edge Runway Threshold Runway End Runway Centre Line Runway Touchdown Zone Stop Bars at Taxi- Holding Positions Essential Taxiway Including Stop Bars other than those at Taxi-Holding Positions Obstacles	1 second 15 seconds 1 second 1 second 1 second 1 second 1 second 15 seconds 15 seconds	ILS localizer ILS glide path ILS inner marker ILS middle marker ILS outer marker	
Precision approach category III	(Same As Category II Except all Stop Bars- 1 second)		Same as Category II	

Pavement Bearing strength (139.02.10(7))

(1) The load-bearing qualities shall be sufficient to support the aircraft it is intended to serve without causing structural damage to the aircraft.

(2) The bearing strength shall be reported using the ACN/PCN method.

(3) Details of the five elements of the code and an example are shown below:

Table 17: Elements of the code and example

56 (a)	**F** (b)	**B** (c)	**X** (d)	**T** (e)

(a) The PCN number. Refer to aircraft manufacturer for individual aircraft requirements. The PCN shall not be less than the highest ACN.

(b) Pavement type for ACN-PCN determination: code

R - Rigid pavement
F - Flexible pavement

(c) Sub-grade strength category: Code

A - High strength: Characterized by K=150 Nm/m3 and representing all K values above 120 NM/m3 for rigid pavements, and by CBR = 15 and representing all CBR values above 13 for flexible pavements.

B - Medium strength; Characterized by K =80 Nm/m3 and representing a range in K of 60 to 120 Nm/m3 for rigid pavements, and by CBR = 10 and representing a range in CBR of 8 to 13 for flexible pavements.

C - Low strength: Characterized by K=40 Nm/m3 and representing a range in K of 25 to 60 Nm/m3 for rigid pavements, and by CBR = 6 and representing a range in CBR of 4 to 8 for flexible pavements.

D - Low strength: Characterized by K=20 Nm/m3 and representing all K values below 25 Nm/m3 for rigid pavements, and by CBR = 3 and representing all CBR values below 4 for flexible pavements.

(d) Maximum allowable tyre pressure category: Code

W - High: no pressure limit

X - Medium: pressure limited to 1, 50 MPa

Y - Low; pressure limited to 1, 00 MPa

Z - Very low: pressure limited to 0, 50 MPa

(e) Evaluation method: Code

T - Technical evaluation: representing a specific study of the pavement characteristics and application of pavement behaviour technology.

U - Using aircraft experience: representing a knowledge of the specific type and mass of aircraft satisfactorily being supported under regular use.

[2. Applicability (Note: Entire applicability list deleted)]

[The applicability of the Standards and Recommended Practices, as contained in Annex 14, and the adoption thereof as "aerodrome design and operating standards" under regulation 139.02.2 is outlined in the following table:]

[Applicability of Annex 14 Standards and Recommended Practices in relation to aerodrome physical characteristics, obstacle limitation surfaces, visual aids, equipment and installations and operations.
***Note*: Annex 14 standards do not apply to equipment and installations not used in SA.]**

Paragraph to be Applied	Recommended Practices exempted or amended			Notes
	Recommendation Exempted for one or more AD categories	Category for which recommendation is exempted	Replacement for Recommended Practice	
Chapter 1: General 1.1 to 1.3; 1.6, 1.7				
Chapter 2: Aerodrome Data. 2.1 to 2.9; 2.12; 2.13	2.9.8–2.9.11	1-3 non-commercial and non-asphalt runways		For purposes of this Annex SACAA categorise aerodromes based on the Rescue and Firefighting Services (RFFS) categorisation system of 1–10.
Chapter 3: Physical Characteristics	3.1.10	1–3 non-commercial	Not less than largest of twice main gear span or 9m	

Chapter 3 all Standards and Recommended Practices (SARPS) applicable except exemptions here listed	3.1.13–3.1.18	1–10	Not Aerodromes (AD's) with plans approved before Date of Publication (DOP). Only for new AD's from DOP	Notification through AD/Approach Control (APP)/NOTAM of change in condition. Does not mean friction testing at every instance.
	3.1.19–3.1.20	1–10	Not AD's with plans approved before DOP. Only for new/rehabilitated Runways (RWY's) from DOP	Notification through AD/Approach Control (APP)/NOTAM of change in condition. Does not mean friction testing at every instance.
	3.1.24	Cat 1, 2 and non-asphalt		
	3.2.4	1-10 Non-Asphalt	Not AD's with plans approved before DOP. Only for new/rehabilitated RWY's from DOP	
	3.3	1–10	If RWY width is adequate, no turn pad required.	
	3.3.13	1–10	If not compliant – achieve compliance by Dec 2015	
	3.4.5	1–2	Not less than 15m either side of the runway centre line	
	3.4.9	1–2	Not less than 15m either side of the runway centre line	

3.5	4-10	Any aerodrome that is category 1 to 2. Cat 3 is exempted if it has a runway code 1 and 2 and is a non-instrument runway.	
3.4.12–3.4.17	1–10	Not RWY's with plans approved before DOP. Only for new/changing functionality RWY's from DOP	
3.4.17	1–2	Not less than 15m either side of the runway centre line	
3.7	3-10	Not RWY's with plans approved before DOP. Only for new/changing functionality RWY's from DOP	
3.7	1-2	Annex 14 states that aerodromes do not have to have Stop-ways in paragraph3.7	
3.9.1	1, 3	Backtrack on RWY allowed under certain traffic density conditions.	
3.9.6	1–10	Can over steer provided risk of excursion is mitigated (e.g. cameras on aircraft (AC)	Supplement to Recommendation
3.9.9–3.9.12	1-10	Not Taxiways (TWY's) with plans approved before DOP. Only	

			for new/functionally changed TWY's from DOP	
	3.10.1	1–10	Not TWY's with plans approved before DOP. Only for new/functionally changed TWY's from DOP	
	3.11.4–3.11.6	1–10	Not TWY's with plans approved before DOP. Only for new/functionally changed TWY's from DOP	
	3.13.5	1–10	Not Aprons with plans approved before DOP. Only for new/functionally changed Aprons from DOP	
	3.13.6	1–10	When special circumstances so warrant, the clearances maybe reduced for Code letters C, D, E and F.	
	3.13.1	1–2	Not applicable	
	4.1	See Table 4.1		
Chapter 4: Obstacles All SARPS applicable except exemptions here listed	Table 4.2 and related recommendations	STOL use runways		
	4.2.12	1–10	Existing obstacles factored into procedure design (PD) limits. New	

			obstacles to be assessed same.	
	5.1.1.4	1, 2 Manned Aerodromes	No circle required	
	5.1.3	1–10	Not required	
	5.1.4	1–10	Not applicable	
	5.2.1.7	1–10	Not enforced	
	5.2.8.4–5.2.8.11	4–10	New practice. Compliance as required. RWY Cat II and III	
Chapter 5: Visual Aids Navigation Chapter 5 all applicable except exemptions here listed	5.2.13.1	1–10 3 non-commercial	As required by traffic density.	
	5.2.16.2–5.2.16.10	1–10	To be complied with for Cat 3–10. From Jan 2014.	
	5.3.1.2	3–10	From June 2014	
	5.3.5.6–5.3.5.17	1–10	VASIS not in use anymore	
	5.4	1, 2, -3 and non-commercial		
	5.5.4	1–10	Not applicable to South Africa	
	5.5.5.1	1–2 1-10	Not required if taxiway can be d clearly distinguished	
	5.1.3	1-10	Signalling Lamps not in use anymore.	
Chapter 6: Visual Aids Obstacles All Applicable				
Chapter 7: Visual Aids Restricted				

Areas All Applicable				
Chapter 8: Electrical Systems All applicable except exemptions here listed	8.1.9, Table 8.1	Cat 1and 2, non-commercial		
Chapter 9				
9.1 Emergency management programme	Not in used in CAR 139.02.29, 9.1.4-9.1.5 & 9.1.7-9.16	Cat 1 to 3 non-scheduled air operations	CAR 139.02.6	
9.2 Rescue and Firefighting	Not in used in CAR 139.02.29, 9.2.4 & 9.2.8 – 9.2.10 & 9.2.15 - 9.2.25	Cat 1 to 3 non-scheduled air operations	CAR 139.02.7 and other	
9.3 Disabled Aircraft removal	Not in used in CAR 139.02.29, 9.3.1 & 9.3.2	Cat 1 to 3 non-scheduled air operations	CAR 139.02.6	
9.4 Wildlife strikes hazard reduction	9.4.5	Non-commercial AD's Cat 1 to 3 non-scheduled air operations		
9.5 Apron management services	9.5.1 & 9.5.2	Non-commercial AD's Cat 1 to 3 non-scheduled air operation		
	9.8	Based on risk assessment Radar not only option to achieve same effect		
	9.8.7, 9.8.8			
Chapter 10: Maintenance	10.2.5	Non-commercial AD's	[Runway has to be restored to operational status after each work session.]	
	10.3.3	1–10		

[139.02.6] 139.02.14 Establishment of aerodrome emergency management System

(1) The aerodrome emergency planning shall be to prepare for a course of action to minimise those effects, particularly in respect of saving lives.

[1] *(2)* The aerodrome operator shall establish an aerodrome emergency management system (AEMS) as contemplated in CAR 139.02.14 which shall include the following, but not be limited to:

(a) aircraft emergencies;
(b) sabotage including bomb threats;
(c) unlawful seizure of aircraft;
(d) dangerous goods occurrences;
(e) building fires;
(f) natural disasters, such as floods, veld fire, tsunamis, etc.;
(g) public health emergencies including communicable diseases

[2 Part 7 of ICAO Doc 9137-AN/89 is herewith incorporated in terms of section 163(2) of the Civil Aviation Act as the minimum standard for an AEMS.]

(3) The emergency plan shall have the cooperation and participation of all the concerned agencies. Agencies to be considered include:

(a) air traffic services;
(b) rescue and firefighting services (fire departments);
(c) police and/or security services;
(d) airport authority;
(e) medical services;
(f) hospitals;
(g) aircraft operators;
(h) government authorities;
(i) communication services;
(j) airport tenants;
(k) transportation authorities (land, sea and air);
(l) rescue co-ordination centre;
(m) military;
(n) harbour patrol or coast guard;
(o) clergy;
(p) customs;
(q) mental health agencies;
(r) public utilities;
(s) postal authorities;
(t) coroner; and
(u) SASAR.

(4) A full-scale emergency exercise shall be conducted at intervals not exceeding two years and special emergency exercises between the full-scale emergency exercises to ensure that any deficiencies found during the full-scale have been corrected.

(5) The plan shall include human factors principles to ensure best response by all agencies participating in emergency operations and the principles shall include –

(a) the effects of human performance on the plan, for example workload, capabilities, functions, decisions aids, environmental constrains, team versus individual performance;
(b) training effectiveness;
(c) staffing including numbers, skills, levels and organisational structure;
(d) personnel selection; and
(e) safety and health aspects, for example hazardous materials, safety systems and protective clothing.

(6) A fixed emergency operations centre and a mobile command post shall be available for use during an emergency.

(7) The mobile command post shall be a facility capable of being moved rapidly to the site of an emergency, when required, and shall undertake the local coordination of those agencies responding to the emergency.

(8) A person shall be assigned to assume control of the emergency operations centre and when appropriate, another person at the mobile command post.

(9) A communication system shall be provided linking the command post and the emergency operations centre with each other and with the participating agencies.

(10) For emergencies in difficult environments, the EMS plan shall include -

(a) readily availability of and coordination with appropriate specialist rescue services to be able to respond to emergencies where an aerodrome is located close to but not limited to water and/or swampy areas; and
(b) where a significant portion of approach or departure operations takes place over these areas.

[(3)](11) The medical equipment and medical supplies depicted in Appendix 3 table 3-1 of ICAO Doc 9137- AN/8989, Part 7, shall be made available on the aerodrome. If not self-proficient, the aerodrome operator shall enter into an agreement with a service provider, capable of providing such service, to make the necessary medical equipment and required medication available in the event of an emergency. The aerodrome operator shall ensure that the agreement is kept current and that the service provider is at all times capable of its obligations. AEMS manuals shall be compiled as prescribed in the TGM which is available on Authority website – www.caa.co.za.

[139.02.7] 139.02.15 AERODROME RESCUE AND FIREFIGHTING

[1] (2) Level of Protection to be provide for Rescue and Firefighting services

Classification matrix

Column I	**[Column II]**	Column **[III]** II	Column **[IV]** III	Column IV
Aerodrome **[License]** Category	**[Aircraft Category for Firefighting]**	Aircraft Overall Length	Aircraft Maximum Fuselage Width	Number of firefighting Vehicles
1.	**[1]**	N/A	N/A	N/A
2.	**[2]**	N/A	N/A	N/A
3.	**[3]**	at least 12 m but less than 18 m	3 m	*1*
4.	**[4]**	at least 18 m but less than 24 m	4 m	*1*
5.	**[5]**	at least 24 m but less than 28 m	4 m	*1*
6.	**[6]**	at least 28 m but less than 39 m	5 m	*2*
7.	**[7]**	at least 39 m but less than 49 m	5 m	*2*
8.	**[8]**	at least 49 m but less than 61 m	7 m	*3*
9.	**[9]**	at least 61 m but less than 76 m	7 m	*3*
10.	**[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 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 [that] the time of the actual movements and may be reduced by one level during other times.

[2](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 **[one category lower]** at all times if:

[(a)] (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.

[(b)] (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.

[(c)] (iii) fully trained and permanently appointed firefighting personnel are provided.

[(b)] (iv)for category **[4]** 3 **[and lower]** aircraft firefighting service, each firefighting vehicle is capable of discharging its content at the required application rate as indicated in Column VI 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 3 license the level of firefighting service and equipment required shall be based on a risk assessment and shall not exceed the requirement 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

[Column	**[Column II]**	**[Column III]**	**[Column IV]**	**[Column V]**	**[Column VI]**
[Aerodrome] **[[License**	**[Critical Category for Firefighting]**	**[Quantity of Water or premix foam solution (in litres)]**	**[Quantity of Complementary Extinguishing Agents(in**	**[Minimum Number of Aircraft Fire-**	**[Total Discharge Capacity (in litres per**
[1.]	**[1]**	**[230]**	**[45]**	**[1]**	**[230]**
[2.]	**[2]**	**[670]**	**[90]**	**[1]**	**[550]**
[3.]	**[3]**	**[1200]**	**[135]**	**[1]**	**[900]**
[4.]	**[4]**	**[2400]**	**[135]**	**[1]**	**[1 800]**

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

[(e)] (v)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.

[(f)] (vi) 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.

[(g)](vii)The ancillary equipment to be carried on the vehicle shall consist of the equipment depicted in the rescue equipment list below.

(e) 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; or

(ii) a foam meeting the minimum performance level B; or

(iii) a foam meeting the minimum performance level C; or

(iv) 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.

(f) At aerodromes where operations by aeroplanes 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.

(g) 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.

(h) The amount of foam concentrate provided on a vehicle shall be sufficient to produce at least two loads of foam solution.

(i) Supplementary water supplies, for the expeditious replenishment of rescue and firefighting vehicles at the scene of an aircraft accident, shall be provided.

(j) 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.

(k) 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.

(l) 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.

Rescue equipment List:

Airport rescue and firefighting category	**1-2**	**3-5**	**6-7**	**8-10**
Adjustable wrench	N/A	1	1	1
Axe, rescue, large non wedge type	**[1]** N/A	1	1	1
Axe, small non-wedge type or aircraft type	N/A	2	4	4
Cutter bolt 61 cm	N/A	1	1	1
Crowbar, 95 cm	N/A	1	1	1
Crowbar 1.65 m	N/A	-	1	1
Delivery hoses 30m x 50 and 64mm diameter	N/A	10	16	22
Chisel, cold 2.5 cm	N/A	1	1	1
Flashlight	N/A	3	4	8
Hammer 1.8 kg	N/A	1	1	1
Hook, grab or salving	N/A	1	12	13
Saw, metal cutting or hacksaw, heavy duty with spare blades	N/A	1	1	1
Shovel	N/A	1	2	2
Blanket, fire resisting	N/A	1	12	13
Ladder, extending (of over-all length appropriate to aircraft in use – rescue capable	N/A	1	2	**[2 or]** 3
Rope line 15 m length	N/A	1	**[-]** 2	**[-]** 3
Rope line 30 m length	N/A	-	**[1]** 2	**[1]** 3
Pliers 17.8 cm (side cutting)	N/A	1	1	1
Pliers, slip joint 25 cm	N/A	1	1	1
Screwdrivers, assorted set	N/A	1	1	1
Snippers, tin	N/A	1	1	1
Chocks 15 cm high	N/A	-	1	1
Chocks 10 cm high	N/A	1	-	-
Powered rescue saw complete with two blades; or pneumatic chisel complete - plus spare cylinder, chisel, and retaining spring	N/A	1	1	2
	N/A			
Harness cutting tool	N/A	2	3	4
Gloves, flame resistant pairs, unless issued to individuals	N/A	3	4	8
[Breathing apparatus and cylinders]		**[2]**	**[3]**	**[4]**

[139.02.8]
139.02.16
AERODROME RESCUE AND FIREFIGHTING TRAINING FACILITY

Breathing apparatus and spare cylinders				
[Spare cylinders]		**[2]**	**[3]**	**[4]**
Hydraulic or pneumatic forcing tool	N/A	1	1	1
Medical-First aid kit	N/A	1	**[1]** 2	**[1]** 3
Automated external defibrillator (AED)	N/A	1	2	3
Tarpaulin	N/A	*1*	*2*	*3*
Thermal imaging camera	N/A	-	*1*	*2*
Fan for ventilation and cooling	N/A	*1*	*2*	*3*
Stretchers	N/A	*2*	*2*	*2*

1. Training facilities for category 6 or above

(1) For aerodromes operating in terms of an aerodrome licence category 6 level or higher with more than 700 total scheduled commercial air movements during the busiest consecutive three months; the structure of the facility **[contemplated in CAR 139.02.8]** shall provide for:

(a) Effective training in the following aspects –

(i) Aircraft structural fires external;

(ii) Aircraft structural fires internal;

(iii) Aircraft wheel fires;

(iv) Aircraft engine fires reciprocating as well as jet engines;

(v) Aircraft cabin fires;

(vi) Aircraft overhead storage bin fires;

(vii) Aircraft galley fires;

(viii) Aircraft baggage-hold fires; as well as a facility to conduct Self Contained breathing apparatus training in a smoke filled environment;

(ix) Pressure fed aircraft fuel fires;

(x) Sufficient space and structure to exercise rescue equipment skills, with the type of equipment required for level of operation;

(xi) An area where ladder drills can be performed, preferably at the simulated aircraft structure;

(xii) An area where vehicle monitor/ turret deployment can be utilized and practiced;

(xiii) A suitable area where first-aid hose-reels and soft delivery hand-lines can be deployed;

(xiv) First aid to at least level **[2]** ***3.***

(b) The facilities referred to in this item shall be constructed in such a way that it is environmental friendly and include an effluent drainage separation pit.

(c) The entire facility shall have a bunt wall to contain un-burnt fuel and extinguishing media with ample drainage and filter system leading to the drainage pit.

(d) The facilities shall be constructed in such a way that the smoke emission does not

affect the aircraft operation of the aerodrome.

(e) In addition to the above, classroom facilities shall be provided for effective conveyance of theoretical information to students. This classroom shall be suitably equipped to provide the necessary instruction and be suitably constructed so as to accommodate at least one shift of the required staffing levels for the appropriate category of aerodrome.

(f) The facility where theoretical training is to be conducted shall be as close as possible to the fire station to facilitate rapid response by the students to any eventuality if they form part of the operational staffing levels.

(g) Ablution facilities **[must]** shall be provided.

2. [Training facilities for aerodromes operating a category 3 where flying schools have been established and category 4 and 5

(1) [For aerodromes operating a category 3 where flying schools have been established and category 4 and 5, at least the following training facilities are required:

(a) An open air training facility where the routine firefighting techniques can be practiced under simulated conditions to keep personnel skills level honed. This area shall provide for–

(i) An area where firefighting vehicle deployment can be practiced and the correct positioning at a potential disaster site can be exercised;

(ii) A facility where under simulated conditions, Self-Contained Breathing Apparatus (SCBA) familiarisation and training can be exercised;

(iii) Sufficient space where firefighting vehicle monitor/turret and hand-line application can be practiced.

(iv) Sufficient space to effectively utilize rescue equipment.

(b) The fire ground shallbe enclosed with a bunt-wall to contain any un-burnt fuel or material and shall preferably have concrete floor covered with a steel pan.

(c) Additional standards regarding an effective training facility can be found in the NFPA 1001/3 standards.

(2) If an aerodrome issued with an aerodrome licence below a category 4 level, including category 3 aerodromes where flying schools have been established, is not capable of establishing such training facility, approval from the Director is required to deviate from this requirement, in which case, the required training shall be conducted at an aerodrome where such facilities are available and the training standards of that facility is SACAA endorsed or approved.]

[139.02.9] 139.02.17 AERODROME RESCUE AND FIREFIGHTING PERSONNEL TRAINING STANDARDS

(1) The holder of the license of an aerodrome above category 3 level shall establish training standards, for approval by the Director and shall maintain all training records for at least 5 years.

(2) The training standards for aerodromes above category 3 level of operation and frequency of re- training required in this subpart shall include but not be limited to–

(a) Initial training to achieve a new qualification or competency;

(b) Training to transfer or upgrade from a current qualification or competency to a new qualification or competency;

(c) Special requirements for direct entry staff:

(i) Airside induction;

(ii) Radio telephony;

(iii) Vehicle driver/operator training on each different type of vehicle deployed for aerodrome rescue and firefighting purposes. Competency certification in this regard is required.

(d) Basic firefighting procedure for aircraft rescue and firefighting personnel based on aerodrome specific equipment and infrastructure including the type of aircraft normally operating to and from that aerodrome and the

potential problems such aircraft may pose to the aerodrome rescue and firefighting services.

(e) Effective utilisation of rescue and firefighting equipment.

(3) All firefighting personnel deployed at an aerodrome above category 3 shall be in possession of at least a Level One fire-fighter certificate obtained from the CAA accredited institution; and be given on the job training in accordance with a program to ensure that core competencies applicable to the functional levels are obtained and maintained. Re-training intervals not exceeding 90 days shall be maintained. Certification with regard to all training obtained shall be maintained and be available for inspection purposes. Except for aerodromes contemplated under CATS 139.02.15(e) the training requirements for firefighting personnel on other aerodromes shall be individually determined on a risk basis.

(a) All persons in an officer's position shall be in possession of at least a Fire Fighter 2 **[or 3 CAA approved Certificate].**

(b) Training can only be conducted by persons in possession of a training instructors' certificate – National Fire Protection Association 1041 and shall at least hold the rank of an officer.

(c) Training shall consist of both theoretical and practical training in all aspects. Practicaltesting of competence shall be conducted not more than 14 days after theoretical training was concluded. If this is not achieved, retraining in the theoretical part is required within 90 days.

(d) Level of competence achieved (both theoretical and practical) shall be documented and trainees shall sign for all training received.

(e) Training records shall include a section where the instructor put his or her perception of success or competence achieved by trainees.

(f) Training records shall include a section where the trainee can deliberate his or her perception of competence achieved.

(g) Training shall be provided individually, as well as in group context, record thereof shall be kept per individual.

(4) Where applicable in terms of subparts 1, 2 and 3 above, core competency training for each qualification held is required within the 90 day period. The core competencies are listed below. This list is not exhaustive and may require local rating, e.g. water rescue services and/or specialised training in desert/sandy area, water logged arrears if or mountainous area operations if prevalent at the aerodrome or immediate vicinity-

(a) Aircraft construction for aerodrome rescue and firefighting personnel on the type of normally operating to and from the aerodrome. This does not preclude the types normally flying within the aerodrome airspace and could make use of the facility for emergency landings.

(b) The firefighting vehicle driver or operator training in off-road conditions on each of the types of surface areas most likely to be encountered on or in the vicinity of the aerodrome, besides the national drivers licence for the specific code of firefighting vehicle, driver/operator certification on all different type/s of vehicles is required. This shall include equipment deployed at the aerodrome and also include competency certification in the following aspects: This includes but is not limited to:

(i) Foam induction systems deployed on the vehicles, inline indictors;

(ii) Vehicle primer systems, all types used on the aerodrome;

(iii) Switching mode from on-road to off-road driving;

(iv) Vehicle operational panel layout;

(v) Dry chemical powder unit operations;

(vi) Vehicle pumps and primers operations;

(vii) Vehicle valve operations;

(viii) Vehicle replenishment;

(ix) Vehicle public address systems and marking beacons;

(x) Vehicle deployment approach and set-up at accident site;

(xi) Deep lifting utilizing the vehicle primer pump and associated equipment.

(c) Aerodrome topography including aerodrome runway and taxiway layout, as well as an area of up to 10 kilometres from the aerodrome reference point:

(i) Aerodrome radio telephony certified by **[CAA]** the Authority accredited training institution. Certification is subject to Air Traffic Control (ATC) endorsement, this ATC endorsement is aerodrome specific.

(ii) Aerodrome topography and vicinity familiarization training to cover at least the area within which response is required under the Aerodrome Emergency Management System contained in CAR 139.02.6.

(iii) [Individuals from whom it is expected to utilize Self Contained Breathing Apparatus (SCBA) shall be in

possession of a competency certificate in the testing and utilization of the SCBA sets used at the aerodrome. The instructor conducting this type of training shall have had his/ her training at the manufacturers/supplier of such equipment.]

(iii)Training on emergency response preparedness

(d) Training and certification of competence in utilization of specialised equipment shall be conducted on all different types of specialised equipment deployed at the aerodrome; this includes but is not limited to:

(i) Heavy lifting devices, if provided or required;

(ii) Specialised cutting devices if provided or required;
(iii) Boats if provided for water rescue if provided or required;
(iv) All electrical equipment supplied.
(v) Self-contained Breathing Apparatus (SCBA).

(e) Small gear training shall include all types of equipment depicted in the rescue equipment list for the appropriate category of firefighting operations. The following areas of competence are required and need to be included in the training curriculum:

(i) Application of foam onto an appropriate fire, consisting of material representative or normally found in aircraft, with an attack vehicle monitor;
(ii) Vehicle hand-line and first –aid attack line operations;
(iii) Fire station communication centre if provided;
(iv) Fire alarms and alarm notification systems;
(v) Indicator panels for fixed fire-detection and suppression systems;
(vi) Foam branches;
(vii) Type specific branches used at the aerodrome;
(viii) Ladder construction and deployment;
(ix) Knots and lines;
(x) Soft and hard deliveries composition and uses;
(xi) Agent application through operational branches and use of equipment for rescue purposes; and
(xii) Deep lifting aerodrome category 5 and higher.

(f) Rescue and Firefighting training shall include but not limited to the following:

(i) Aircraft tactics strategies
(ii) ARFFS equipment
(iii) Aircraft dangerous goods
(iv) Aircraft victim rescue
(v) Engine/Auxiliary Power Unit fires
(vi) Interior aircraft fires
(vii) Aircraft wheel brake assembly fires
(viii) Fuel fires

(g) Aircraft Familiarisation training on aircraft that is most likely to land or take-off on that particular aerodrome.

(vi) The required training shall be conducted at an aerodrome where training facilities and training standards are available and the training standards and facility is CAA endorsed or approved as follows:

(i) Competency based training on vehicles and equipment specified for all levels of operation shall be conducted at a CAA aviation approved institution with intervals not exceeding 90 days and shall include all vehicles and equipment specified for aerodrome rescue and firefighting for the respective levels of aerodrome and firefighting service specified for the aerodrome.

(ii) Record of all training conducted shall be kept for at least 5 years. These records shall reflect the type of training conducted, duration of such training and competency levels achieved. The record shall be signed by both the trainees and the instructors.

(iii) First Aid up to a level **[2]** 3 is required. This shall include triaging of patient.

139.02.19.1 ESTABLISHMENT OF ENVIRONMENTAL MANAGEMENT PROGRAMME

1. Bird and wildlife strike control programme

(1) The bird and wildlife strike control programme shall contain the following elements =

(a) assignment of trained personnel accountable for developing and implementing the bird/wildlife strike prevention programme;
(b) a process to report, collect and record data on struck and living birds and wildlife;
(c) risk assessment methodology to analyse the data and assess the bird and wildlife hazard in order to develop mitigation, proactive and reactive measures;
(d) a process of habitat and land management both on the airport and in its vicinity in order to reduce the attractiveness of the area to birds and wildlife; where applicable and relevant, this shall include effective grass management techniques;
(e) a process to expel or remove hazardous birds/wildlife, including by lethal means where appropriate;
(f) a process for liaison with non-airport agencies and local landowners to ensure the airport operator is aware of developments that may contribute to creating additional bird hazards in the infrastructure, vegetation, land use and activities in the airport vicinity and
(g) a programme to have regular meetings with all stakeholders of the airport's bird and wildlife strike prevention committee.

2. Information to be contained in the Environmental management programme(s)

(1) The information referred to in CAR 139.02.22(3) (b) which shall be contained in the EMPs shall include the following:

(a) Human resources
  (i) A statement identifying human resources available for the implementation of the EMP.

(b) Scope
  (i) The activities that are within the scope of the EMP.

(c) A Procedure for
  (i) the identification of environmental aspects and impacts of the operator's activities, services and/or products;
  (ii) significance rating which details an assessment of each potential impact that the operator identifies that gives an overall indication of the implication of the impact; and
  (iii) determination of any legal obligations.

(d) A register of the identified and rated environmental aspects and impacts that is kept up to date and reviewed annually to identify new aspects and remove any unnecessary items.

(e) As a minimum, the following is required for each EMP:
  (i) objective(s);
  (ii) target(s);
  (iii) mitigation measures/ action plans and/or procedures;
  (iv) responsibilities;
  (v) time frames to rectify all identified environmental impacts; and
  (vi) continuous measurement and monitoring.

(2) The operator shall ensure that, at a minimum, the EMPs consider management of environmental aspects resulting from:
  (a) aircraft noise;
  (b) air quality in the vicinity of aerodrome;
  (c) use of ozone-depleting substances;
  (d) construction and expansion of airports or associated infrastructure/ aerodrome and associated infrastructure development projects;
  (e) water and soil pollution in the vicinity of aerodrome;
  (f) energy use;
  (g) waste at aerodrome; and
  (h) environmental emergencies arising from accidents/incidents involving dangerous goods and hazardous materials.

Note: More information can be obtained from TGM on the SACAA website.

[139.02.12] 139.2.20 NOTIFICATION OF AERODROME DATA AND INFORMATION

1. Determination and reporting of water on runways

[1](d) Whenever water is present on a runway, a description of the runway surface condition in the centre half of the width of the runway, including the possible assessment of water depth, where applicable, shall be made available using the following terms:

DAMP— the surface shows a change of colour due to moisture.

WET—the surface is soaked but there is no standing water.

WATER PATCHES—significant patches of standing water are visible.

FLOODED— extensive standing water is visible.

139.02.[23]. 22 GENERAL DUTIES OF HOLDER OF LICENCE

6. Monitoring of aircraft noise

(1) Aircraft Noise Contours

The calculation and prediction of aircraft noise referred to in CAR 139.02.**[22]** 23 shall be done in accordance with the requirements and standards contained in National Standard SANS 10117.

(2) Noise Monitoring Stations

The noise monitoring stations and equipment to monitor adherence to aircraft flight track referred to in CAR 139.02.22 shall be done in accordance with the requirements and standards contained in ISO 20906.

(3) **[Noise Abatement Operating Procedures]** Balanced approach to noise management

[The noise abatement operating procedures referred to in CAR. 139.02.22 shall be done in accordance with the requirements and standards contained in Chapter 6 of ICAO Doc 9829 and Section 7 of ICAO Doc 8168.]

(a) The balanced approach to noise management shall consists of identifying the noise problem at an airport and then analysing the various measures available to reduce noise through the exploration of four principal elements, namely reduction at source, land-use planning and management, noise abatement operational procedures and operating restrictions.

(b) Aircraft operating procedures for noise abatement shall not be introduced unless the regulatory authority, based on appropriate studies and consultation, determines that a noise problem exists.

(c) Aircraft operating procedures for noise abatement shall be developed in consultation with operators that use the aerodrome concerned. These procedures shall be done in accordance with the requirements and standards contained in Chapter 6 of ICAO Doc 9829 and Section 7 of ICAO Doc 8168.

(d) The factors to be taken into consideration in the development of appropriate aircraft operating procedures for noise abatement shall include the following –

(i) the nature and extent of the noise problem including: the location of noise-sensitive areas; and critical hours;

(ii) the types of aircraft affected, including aircraft mass, aerodrome elevation, temperature considerations;
(iii) the types of procedures likely to be most affective;
(iv) obstacle clearances (PANS-OPS -ICAO Doc 8168), Volumes I and II; and
(v) human performance in the application of the operating procedures.

(e) Land-use planning and management are the responsibility of national and/or local planning authorities. Guidance material which shall be used to assist planning authorities in taking appropriate measures to ensure compatible land-use management around airports to the benefit of both the airport and the surrounding communities is contained in the ICAO Doc 9184- Airport Planning Manual, Part 2.

(4) **Noise Violations**

The noise violations referred to in CAR 139.02.**[22]** 23 shall be reported to the Director in accordance with form CA139-11, available on the SACAA website.

139.02.26 Aerodrome inspection programme

3. The aerodrome inspection programme which apply in respect of the physical characteristics, visual aids, obstacle limitations surfaces provided at an aerodrome shall be in accordance with the requirements as contained in the latest editions of the following Annexes and documents to the Convention on International Civil Aviation - Annex 14 'Aerodromes', Volume I 'Aerodrome Design and Operations', Airport services manuals. TGM is available on www.caa.co.za/airports and may be used as guidance

139.02.31 ACCESS OF GROUND VEHICLES TO AERODROME MOVEMENT AREA

1. Signs, signals or standards

(a) The signs, signals and standards prescribed in Chapter IX of the National Road Traffic Regulations, 2000, apply with the changes required by the context to the use of all surface roads in the aerodrome movement area.

2. Rules and procedures for the operation of ground vehicles

(1) The rules and procedures for the vehicles operating on the aerodrome movement area are the rules and procedures prescribed in Chapter X

of the National Road Traffic Regulations, 2000, as amended.

(2) The mechanism and sanction to ensure compliance with the rules and procedures for the operation of ground vehicles in the aerodrome movement area is the mechanism and sanction prescribed in section 56 of the Criminal Procedure Act, 1977.

(3) The holder of an aerodrome licence shall appoint a person to effectively administer vehicle control within the aerodrome movement area.

(4) Vehicles operating on the movement area shall be equipped with appropriate radio equipment to be able communicate with all appropriate authorities and maintained in a fully serviceable condition.

(5) The aerodrome operator shall make provision for ATSU in its responsibility for control of vehicles on the manoeuvring area, in particular, action shall be taken to ensure –

(a) a system of vehicle permits is established and only authorised vehicles permitted on the manoeuvring area;

(b) Radio equipment is provided on vehicles and is maintained in a fully serviceable condition;

(c) drivers are fully conversant with:

(i) Radiotelephony procedures;

(ii) terms and phrases used in air traffic control, including the phonetic alphabet;

(iii) the meaning of visual signals on the aerodrome, with particular emphasis on those intended to prevent infringement of active runways;

(iv) the topography of the aerodrome;

(v) the "rules of the road" relating to vehicles and aircraft; and

(vi) the need to avoid infringement of the restricted areas associated with radio navigation facilities; and

(vii) Vehicles are fitted with appropriate obstacle marking and lighting.

(d) the aerodrome operator shall –

(i) Monitor vehicular traffic movement on the apron in order to reduce to a minimum the risk of aircraft / vehicle conflict and to promote the safety of pedestrians and to achieve efficient traffic flows.

(ii) All vehicle used on the apron areas shall display an airside vehicle permit.

139.02.34 APPROVAL OF AIRSIDE DRIVING TRAINING

(1) The holder of an aerodrome licence category 4 and above shall establish a training manual and submit two complete copies thereof along with a list of effective pages for approval by the Director.

(2) A holder of an aerodrome licence category 4 and above may outsource airside driving training to another organisation provided they meet the following criteria–

(a) the training organisation is the holder of a valid ATO certificate issued in terms of Part 141;
(b) the training organisation submit two complete copies of its training manuals for approval by the Director;
(c) the training organisation conduct the training in accordance with the training standards prescribed in Part 141.
(d) the holder of an aerodrome licence shall ensure that training records are easily retrieved from an outsourced training organisation.
(e) The holder of an aerodrome licence shall ensure that a service level agreement is in place with the training organisation and institute a programme of inspections, as part of its safety management system, to ensure that agreed training standards are being maintained.

139.02.35 AIRSIDE VEHICLE DRIVING TRAINING STANDARDS

1. The training manual for aerodromes category 4 shall include -

(1) Criteria

(a) Driving personnel shall be in possession of a valid driver's license, medical fitness certificate and are able to demonstrate language proficiency.
(b) Drivers expected to operate on the airside shall have successfully completed the aerodrome airside induction training as a pre-requisite.

(2) Delivery method

(a) The training shall cover the theory content and practical exercises in the classroom using interactive media.
(b) Aerodrome familiarisation and application of techniques shall take place, under supervision, in the aerodrome environment.

(3) Validity

Airside vehicle driving training shall be valid for period of 2 years unless there is significant change to the movement areas.

(4) Length of training

Initial airside driver training shall be covered over a period of minimum two days and refresher training shall be conducted over minimum one day.

(5) Training content shall address the following topics -

(a) Legal requirements

(i) National Road Traffic Act,1996(Act No 93 of 1996);
(ii) Occupational Health and Safety,1993(Act No.85 of 1993);
(iii) Part 139 of the Regulations (Aerodromes and Heliports);
(iv) ATC procedures related to vehicles on rights of way, ICAO Doc 4444;
(v) Aerodrome safety instructions for airside vehicle operations;
(vi) Airside vehicle driving permit requirements;
(vii) Airport conditions of use relating to airside driving; and
(viii) Part 140 Safety Management System.

(b) The role of:

(i) Civil Aviation Authority (CAA);
(ii) Aerodrome licence holder;
(iii) South African Police Services (SAPS) and their involvement with airside driving; and
(iv) other enforcement authorities dealing with vehicles, driving, health and safety.

(c) Aerodrome layout

(i) Topography of the local aerodrome;
(ii) Surface markings and signs (for both vehicles and aircraft);
(iii) Prohibited areas;
(iv) Speed limits;
(v) Aviation terminology used such as taxiway, apron, roads, crossings etc.;
(vi) Parking areas, restrictions and hot spots.

(d) Personal responsibilities

(i) minimum medical fitness to drive (including, eyesight, colour perception and hearing);
(ii) personal Protective Equipment (PPE) – (including, hearing, foot, high

visibility clothing);
(iii) driving around aircraft stands;
(iv) how to alert a pilot to a danger or emergency stop;
(v) no smoking and other hazardous activities;
(vi) responsibilities of drivers with respect to avoiding collisions;
(vii) no-smoking/no-drinking requirements airside;
(viii) responsibilities with respect to foreign object debris and fuel/oil spillage; and
(ix) precaution when driving at night, in low visibility and adverse weather.

(e) Vehicle standards

(i) condition and maintenance standards;
(ii) display obstruction lights and company insignia;
(iii) requirement for daily vehicle inspections;
(iv) vehicle fault reporting and rectification; and
(v) issue and display of airside vehicle permits.

(f) Hazards of general airside driving

(i) danger zones around aircraft;
(ii) speed limits;
(iii) engine suction/ingestion, jet blast, propellers and helicopters;
(iv) fueling of aircraft;
(v) foreign object debris and spillages;
(vi) vehicle reversing and towing;
(vii) staff and passengers walking across aprons;
(viii) air bridges and other services such as fixed electrical ground power;
(ix) the general aircraft turnaround process;
(x) aircraft emergency stop and fuel cut-off procedures; and
(xi) hazardous cargo;

(g) Emergency procedures

(i) action in the event of an aircraft accident/incident;
(ii) action to be taken in the event of vehicle accident;
(iii) action to be taken in the event of a vehicle striking an aircraft;
(iv) action to be taken in the event of fire;
(v) action to be taken in the event of personal injury; and
(vi) reporting procedures

(h) Security procedures

(i) Permit requirements.

(ii) Vehicle security permits.
(iii) Security restricted zones.
(iv) Security control zones.

(i) Communication

(i) Light signal and their use; and
(ii) Basic radio communication procedure.

(j) Penalties for non-compliance

Penalties and driving offence procedures;

(k) Practical training (visual familiarization)

(i) airside service roads, taxiway crossings and restrictions during low visibility;
(ii) aprons and stands;
(iii) surface paint markings for vehicles and aircraft;
(iv) surface paint markings that delineate the boundary between aprons and taxiways;
(v) signs, markings and lighting used on the taxiway that indicate the runways ahead; parking areas and restrictions;
(vi) speed limits signs; and
(vii) hazards during aircraft turnarounds and aircraft movements.

2. Manoeuvring area vehicle driver and Radiotelephony (RTF) training

(1) The number of drivers permitted to drive on the manoeuvring area shall be kept to the minimum necessary, and the functions they perform shall be within the following areas of responsibility:

(i) runway inspections;
(ii) bird control;
(iii) fescue and firefighting;
(iv) essential maintenance and engineering;
(v) ATC; and
(vi) airline or handling agent for aircraft towing and runway crossings.

(2) Criteria

(a) Driving personnel shall provide the aerodrome operator with a letter from their organisation that their job requires access to the manoeuvring area including the runway during operational hours.
(b) Drivers expected to operate on the manoeuvring area of an aerodrome shall have successfully completed the airside vehicle driving training as prescribed

in this part.

(c) Drivers expected to drive on the manoeuvring area shall also obtain a period of 3 months experience in general airside driving before training to operate on the manoeuvring area including the runway.

(3) Delivery method

(a) This training shall consist of two main components, the first comprising of two parts being the classroom theoretical part which shall include the use of prepared presentations, maps, diagrams, videos, booklets and checklists as appropriate; and the practical part as per training content prescribed in section (i).

(b) The second component shall involve supervised practical training and visual familiarization on the aerodrome by a suitably trained person, thereafter a practical assessment shall be completed by an examiner designated by the Authority

(c) The training shall be based on the use of a driver simulator for situational awareness training and hazard identification, under practical mentored instruction.

(4) Validity

Manoeuvring area vehicle driver and Radiotelephony (RTF) training shall valid for period of 2 years.

(5) Duration of training

Radiotelephony (RTF) training shall be covered over a minimum period of 2 days and refresher training shall be conducted over minimum of 1 day.

(6) Training content shall address the following topics:

(a) Legal requirements

(i) ATC Rules, rights of way of aircraft ICAO Doc 4444;
(ii) definitions of movement area, manoeuvring area, aprons, stands; and
(iii) methods used to disseminate information regarding works in progress.

(b) Air Traffic Control

(i) function of aerodrome control and its area of responsibility;
(ii) function of ground movement control and its area of responsibility;
(iii) normal and Emergency procedures used by ATC relating to aircraft;
(iv) ATC frequencies used and normal hand over/ transfer points for

vehicles;

(v) ATC call signs, vehicle call signs, phonetic alphabet, standard phraseology;

(vi) demarcation of responsibilities between ATC and Apron Control if applicable.

(c) Personal responsibilities

(i) minimum medical fitness to drive (including, eyesight, colour perception and hearing);

(ii) personal Protective Equipment (PPE) – (including, hearing, foot, high visibility clothing);

(iii) driving standards;

(iv) no smoking and other hazardous activities;

(v) responsibilities of drivers with respect to avoiding collisions;

(vi) responsibilities with respect to FOD, fuel or oil spillages;and

(vii) responsibility with respect to escorting other vehicles on the manoeuvring area

(d) Vehicle Standards

(i) condition and standard to ensure the vehicle used for the purpose and task;

(ii) requirements to display obstruction lights and company insignia, including reflective markings;

(iii) requirements for daily vehicle inspections prior to operating on the manoeuvring area;

(iv) attention to the display of obstruction and general lights; and

(v) serviceability of all essential communications systems with ATC and base operations.

(e) Aerodrome layout

(i) signs, markings and lighting used on the manoeuvring area;

(ii) signs, markings and lighting used to protect the runway;

(iii) description of equipment essential to air navigation such as instrument landing systems (ILS);

(iv) description of protected zones related to ILS antenna;

(v) description of ILS protected areas and their relation to runway-holding points;

(vi) description of runway instrument/visual strip, cleared and graded area; and

(vii) description of lighting used on the manoeuvring area.

(f) Hazards of manoeuvring area driving

(i) engine suction/ingestion and blast, vortex, propellers, and helicopter operations;
(ii) operations in low visibility and other adverse weather conditions;
(iii) procedures in the event of a vehicle or radio becoming unserviceable while on the manoeuvring area;
(iv) right of way of aircraft, towed aircraft and rescue; and
(v) firefighting vehicles in an emergency.

(g) Emergency procedures
(i) actions to be taken in the event of a vehicle accident/incident;
(ii) actions to be taken in the event of an aircraft accident/incident;
(iii) actions to be taken if foreign object debris found on runways and taxiways;
(iv) procedures to be used by vehicle drivers if lost or unsure of their position; and
(v) aerodrome emergency telephone numbers.

(h) Aircraft familiarisation
(i) knowledge of aircraft types operating at the aerodrome;
(ii) knowledge of airline call signs, including insignia;
(iii) knowledge of aircraft terminology relating to engines, fuselage, control surfaces, undercarriage, lights, vents, etc.

(i) Practical training (visual familiarisation)
(i) runways (including access and exit routes), holding areas, taxiways and aprons;
(ii) signs, surface markings and lighting associated with runways, holding positions, CAT I, II and III operations;
(iii) all signs, surface markings and lighting associated with taxiways;
(iv) markings that demarcate the boundary between aprons and manoeuvring areas;
(v) navigation aids such as ILS, protected area, antenna, RVR equipment and other meteorological equipment;
(vi) hazards of operating around aircraft landing, taking off or taxiing; and

(7). Radiotelephony (RTF) Training

(1) The movement of vehicles on the manoeuvring area is subject to authorisation by ATC.

(2) All vehicles that operate on the runway shall be fitted with the appropriate radio communication frequencies.

(3) Drivers of vehicles operating on the manoeuvring area shall display a high degree of competence in their use of RTF phraseology and aviation English.

(8). Radiotelephony training shall address the topics –

(a) Hierarchy of message priority
Message priorities, an understanding of distress, alerting, control and information messages.

(b) Phonetic alphabet
Correct pronunciation of letters, words and numbers.

(c) Standard phraseology

(i) Emphasis on the need for drivers to use standard phraseology; and
(ii) The need for caution with certain phrases such as "cleared" and "go ahead".

(d) Call signs for aircraft, ATC and vehicles

(i) Understanding the terminology and acronyms used by ATC and pilots;
(ii) Knowledge of airline and vehicle call signs used at the aerodrome.

(e) Read back procedures

The need for vehicle drivers to use standard read back, in the same manner as pilots, for instructions such as "enter/cross the runway", and if conditional clearances are used.

(f) Readability scale

Understanding and use of the readability scale from 1 to 5.

(g) Lost or uncertain of position

Procedures for vehicle drivers lost or uncertain of their position on the manoeuvring area.

(h) Vehicle breakdown

Local procedure for vehicle breakdown on runways and taxiways; and procedures for for notifying ATC of vehicle failure.

(i) Radio failure

(i) Understanding of the local procedure if radio failure occurs while on the runway or taxiway; and
(ii) understanding the light signals that can be used by ATC to pass instructions to vehicles.

(j) Transmitting techniques and use of RTF

(i) Understanding the reasons for listening out prior to transmitting;
(ii) use of standard phraseology and aviation English;
(iii) words and sounds to be avoided;
(iv) correct positioning of microphones to avoid voice distortion;
(v) avoidance of "clipped" transmissions;
(vi) awareness of regional accents and variations of speech; and
(vii) speed of delivery of RTF phraseology.

(k) Portable radios

(i) correct use of radios;
(ii) effective range and battery life;
(iii) screening/shielding effects on the aerodrome; and
(iv) use of correct call signs, either related to a vehicle or a person.

(l) Safety requirements while using radios

(i) Instructions regarding the use of portable radios and hand-held microphones while driving a vehicle; and
(ii) Instructions on the use of mobile telephones while operating airside.

(m) Assessments

(a) The aerodrome operator or outsourced training organisation shall ensure that processes are in place to ensure that designated examiners -

(i) are technically competent in meeting the regulatory training standards;
(ii) can demonstrate they can assess candidates as competent in the prescribed training.

3. Maintenance of competence for drivers in the manoeuvring areas

(1) In order to improve and maintain safety in the aircraft manoeuvring areas, all personnel required to drive shall be in possession of an airside vehicle operator's permit which shall display the following information:

(a) name of the driver;
(b) company name;
(c) driver's permit number;
(d) type of training provided to the driver;
(e) an approved ATO; and;
(f) competency period.

(2) Following the initial training and issuance of the permit, all drivers of vehicles and operators of equipment shall demonstrate competence at regular periods throughout the term of the permit.

(3) Records of competence tracking shall be kept and made available for audit purposes by the aerodrome safety management team and Authority inspectors. Templates for record of competence tracking that shall be used by the drivers of vehicles and operators of equipment are shown on table 1,2 and 3.

(4) Failure to comply may lead to the driving permit being revoked, shall a permit be revoked, reinstatement shall only be granted following attendance on a refresher course and successful completion of the set examination.

Items A to D are required to be checked/undertaken on a 3-monthly basis

A. Turnaround procedures (compliant with current airport safety documentation)

B. Towing – Apron (compliant with current airport safety documentation)

C. Radio Telephony (compliant with current airport safety documentation).

D. Current with airside safety operations instructions.

Items E to F are required to be checked/undertaken on a 6-monthly basis

E. Towing – Airfield (compliant with current airport safety documentation).

F. Airfield layout (compliant with the latest changes).

Items G to I are required to be checked/undertaken on a 12-monthly basis

G. General Airside Driving (compliant with current airport safety documentation)

H. Vehicle Type Check (compliant with current airport safety documentation)

I. Table Top discussion (to include items A to I)

Table 1. Maintenance of Competence for Airside Vehicle Drivers

Maintenance of Competence for Drivers in the Manoeuvring Area																
Jan-Dec		Freq		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Subject																
A	Turnaround Procedures	3 Months	Date/Initials												
			Performance condition												
B	Towing on APRON	3 Months	Date/Initials												
			Performance condition												
C	Radio Telephony	3 Months	Date/Initials												
			Performance condition												
D	Currency Safety Doc	3 Months	Date/Initials												
			Performance condition												
E	Towing on AIRFIELD	6 Months	Date/Initials												
			Performance condition												
F	Airfield Layout	6 Months	Date/Initials												
			Performance condition												

Table 2. Maintenance of Competence for Drivers in the Manoeuvring Area

Maintenance of Competence for Drivers in the Manoeuvring Area															
Jan-Dec		Freq		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Subject															
G	General Airside Driving	12 Months	Date/Initials												
			Performance condition												
H	Vehicle Type Check	12 Months	Date/Initials												
			Performance condition												

Table 3 Maintenance of Competence for Drivers on the Runway

Maintenance of Competence for Drivers on the Runway															
Jan-Dec		Freq		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Subject															
A	Turnaround Procedures	3 Months	Date/Initials												
			Performance condition												
B	Towing	3	Date/Initials												

	APRON	**Months**	Performance condition										
C	**Radio Telephony**	**3 Months**	Date/Initials										
			Performance condition										

(e) insertion after technical standard 139.3 29 of the following technical standard:

"139.06.3 REGISTRATION, DE-REGISTRATION OR RE-REGISTRATION OF AERODROME

1. Process of registration

(1) The owner of an unlicensed aerodrome, whether temporary or permanent, shall register the aerodrome in the Authority website.

(2) In the registration process, the owner shall provide the Director with the address, location, type of aircraft operations envisaged and the name of the owner as well as any obstacles that may pose a safety hazard to users of the aerodrome for purposes of publication by the Director.

(3) The owner shall submit an online confirmation annually to the Director, that the aerodrome exists and whether there is a change in details or status of the aerodrome. The process of Registration shall be completed on the Authority website at www.sacaa.co.za, where owners shall initiate, renew or cancel the registration on the appropriately marked form.

(4) Transitional Arrangements: All existing aerodromes that resort under this category shall be registered in accordance with this part within one year of date of publication.

AMENDMENT OF TECHNICAL STANDARD 171

7. Technical Standard 171 is hereby amended section 1 by –

(a) insertion in section 1 before the definition of "technical safeguarding" of the following definitions:

1. Definitions

"accuracy" in relation to a radio navigation service or facility means the degree to which the value measured or displayed by the service or facility conforms to the true value.

"availability" for a telecommunication service, radio navigation service or support service means the percentage of its operating hours that the service is not interrupted.

"configuration" in relation to:

(a) a telecommunication or radio navigation service — means the configuration of each facility and any interconnection between facilities that make up the service; and

(b) a facility — means the configuration of equipment, hardware, software and data, and the interconnections between equipment.

"coverage" in relation to a telecommunication or radio navigation service, means the volume of airspace in which, or the locations between which, the service is nominally provided.

"facility" means one or more items of equipment, at one or more locations, that provide an aeronautical telecommunication or radio navigation service.

"functional specification" for a telecommunication service, a radio navigation service or a support service, is a general description of the service, its operating principles and its functions.

"integrity" in relation to a telecommunication service, a radio navigation service or a support service:

(a) means the likelihood that the information supplied by the service at a particular moment is correct; and

(b) includes the ability of the service to warn users promptly when the service shall not be used.

"operating hours" for a telecommunication or radio navigation service, means the times during which the service provider shall, under its approval, operate the service.

"parametres" is an element of a system that is useful, or critical, when identifying the system, or when evaluating its performance, status and condition.

"recovery time" means the period during which a service is interrupted.

"reliability" of a telecommunication service, a radio navigation service or a support service, means the probability that the service shall perform its function or functions without failure for a specified period.".

(b) It is hereby proposed to amend technical standard 171.02.1 by the addition after section 1 of the following section:

"(2) Additional requirements Category F rating

In addition to the requirements prescribed in section 1, the manual of procedure of an applicant for a Category F rating shall contain:

(a) procedures for notifying the aeronautical telecommunication service provider of proposed equipment changes and modifications or change of aircraft type;
(b) details of the aircraft which the ESO uses for flight inspection;
(c) functional description, technical specification and manufacturer's type number for all major items of the flight inspection system. This shall include details of the equipment used for calibrating the system;
(d) location, characteristic and type of all measurement aerials on the aircraft;
(e) technical description of any parts of the system which the applicant has designed or built;
(f) the design authority for all equipment;
(g) details of a log or record system for faults and maintenance of the measuring system;
(h) a typical or test flight inspection report;
(i) a typical or test sample structure measurement for those navigational aids where structure measurements form part of a normal flight inspection;
(j) a statement showing 95% confidence, the measurement uncertainty which the ESO claims to achieve for each of the measurable parameters;
(k) details of statistical methods or interpolative techniques which may be applied;
(l) details of any operating certificates held in respect of aircraft operations;
(m) procedures for the control of sub-contractors; and
(n) a statement of compliance with the flight inspection requirements of this section.

(b) insertion after technical standard 171.02.1 of the following technical standard-:

"171.02.5 EQUIPMENT, TOOLS AND MATERIAL

1. Equipment relating to Category F rating

The equipment referred to in CAR 171.02.5 is as follows:

(a) Aircraft

(i) An aircraft shall be appropriate for the purpose of flight inspection and be operated in a way which ensures accurate measurement of all parameters.

(ii) The aircraft shall be a multi-engine type capable of safe flight within the intended operational envelope with one engine inoperative, fully equipped and instrumented for night instrument flight.

(iii) The aircraft shall be managed by two flying crew members.

(iv) A cross-wind limit shall be set which allows measurement accuracies to be within the limits required. This limit shall be shown in the operating instructions;

(v) An aircraft shall have a stable electrical system with sufficient capacity to operate the additional electronic and recording equipment.

(vi) An aircraft shall be fitted with an electrical load sharing and safety circuit.

(vii) The FIS shall only be powered up inflight when:

(aa) the aircraft has both engine generators operating;

(bb) the aircraft cabin pressure is below 10 000 feet; and

(cc) the propeller modulation is at an acceptably low level.

(b) Flight inspection equipment

(i) Flight inspection of navigation equipment shall verify that all parameters of the navigation equipment meet the requirements prescribed in CAR 171.03.13. The FIS and support equipment integrated in the aircraft shall be capable of measuring all these parameters.

(ii) The build state and installation of the FIS shall be approved and certified to the applicable FAA FAR/EASA regulations for the specific aircraft model. This shall include producing an approved AFMS that contains all addition modifications to the aircraft, in order to accommodate the FIS integration.

(iii) The flight inspection equipment shall not interfere with the operation or accuracy of the aircraft's normal navigation and general avionics equipment.

(iv) The flight inspection measurements shall be adequately protected against the prevailing electromagnetic environment effects internal or external to the aircraft. Abnormal interference effects shall be clearly identified on the inspection results.

(v) The FIS shall have the facility for listening to the identity modulation of the navigation aid being inspected.

(vi) The FIS shall include equipment which can determine and record the aircraft's position in space relative to a fixed reference point. The uncertainty of measurement shall be commensurate with the parameter being inspected.

(vii) The FIS shall include equipment which can record the measured parameters of the navigation aid being inspected.

(viii) All recordings shall be marked so that they can be correlated with the aircraft's position at the time of the measurement.

(ix) All software shall be subjected to a software quality control procedure to ensure that all software products utilized by the FIS meet its flight inspection quality and safety objectives.

(x) Aerials shall be positioned in such a manner that they are not obscured from the signal during any normal inspection flight profiles.

(xi) All aerials to be used for tracked structure measurements shall be positioned with due regard to the tracking reference on the aircraft. If the aerials and the reference are not in close proximity, this error shall be addressed in the measurement uncertainty calculations and in setting the operational crosswind limit. Alternatively, the errors may be corrected using information from the aircraft's attitude sensors and data concerning movement of the aerial's phase center.

(c) insertion in Technical Standard 171 03.6 after subsection (4) of the following subsection:

"(5) An ESO who does not have a demonstrable history of flight inspection of navigation equipment shall provide a practical test transmission capability. The tests shall be in two parts and the ESO may be required to perform either or both of the following parts:

(a) Demonstration of position fixing accuracy: This shall be evaluated on an established test range. The precise details of this trial cannot be defined until details of the ESO's systems are known;

(b) Demonstration of overall system performance: For this trial the ESO shall make a simulated commissioning inspection of the selected navigational aid. The trial may require several similar flight profiles to be flown to demonstrate the repeatability of measured results.".

(d) insertion after technical standard 171.03.13 (1) of the following subsections-

"(2) General FIS Measurement of uncertainty

(a) The measurement uncertainty for any parameter shall be small compared with the operational limits for that parameter.

(b) The measurement uncertainty to 95% probability shall be calculated for each of the parameters to be measured. The method of calculation and any assumptions made shall be clearly shown.

(c) Many measurements are a combination of receiver output and aircraft position. In these cases the figure required is the sum of all the errors involved in the measurement, including aircraft position.

(d) For measurements which can only be derived from recordings, the accuracy and resolution of the recording equipment shall be included in calculating the expected measurement uncertainty.

(e) When modifications are made which shall affect the uncertainty of measurement of any parameter, new calculations shall be submitted.

(f) Any uncertainties shall be maintained under the specified environmental conditions for a flight inspection procedure. The operator shall define the environmental conditions.

(g) Details of measurement uncertainty with respect to temperature shall be available for all the measuring equipment. This may be in the form of test results made by the operator, or manufacturer's specifications. If manufacturer's specifications are quoted, the flight inspection service provider shall be prepared to produce manufacturer's test results as evidence.

(h) If the measuring equipment requires any warm-up or cooling time, this shall be clearly indicated in the operating instructions.

(i) The accuracy of marking shall be commensurate with the accuracy required in the final figure. Specific requirements are given in the appropriate sub-section of this technical standard.

(3) Inspection procedures and standards

(a) All measuring equipment used for flight inspection shall be calibrated to defined standards.

(b) Clearly defined inspection procedures shall be applied to all equipment involved in the measurement of the various parameters. All equipment and standards used in the inspection process shall conform to SANAS and International Standards.

(c) When any equipment used is claimed to be self-calibrating, the internal processes involved shall be clearly defined. This involves showing how the equipment's internal standard is applied to each of the parameters which it can measure or generate. The internal standard shall have traceability to SANAS and International Standards.

(d) Details of inspection intervals required shall be contained in the inspection records. The ESO shall be prepared to produce evidence in support of the quoted inspection intervals.

(4) Operating instructions

(a) The operating instructions shall ensure that all measurements are made to defined and documented procedures.

(b) This documentation shall include concise details of-

(i) the flight profile to be used for each individual measurement;
(ii) pre-flight inspection of measuring equipment;
(iii) siting of any necessary ground tracking or position fixing equipment;
(iv) scheduled maintenance and inspection of the measuring equipment;
(v) operation of the measuring equipment;
(vi) production of the flight inspection report;
(vii) certification; and
(viii) the method of calculating any results which are not directly output by the measuring equipment.

(5) Flight inspection report

(a) The flight inspection report shall clearly and accurately document the measured performance of a navigational equipment.

(b) All flight inspection results shall be documented to a report format acceptable to the Director. The minimum information to be provided on the report shall be-

(i) station name and facility designation;
(ii) category of operation;
(iii) date of inspection and certificate expiry date;
(iv) serial number of report;
(v) type of inspection;

(vi) aircraft registration;
(vii) manufacturer and type of system being inspected;
(viii) names and functions of all personnel involved in the inspection;
(ix) results of all measurements made;
(x) method of making each measurement (where alternatives are available). These may be referenced to the operating instructions;
(xi) details of associated attachments and recordings;
(xii) details of extra flights made necessary by system adjustments;
(xiii) comments by the navigation aid inspector/equipment operator;
(xiv) details of any immediately notifiable deficiencies;
(xv) statement of conformance/non-conformance;
(xvi) navigation aid inspector's signature; and
(xvii) signature of the individual who is legally responsible.

(6) Records and graphs

(a) Records and graphs shall be produced in a manner which ensures that system parameters are accurately deduced from them.
(b) If recordings or graphs are used to derive figures for the inspection report, the scales shall be commensurate with the permitted measurement uncertainty limits.

Note: *If the recordings or graphs are only used to show that results are within designated tolerances, they may be presented on a reduced scale.*

(c) The data from which these recordings and graphs are made shall be stored with sufficient accuracy that expanded scale plots can be provided on demand.
(d) For flights where parameters are evaluated by comparison of the received signal and the output of a tracking device, only the final result need be presented for a normal inspection unless other data has been requested by the aeronautical telecommunication service provider. Position data and raw signal data shall be recorded or stored and provided on demand.
(e) The minimum identification on each record and graph shall include the following:
    (i) date and time;
    (ii) description of type of flight;
    (iii) transmitter number;
    (iv) facility under inspection; and
    (v) designation of facility being inspected.
(f) The following meteorological conditions shall be recorded at beginning of the flight for the facility under inspection-
    (i) wind conditions;
    (ii) outside temperature;
    (iii) cabin temperature;

(iv) visibility;
(v) cloud ceiling;
(vi) ground status i.e. wet or dry;
(vi) QNH

(g) The ESO shall provide for approval, details of the arrangements to be made for archiving data from flight inspection results.

(7) Flight check of instrument landing systems (ILS).

(a) General

This section sets out requirements for flight inspection service operators relating to the flight checking of ILS.

(b) Aircraft

Flight control based on the operations manual, using only the mandatory navigation instruments is not considered sufficiently accurate for inspection of the following types of ILS-

(i) Category III systems.
(ii) Category II systems.
(iii) Category I systems, which the operator wishes to use for auto land in good visibility.

(c) For inspection of the above systems the aircraft shall be fitted with equipment which shall provide repeatable following of the required path.

Note: Systems considered suitable to this purpose include telemetry of the ground based tracking system's output to a separate instrument in the aircraft, or an autopilot.

(d) If an autopilot is used the Authority shall be satisfied that it is capable of safe operation down to 50 feet above the threshold elevation.

(8) Flight inspection System

(a) The ILS/DME inspection system shall be capable of measuring and recording the following parameters-

(i) Localizer Field Strength;
(ii) Localizer Modulation Sum (SDM);
(iii) Localizer Difference in Depth of Modulation (DDM);
(iv) Glide Path Field strength;
(v) Glide Path Modulation Sum (SDM);
(vi) Glide Path Difference in Depth of Modulation (DDM);
(vii) Marker Beacon Field strength;
(ix) Marker Beacon Fly-through Time;
(x) DME Field strength;
(xi) DME Distance; and

(xii) Height above the facility under inspection.

(b) The recording equipment shall be capable of recording any of the ILS parameters listed in paragraph (a)

(c) The equipment shall measure and record course structure by comparison of tracking data and the ILS signal, from a distance of at least 10 NM from the runway threshold.

(d) It shall be possible to annotate the recordings with comments and any other necessary information at the time of making the recording.

(e) For course structure bend and scalloping measurements, the total time constant of the measuring and recording equipment shall be equal or greater than 92.6/V seconds where V is the aircraft velocity in kilometers per hour

(f) If digital sampling/storage is used, the sampling rate shall be compatible with this time constant but never less than 4 samples per second for all parameters which are continuously measured.

(g) The equipment shall be capable of recording a minimum of 4 parameters simultaneously.

(9) ILS Measurement of uncertainty

(g) Maximum permitted measurement uncertainty at 95% confidence level is prescribed as follows-

Note: Throughout the following tables, the figure of 2dB for field strength is the permitted uncertainty for repeatability of measurement. It is not a requirement for absolute field strength measurement.

(i) Localizer. As per Table 1:

Table 1: Localizer Measurement Uncertainty Limits

	Cat I	Cat II	Cat III
Alignment (average) (related to threshold)	2.0m	1.0m	0.7m
Displacement sensitivity (of the actual figure)	±3μA	±3μA	±2μA
Field strength (relative)	±3dB	±3dB	±3dB
Off course clearance	±5μA	±5μA	±5μA
Course structure Outer limits of coverage to ILS Point A	±6μA	±6μA	±6μA
Course structure ILS Point A to threshold	3μA	2μA	1μA
Modulation sum (absolute mod depth)	0.5%	0.5%	0.5%

Polarisation	±1μA	±1μA	±1μA
Modulation balance (CSB)	±1μA	±1μA	±1μA

(ii) Glide Path. As per Table 2:

Table 2: Glide Path Measurement Uncertainty Limits

	(a) Cat I	(b) Cat II	(c) Cat III
Angle (of the glide path angle)	0.75%	0.5%	0.3%
Displacement sensitivity (of the actual figure)	2.5%	2.0%	1.5%
Field strength (relative)	3dB	3dB	3dB
Clearance (for a nominal 190μA input)	±6μA	±6μA	±6μA
Course structure	3μA	2μA	2μA
Modulation sum	0.5%	0.5%	0.5%
Modulation balance (CSB)	±1μA	±1μA	±1μA

(iii) Associated DME:
- (aa) Field strength (relative) 2dB;
- (bb) Distance 60 meters at threshold and point A

(iv) Uncertainty of position marking of flight inspection data:
- (aa) Approach towards a facility:
  - (i) ±0.1 NM for markings at each nautical mile;
  - (ii) ±0.1 NM for marking at ILS point A;
  - (iii) ±0.05 NM for marking at ILS point B;
  - (iv) ±0.1° for marking glide path slice at 1.75 x (glide path angle);
  - (v) ±20 meters for marking the threshold crossing.
- (bb) Orbital flights:
  - (i) ±1.5 Degree.

***Note:** A marking accuracy of ±1.5° applies to clearance and coverage inspection, it is not sufficient for measuring displacement sensitivity.*

(b) Records and graphs

(i) Where chart recordings are used for parameter evaluation, they shall have sufficient resolution for this purpose. The minimum requirements are given below-

(aa) Structure stability recordings (deviation current)

(i) Localizer. minimum sensitivity of 1 mm per μA.

(ii) Glide path. minimum sensitivity of 0.5 mm per μA.

(bb) Structure measurements (corrected recordings)

(i) Localizer. minimum sensitivity of 1mm per μA.

(ii) Glide Path. minimum sensitivity of 0.5mm per μA for the initial part of the recording. For category II & III systems, it shall be possible to show the signal characteristic down to threshold crossing. This may require reduced sensitivity depending on available chart width.

(cc) Other measurements:

Many other recordings shall need sensitivity changes during the recording to obtain optimum resolution at all times. The chart produced shall be capable of displaying at least 450 μA of deflection current without saturation. Sufficient different sensitivities of display shall be available to allow signal characteristics to be measured accurately.

(dd) Position annotation: records and graphs shall be annotated to show the position of the aircraft at the time of making the measurement. The minimum requirements are given below:

(i) Approaches towards a facility. Every nautical mile (referenced to 0 NM at the threshold), ILS points A, B & C, Threshold.

(ii) Glide path level flight (on localizer centerline). Every nautical mile (referenced to 0 NM at the threshold).

(ii) Orbital flights. Every 5 degrees

(10) Flight check of VHF omnidirectional radio range (VOR)

(a) General

Note: *This section sets out requirements for ESO relating to the flight checking of VHF omnidirectional radio range (VOR).*

(b) Equipment

(i) The VOR inspection system shall be capable of measuring and recording the following parameters:

(aa) Alignment accuracy;

(bb) Field strength;

(cc) 30Hz modulation depth;

(dd) 9960Hz modulation depth;

(ee) 30Hz FM index;
(ff) VOR radial;
(gg) Azimuth bearing

(ii) It shall be possible to annotate the recordings with comments and any other necessary information at the time of making the recording.

(iii) During orbital flights the system shall be capable of measuring and recording every 5 degrees.

(c) VOR FIS Measurement of uncertainty

(i) Maximum permitted measurement uncertainty at 95% confidence level is given in Table 3:

Table 3: VOR Measurement Uncertainty Limits

Parameter	Measurement
Alignment	0.5^0
Field Strength	3dB
Modulation 30Hz and 9960Hz	1.0%

(11) Records and graphs

(a) Where chart recordings are used for parameter evaluation, they shall have sufficient resolution for this purpose.

(b) Records and graphs shall be annotated to show the position of the aircraft at the time of making the measurement.

(12) Flight Check of non-directional beacon (NDB)

(a) general

Note: *This sets out requirements for ESO relating to the flight checking of NDB.*

(b) Equipment

(i) The NDB inspection system shall be capable of measuring and recording the following parameters-
(aa) accuracy;
(bb) field strength.

(ii) It shall be possible to annotate the recordings with comments and any other necessary information at the time of making the recording.

(iii) During orbital flights the system shall be capable of measuring and recording every 5 degrees.

(c) NDB Measurement of uncertainty

(i) Maximum permitted measurement uncertainty at 95% confidence level is provided in Table 4:

Table 4: NDB Measurement Uncertainty Limits

Parameter	Measurement
Accuracy	2.0°
Field Strength	3dB

(d) Records and graphs

(i) Where chart recordings are used for parameter evaluation, they shall have sufficient resolution for this purpose.

(ii) Records and graphs shall be annotated to show the position of the aircraft at the time of making the measurement". "

INSERTION OF TECHNICAL STANDARD 178

8. Technical Standard 178 is hereby inserted as follows:

"Refer to Appendix A for the SA-CATS 178.

APPENDIX A: SA-CATS 178

SA-CATS 178
Aeronautical Assessment of Aviation Obstacles

CONTENTS

178.01.5 Quality assurance system
1. Minimum requirements

178.01.10 Documents and records
1. Records to be kept
2. Retention period

178.02.1 Operations manual

1. Contents

178.02.3 Minimum requirements for competent persons

1. Minimum qualification and experience
2. Competency assessment requirements

178.02.4 Duties of approval holder

1. Standards and requirements

SUBPART 1: GENERAL

178.01.5 Quality assurance system

1 Minimum requirements

(1) The holder of an aeronautical obstacle assessment certificate shall establish internal quality assurance procedures to ensure compliance and the adequacy of organisational procedures.

(2) The procedures referred to in paragraph (1) shall specify –

(a) the level of quality that the certificate holder intends to achieve;
(b) the level and frequency of internal reviews;
(c) the person or persons responsible for carrying out the internal reviews;
(d) how the findings of the internal reviews are to be recorded and reported to the accountable manager;
(e) how quality indicators such as error reports, incidents, and complaints are incorporated into the internal quality assurance procedures;
(f) the senior person's responsibilities for analysis and overview of the internal reviews;
(g) the means for rectifying any deficiencies found during an internal review; and
(h) the documentation requirements for all aspects of the review.

(3) A senior person who has the responsibility for internal quality assurance shall have direct access to the accountable manager on matters affecting the adequacy, accuracy, timeliness, format, and dissemination of the published aeronautical information.

(4) An organisation which has an approved QMS, may be approved in terms of this Part provided the provisions of subsection (2) are complied with.

178.01.10 Documents and records

1 Records to be kept

(1) The following record shall be retained for the period specified in subsection (2) –

(a) Assessment reports, including -

(i) Electronic design files;

(ii) Source data used in the assessment;

(iii) Supplementary information and data;

(iv) All other information and data relevant to the assessment;

(b) Training records;

2 Retention period

(1) The following record as specified in subsection (1) shall be retained for the period of-

(a) assessment reports – indefinitely; and

(b) training records - 10 years

SUBPART 2:
APPROVAL OF AERONAUTICAL ASSESSMENT OF AVIATION OBSTACLES

178.02.1 Operations manual

1 Contents

(1) The operations manual shall contain –

(a) an organisational chart showing lines of responsibility of the organisation's personnel;

(b) a statement signed by the applicant, or designate, confirming that the operations manual –

(i) demonstrates the means and methods for ensuring on-going compliance with the requirements prescribed in the regulations; and

(ii) that the operations manual shall be complied with at all times;

(c) a copy of the quality management system;

(d) details of the aeronautical obstacle assessment personnel;

(e) a copy of the approved training programme for aeronautical obstacle assessment staff;

(f) a copy of the approved training plan for each aeronautical obstacle assessment staff;

(g) a list of facilities and equipment required by the aeronautical obstacle assessment staff;

(h) a list of reference documentation required by the aeronautical obstacle assessment staff;

(i) procedures to conduct aeronautical obstacle assessments, perform quality assurance checks and submission to the Director for review and approval;

(j) the procedure to liaise with the Director to ascertain correct interpretation and compliance with requirements issued by the Director, and to facilitate liaison between the organisation and the Director.

(k) a copy of the internal inspections procedure; and

(l) the procedure for amending and controlling the contents of the manual of procedure;

178.02.3 Minimum requirements for competent persons

1 Minimum qualification and experience

(1) The minimum requirements for the competent person required by CAR 178.02.3(1) are:

(a) Qualifications: A competent person shall, as a minimum, have -

(i) successfully completed an Aeronautical Obstacle Assessment course, or

(ii) successfully completed a Flight Procedure Design/PANS-OPS course, or;

(iii) sufficient evidence exists that training with regards to assessment of obstacles was attended and satisfactory completed.

(b) Experience: A competent person shall -

(i) have a minimum of 2 years aeronautical obstacle assessment experience.

2 Competency assessment requirements

(1) An applicant shall submit three aeronautical obstacle assessment reports to the Director for review and shall consist of an aeronautical obstacle assessment report each of the following runway types:

(a) Precision Approach Runway

(b) Non-Precision Approach Runway

(c) Non-Instrument Runway

(2) In addition to subparagraph (1) the Director may request:

(a) any additional aeronautical obstacle assessment reports conducted by the applicant to be submitted, and

(b) request additional aeronautical obstacle assessments to be conducted based on requirements specified by the Director.

(3) A successfully pass a theoretical knowledge examination of which the pass mark shall be a minimum of 70%.

(4) A person who fails the theoretical knowledge examination referred to in paragraph (3), may apply for re-assessment after a period of three months have lapsed.

(5) The Director may specify any additional requirements, including remedial training, shall the applicant fail to satisfy the competency requirements defined by the Director.

178.02.4 Duties of approval holder

1 Standards and requirements

(1) An approval holder shall ensure that aeronautical obstacle assessments are conducted and submitted in accordance with -

(a) ICAO Standards and Recommended Practices of Annex 10 and 14;
(b) ICAO Doc 9137 Part 6 and ICAO Doc 8168 Vol 2; and
(c) procedures, standards, instructions, directives, technical guidance material and any other requirements as deemed necessary by the Director, as amended"."